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NOV 30 2009

DEPARTMENT OF
WATER RESOURCES

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Attorney for Lawrence and Kay Hansen

**BEFORE THE DEPARTMENT OF WATER RESOURCES
FOR THE STATE OF IDAHO**

IN THE MATTER OF APPLICATION)	APPLICANT HANSENS' EXCHANGE
FOR PERMIT NO. 63-33064,)	OF INFORMATION INCLUDING
IN THE NAME OF LAWRENCE)	REPORT OF EXPERT WITNESS
HANSEN AND KAY HANSEN)	(ERO RESOURCES)
)	

Applicants Lawrence and Kay Hansen, by and through their attorneys, Beeman & Associates, P.C., and pursuant to the Hearing Officer's November 10, 2009 Order, hereby submit the following information:

1. Copies of documents that the party may offer as exhibits at the hearing.

- Exhibit A - Deficit irrigation practices: watering techniques used to manage water application to the vines.
- Exhibit B - Netafim dripline specifications.
- Exhibit C - Picture of New Holland tractor with in-row and between-row tillers for weed management.
- Exhibit D - Picture of Toro vineyard maintenance vehicle.
- Exhibit E - Pictures of vineyard.
- Exhibit F - Picture of dripline and trellis.
- Exhibit G - Davis Creek Cellars: Customer for Tempranillo grapes for 08 and 09 crops.
- Exhibit H - Indian Creek Winery: Customer for Tempranillo grapes for 08 and 09 crops.
- Exhibit I - Report of expert witness (ERO Resources).

2. A list of persons that may be called as witnesses at the hearing.

Lawrence Hansen – Applicant
Steven R. Hannula - ERO Resources
Protestants present at hearing

Protestants' witnesses at hearing
Public Witnesses

DATED this 30TH day of November 2009.

BEEMAN & ASSOCIATES, P.C.

By Josephine P. Beeman
Josephine P. Beeman

CERTIFICATE OF SERVICE

I certify that on this 30th day of November 2009, I caused to be served a true and correct copy of the foregoing document to be served on the following by hand delivery.

Original to:

IDWR Hearing Officer Shelley W. Keen
P. O. Box 83720
Boise, ID 83720-0098

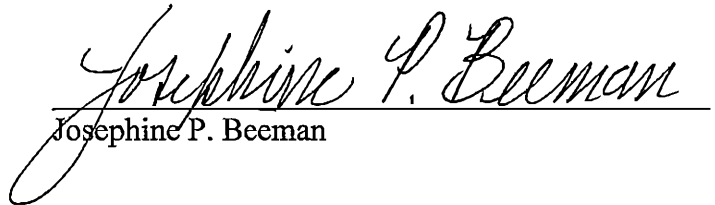
Steve Hannula
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Department of Water Resources

Attorney for Lawrence and Kay Hansen

**BEFORE THE DEPARTMENT OF WATER RESOURCES
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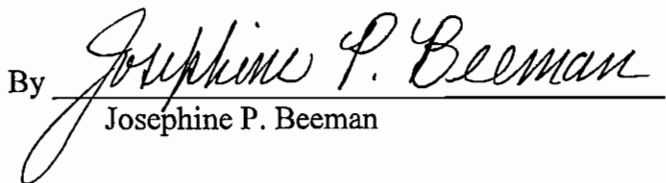
IN THE MATTER OF APPLICATION	)	
FOR PERMIT NO. 63-33064,	)	NOTICE OF APPEARANCE
IN THE NAME OF LAWRENCE	)	(Josephine Beeman for Applicants)
HANSEN AND KAY HANSEN	)	
_____	)	

Josephine P. Beeman of Beeman & Associates, P.C. hereby enters her appearance on behalf of Applicants Lawrence and Kay Hansen. You are requested to serve all future papers and pleadings on her at the address listed hereon.

DATED this 24th day of November 2009.

BEEMAN & ASSOCIATES, P.C.

By


Josephine P. Beeman

CERTIFICATE OF SERVICE

I certify that on this 24th day of November 2009, I caused to be served a true and correct copy of the foregoing document to be served on the following by U.S. Mail.

Original to:

IDWR Hearing Officer Shelley W. Keen
P. O. Box 83720
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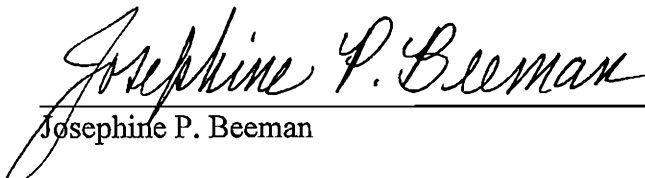
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Josephine P. Beeman

EXHIBIT A

Deficit Irrigation Practices:
Watering Techniques Used to manage Water Application.



Regulated deficit irrigation as a water management strategy in *Vitis vinifera* production

R.L. Wample, Dept. of Viticulture and Enology,
California State University, Fresno, California, United States of America
R. Smithyman, Stimson Lane Vineyards and Estates, Paterson, Washington, United States of America

Summary

An initial six-year study in a commercial vineyard located in the Columbia River Valley of Washington State, United States of America, examined the management practices and potential benefits of regulated deficit irrigation (RDI) on *Vitis vinifera* cv. Sauvignon blanc. The objective of the treatments was to evaluate the effect of deficit irrigation prior to, compared with after, veraison. Each of four irrigation treatments was applied to 1.6 ha and replicated four times for a total 27.0 ha. Irrigation treatments were based on desired soil moisture levels in the top metre of the profile where most of the root system is found. Soil moisture was monitored using a neutron probe and the information was combined with calculations of evaporative demand to determine the irrigation required on a weekly basis. Vine growth, yield, fruit quality and cold hardiness were monitored throughout the study. The results indicated that RDI prior to veraison was effective in controlling shoot growth, as determined by shoot length and elongation rate, as well as pruning weights. Sixteen wine lots, each of approximately 12 000 litres, were prepared each season. Although there was some effect on berry weight, yield was not always significantly reduced. Full irrigation prior to veraison resulted in excessive shoot growth. RDI applied after veraison to vines with large canopies resulted in greater water deficit stress. Fruit quality was increased by pre-veraison RDI compared to post-veraison RDI based on wines made. Regulated deficit irrigation applied at anytime resulted in better early-season lignification of canes and cold hardening of buds. There was a slight improvement in mid-winter cold hardiness of vines subjected to RDI. However, this effect was inconsistent. Studies on Cabernet Sauvignon and White Riesling are underway to confirm these results and to investigate the impact of RDI on fruit quality and winemaking practices.

The introduction of grapevines, especially *Vitis vinifera* cultivars, into new growing regions, has led to an increasing focus on irrigation to maintain or increase vine productivity and fruit quality. Irrigation and the developing strategies for using irrigation as a management tool in winegrape production have been ongoing for at least 20 years. Therefore, an understanding of plant water relations and soil water management is essential to use irrigation successfully to produce consistent yields of high-quality grapes. Effective irrigation management results in better control of plant growth and more efficient and economical crop production. A number of studies examining the effects of decreasing levels of irrigation on vine growth and physiology (Smart and

Coombe, 1983; Mullins, *et al.*, 1992; Williams and Matthews, 1990; Goldberg *et al.*, 1971) have found that drip irrigation resulted in improved WUE based on fruit production and pruning weights per unit of water applied.

In 1972, Peacock *et al.* (1977) compared drip, sprinkler and flood irrigation, and found that drip used less water while achieving good vine vigour, fruit production and quality. However, there was evidence of salt accumulation in a smaller wetted rootzone compared to flood and sprinkler irrigation. In 1985, Bucks *et al.* (1985) reported similar results for the production of table grapes in Arizona. Finally, Araujo *et al.* (1995a, 1995b) found that similar crop production of Thompson Seedless could be achieved with either furrow or drip irrigation. However, they reported a reduction in the nitrogen content of drip irrigated fruit and they found a restricted rootzone associated with daily applications of drip irrigation. This led them to propose the use of drip irrigation to control vine vigour by restricting nitrogen uptake and restricting root volume.

In a study examining the potential benefit of using drip irrigation on Concord vines trained to various trellis systems, Cline *et al.* (1985) found that during dry years in New York, United States of America, drip irrigation improved yields, especially on higher density plantings and with trellis-training systems with higher cropping potential. They found drip to be more compatible than sprinkler irrigation on heavier clay soils with lower infiltration rates. Neja *et al.* (1977) found that timing of irrigation when combined with variations in trellis type resulted in differences in yield and quality of Cabernet Sauvignon grown in the Salinas Valley, California, United States of America. However, their results showed a higher yield with an intermediate level of irrigation when combined with a more elaborate trellis system.

Bravdo and Hepner (1987) showed that drip irrigation was an effective way to apply fertilizer to grapevines with the potential for influencing fruit and must composition. They found a significant response to phosphorus applied through the irrigation system, with higher yields, higher cluster numbers, improved wine sensory characteristics, wine colour and monoterpene levels in the must. They suggested that restriction of the rootzone by irrigation management could be used to control grapevine vigour. Irrigation systems have also had limited success for the application of herbicides (Fourie, 1988).

Irrigation management as a tool for use in the production of grapes has continued to receive attention in many regions of the world. In Australia, the use of regulated deficit irrigation (RDI) has been explored to control vegetative growth and improve the consistency of fruit production and quality (Goodwin and Jerie, 1992). In Spain, Nadal and Arola (1995) reported increased yield, malic and total acidity, and earlier ripening of irrigated Cabernet Sauvignon.

There is a growing need and desire to understand the effects of irrigation (water management) on grapevine growth, development, productivity, and fruit quality. The continued expansion of agriculture, including grape production, into low-rainfall regions compels a response to these issues. Furthermore, increased competition for this increasingly scarce resource will impose greater efficiency in irrigation management practices.

When considering using irrigation management as a tool, it is essential to establish a clear set of goals and to determine where water management may have an impact on them. Possible goals may include controlling vine vigour, preventing occasional water deficit stress, attempting to manage fruit development (berry size), or attempting to alter fruit quality by influencing soluble solids, pH, or titratable acidity. Careful selection of the most appropriate irrigation system for the vineyard site is also a high priority. The irrigation system must match soil type, depth, water holding capacity, infiltration rate, and the effective rooting zone of the vines. This latter point may require detailed knowledge of the cultivar or the rootstock in question. The amount of water available and its cost also demand careful consideration. Vineyards planted on hillsides or rolling terrain are not amenable to furrow or flood irrigation practices. Soils with low infiltration rates and significant slope also present runoff problems for overhead sprinkler systems with high delivery

rates. Drip irrigation can accommodate all of these situations, but has higher initial capital investment costs and generally requires a higher level of management. Additional factors that warrant consideration are water quality, filtration requirements, system automation, and local availability of equipment, supplies, and support. Because of the number of variables involved, growers should contact companies dealing in irrigation design and equipment for recommendations tailored to the vineyard site.

Deciding when and how much to irrigate requires a thorough understanding of the factors that contribute to vine water status and the effects of various water management strategies on grapevine development and productivity. Grapevine water stress develops when the supply of water from the soil through the root system to the growing shoots is less than the evaporative demand. The cause for this imbalance may be: low available soil moisture; a poorly developed, injured, or otherwise restricted root system; unbalanced development of shoot and root systems; and/or high evaporative demand conditions. Salts in the irrigation water or in the soil can also reduce the water available to vines. Extensive trellis systems may contribute to leaf exposure and consequently a higher rate of transpiration than can be supplied by the roots. This latter type of stress is more likely to be transient in nature and less of a concern when adequate soil moisture is available.

The following are some observations and comments regarding the response of grapevines to water stress/management. Some of these statements are supported by research, whereas others are observations that appear to be consistent over several production regions.

Grapevines, especially *Vitis vinifera*, do not generally exhibit immediate signs of water stress, but will show symptoms of repeated stress by cumulative effects on shoot or fruit development. Williams *et al.* (1994) reviewed the effects of water stress and other environmental factors on grapevines. Depending upon the phenological stage at which it occurs, water stress has a wide range of effects on grapevine growth, development and physiology.

Water stress occurs infrequently during bud break and early shoot development due to low water use. However, water stress during this time may result in uneven bud break and stunted shoot growth. More severe and prolonged water stress may result in poor flower-cluster development and reduced pistil and pollen viability and subsequent berry set (Hardie and Considine, 1976). Nutritional deficiencies, especially in N, Mg and Ca, might also become evident under severe water stress (Falcetti *et al.*, 1995). Most of the nutrients required by grapevines early in the season are derived from stored sources, thus reducing the likelihood of early-season deficiency symptoms. Early-season deficiencies in Zn and or B are often the result of water stress the previous season, causing reduced root growth and nutrient uptake (Christensen, 1962).

Following berry set, severe water stress may cause flower abortion and cluster abscission, possibly associated with hormone changes (During, 1986). Uncorrected water stress during this stage of development may result in reduced canopy development and, consequently, insufficient leaf area to adequately support fruit development and maturation. Because initiation of clusters at nodes 1-4 for the following season begins about two weeks prior to full bloom and continues for about two weeks, water stress during this stage may reduce the following season's crop potential. The predominant effect at that stage is believed to be a reduction in the number of clusters per shoot and not the number of flowers per cluster, which develop later in the season and throughout the dormant season as conditions permit.

Immediately after fruit set, water stress may restrict berry cell division and enlargement, resulting in smaller fruit and lower yield. The lag phase of berry development, which follows early berry development, is less susceptible to water stress. However, shoot development, which normally continues during this stage of development, would be reduced by water stress. Insufficient canopy development during this time will limit the photosynthetic capacity of the vine and may restrict fruit development and quality. Aside from reduced yield potential and fruit soluble-solids

accumulation, the fruit may have higher pH, decreased acidity, and reduced colour development in red varieties. Problems associated with fruit sunburn are also more likely.

Rapid senescence of lower leaves, leaf abscission, and progressive loss of canopy, are consequences of water stress that may occur at any stage of development, but are more likely where a larger canopy is present. Sunburn of both red and white varieties can be a consequence of sudden fruit exposure caused by senescence of lower leaves and sudden loss of canopy and reduced canopy cooling caused by low evapotranspiration. Slow development of stress is associated with a loss of acidity and a rise in pH and soluble solids. More rapid onset of stress causes these processes to be arrested as fruit dehydration and raisining occur. Late-season water stress contributes to acclimation of one-year-old wood that begins from the base towards the tip of the cane. High levels of stress will result in abscission of shoot tips, which, if followed by over-irrigation, may stimulate lateral shoot growth. Such growth creates a competitive sink for photosynthates and delays fruit maturation. Late-season irrigation, following water stress, can also reduce cane and vine acclimation increasing the potential for low-temperature injury. Such vines are unlikely to have adequate viable buds the following season. Were exposed to extremely low temperatures, they often show reduced survival of buds, trunks and cordons.

The most detrimental effect of water stress following harvest is the potential for reduced root growth, resulting in decreased nutrient uptake and micronutrient deficiencies the following spring. Low-temperature injury of roots is also a concern if the soil remains dry, thereby increasing the depth of frost during long periods of cold weather. This is more likely in areas with lighter soils and little or no precipitation prior to winter conditions. Root injury is often expressed the following spring as delayed and erratic bud break, and eventual collapse of the developing shoots.

Careful water management is recognized as a tool for achieving some control of grapevine growth and development. The adoption of such a management strategy involves moderate stress at specific stages of development to achieve specific results. The decision to use such an irrigation strategy requires well-defined goals including effects on yield, grape quality, canopy structure, and protection against winter injury. To achieve these goals in the face of variable weather conditions requires both a thorough understanding of the effects of water stress on grapevines at various phenological stages, and also a good understanding of soils and soil water management. This understanding must include knowledge of total and available water holding capacities of the soil and the potential, as well as actual, rooting depths. The role and water use characteristics of cover crops also require careful consideration. Where most of the available moisture during root development is from irrigation water, irrigation methodology and scheduling can influence the distribution of the roots, both vertically and horizontally. Vineyard managers should be familiar with the characteristics of the rootstocks they use.

It is possible to use established crop coefficients (K_c) and measurements or calculations of potential evapotranspiration to estimate water use by vines (ET_p). Grapevine crop coefficients have been developed in several different locations (Evans *et al.*, 1993; Grimes and Williams, 1990; FAO, 1977) and reflect the development of leaf surface area and vine water demand as the growing season progresses. The K_c represents the fraction of the potential evapotranspiration used by the vines, and its value is typically less than one. Variability in vine development from year to year has resulted in referencing the values of K_c with accumulated growing-degree-days (GDD) rather than calendar dates. Crop coefficients are low early in the season due to small leaf area and hence low water use, and approach unity as the canopy reaches maximum development in July and August in northern climates (January and February in the southern hemisphere). The calculation of daily water use (DWU) uses the published K_c for the appropriate accumulated GDD multiplied by the ET_p , a value based on the water use of a well watered, mowed, grass-covered area:

$$DWU = ET_p \times K_c$$

The availability and use of computers make these calculations and record keeping easy, and facilitate improved water management. The calculations must also account for any rainfall that occurs during the irrigation cycle. It is important to recognize that not all rainfall reaches the vine's rootzone, and may, therefore, be considered as effective rainfall.

On a worldwide basis, the estimated range for total water use for wine-, table- and raisin-grape production, with or without irrigation, might vary from 10 to 31 ha-cm/year. Recognizing that grapevine water use increases through the season to a peak shortly after veraison, it is possible to further estimate the fractional water use during the major phenological stages (Table 1).

Table 1
Water use by stage of development

Stage of development	Fraction of annual water use
Bud break to flowering	<5%
Flowering to fruit set	15%
Fruit set to veraison	60%
Veraison to harvest	20%
Harvest to leaf fall	3-5%

Using these estimates in conjunction with the annual precipitation for a given geographical location provides a sound basis for determining when and how much irrigation may be necessary in that area. It is also necessary to consider the suitability of the precipitation pattern for grape production.

Materials and methods

The study took place in the period 1992 - 1997, with the objective of evaluating the potential of using irrigation management to control wine grape vegetative growth and development, while maintaining yield and potentially improving fruit quality. The general approach to achieving these goals was to utilize the inherent growth characteristics and physiology of *Vitis vinifera* in combination with various irrigation schedules.

The vineyard site is in the rain shadow of mountains, and consequently receives about 20-25 cm of precipitation per year; the majority occurs between October and April. Rainfall during the growing season is considered to be ineffective as it occurs in small amounts and is frequently followed by high winds that increase evaporative demand. The number GDD (base 10°C) accumulated at the vineyard site averaged 1 600, with extremes of around 1 400 and 1 800.

The vineyard, 27 ha of Sauvignon blanc, is located at the Columbia Crest Estate Vineyard and Winery in south-central Washington, near Paterson, United States of America. It was planted in 1979 with a 3.1x1.8 m spacing. Vines were trained to a bilateral cordon system, and spur pruned. The vineyard, originally irrigated using a centre-pivot system, was converted to drip irrigation in the mid-1980s. Drip irrigation lines consisted of pressure compensating 2-litre/h emitters at a 100-cm spacing.

Irrigation strategies were applied from 1992. They involved high irrigation (H) defined as 5.6 cm of water and low irrigation (L) defined as 3.1 cm of water per 30 cm of soil in the top 1 m of the soil profile. The H treatment is near field capacity, while the L treatment is near the permanent wilting point for the Quincy soil type found on most of this vineyard. The strategies were:

- (HL) High irrigation applied early in the growing season followed by low irrigation from the point when control of canopy development was achieved in the early-season low-

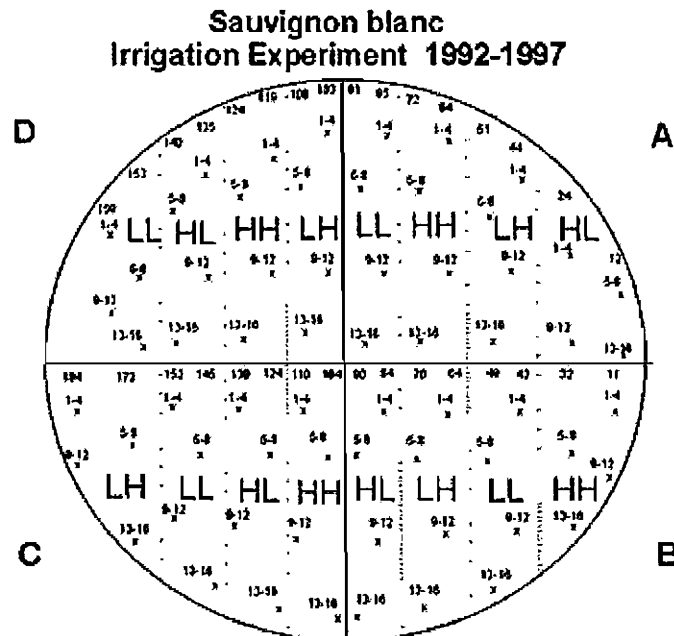
irrigation treatment. The high-irrigation treatment phase typically occurred from bud break to early or mid-July, which is similar to the standard irrigation practice for wine grapes in the State.

- (HH) High irrigation maintained throughout the growing season. This extreme treatment was applied primarily for comparative purposes. However, it was suspected that some growers were using this practice.
- (LL) Low irrigation applied throughout the growing season. This extreme treatment was applied primarily for comparative purposes.
- (LH) Low irrigation applied early in the growing season until control of canopy development was achieved, which typically occurred by early to mid-July, followed by high irrigation through harvest.

At the end of each season, all treatments were irrigated to bring the top 40-60 cm of soil to near field capacity. This provided winter protection for the root system and adequate moisture for early season growth the following year. It was anticipated that there would be sufficient precipitation during the dormant season to fill the soil profile to the 1-m level. Where adequate precipitations did not occur, additional irrigation was applied prior to, or during, budbreak, to fill the soil profile to a depth of one metre.

There were four replicates of each treatment of 1.6 ha each. Treatments were randomized within each 6.5-ha set of replicates (Figure 1). Each 1.6-ha replicate was irrigated independently and equipped with a flow meter. Sixteen neutron-probe sites within each replicate (128 in total) provided weekly readings during the growing season. At each of the neutron-probe sites, four vines were selected for collection of data on growth and yield, i.e. a total of 512 data vines. Vines were spur pruned, leaving 36-40 buds per vine for all treatments. Pruning weights were taken from designated plot vines and randomly selected vines within each treatment-replicate.

Figure 1
Experimental plot design of the Clore vineyard irrigation experiment



Results and discussion

Over the six years of the study, soil moisture measurements taken during the third week of April indicated no differences among treatments in the top 1 m of the soil. Hence, there was uniform soil moisture for early-season growth, and a uniform starting point for irrigation planning. Irrigation schedules were determined using a combination of established K_c for winegrapes in Washington, United States of America (Figure 2) and (ET_p) . The product of these values estimated the actual evapotranspiration ET_a . The ET_a and measured soil moisture were used to determine the hours of irrigation to achieve the desired soil moisture. The average cumulative irrigation over six years for the HH vines was about 50 ha-cm. The average for the LH vines was about 40 ha-cm, while the LL vines received about 30 ha-cm and the HL vines about 36 ha-cm. The HL vines received only about 2.5-5.1 ha-cm more than the LL vines because of low irrigation requirements early in the season (the K_c and ET_p values are lower during April - June than in July and August). Although the HH vines received 50 ha-cm of water, this was still considerably less than the 76-90 ha-cm typically used previously in the Yakima Valley. The data provided in Figure 3 are indicative of the amounts of water applied annually to each of these treatments.

Figure 2
Crop coefficient for determining irrigation requirements

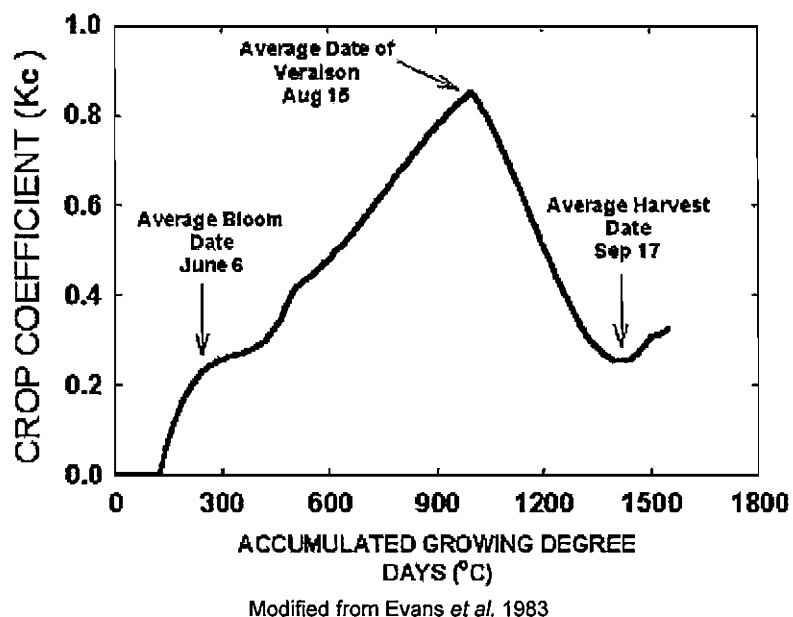
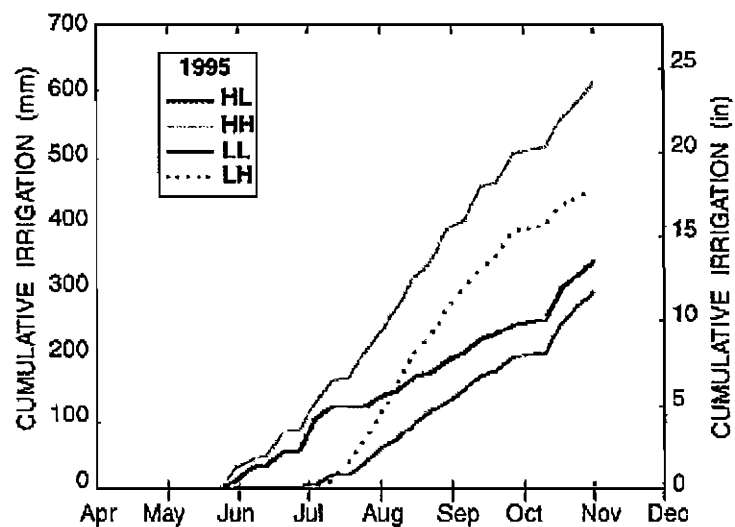
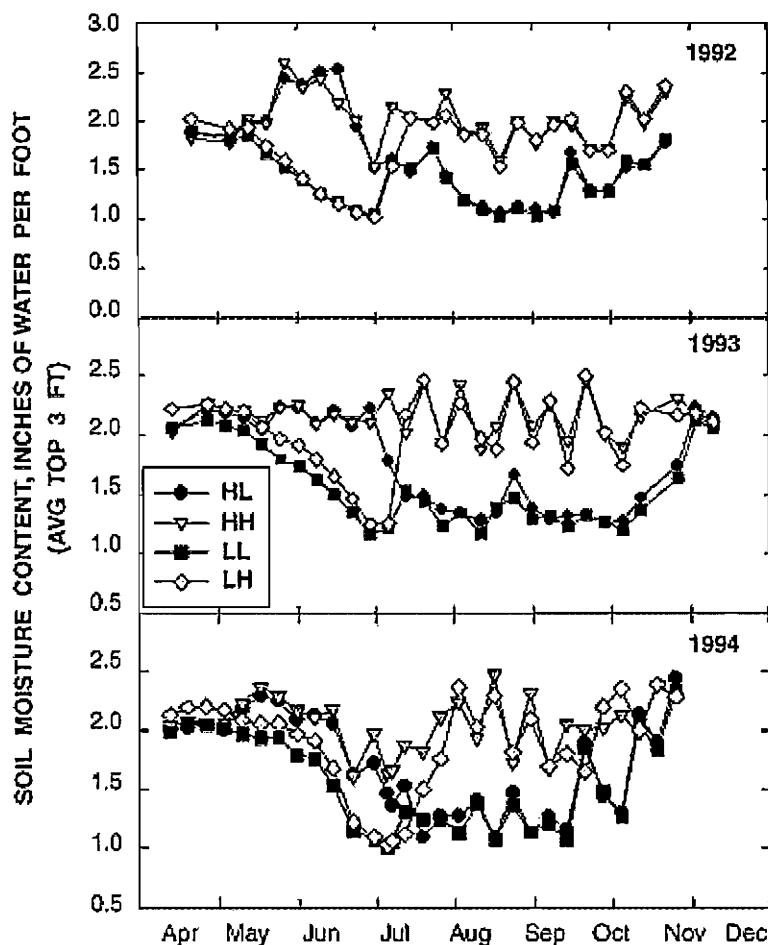


Figure 3
Cumulative irrigation applied to the four treatments in 1995



Irrigation maintained the HH and HL soils near 5.6 cm of water per 33 cm of soil until the first week of July, whereas the moisture in the LL and LH soils declined to 3.0 cm of water per 33 cm of soil in the top 1 m of the soil profile as determined by neutron-probe measurement. Irrigation, based on weekly consumption, was applied to maintain this level of soil moisture. Once shoot growth decreased in the LL and LH vines, the transitions in irrigation treatments were made, generally during the first or second week of July (Figure 4).

Figure 4
Soil moisture profiles determined by neutron-probe analysis 1992-94



Measurements of shoot length and node number were taken from data vines located near the neutron-probe sites. Individual shoots were selected on each cordon and marked for repeated measurements taken on a weekly basis. Shoot length of current-season growth was measured from the junction with 1-year-old wood to the shoot tip. Node number included all nodes from the base of the shoot to the last discernable node at the tip of the cane.

Leaf area measurements, achieved non-destructively by measuring the widest part of the leaf, were regressed against measured leaf area each season as determined with a LiCor leaf area meter. Repeated measurements taken weekly from the same shoots and leaves provided an indication of dynamic vine growth and development.

Fruit and wine quality analyses were based on harvesting the fruit from the various irrigation treatments at 23 percent soluble solids. All replicates were sampled and data were kept separate for statistical purposes. Harvest was based on the average of all replicates for a treatment reaching 23 percent soluble solids. Harvests commenced at about 2100 hours, with completion by 0900 hours the next day. The fruit of each replicate was kept separate for yield and winemaking purposes, thus allowing statistical analysis of these large-scale plots. Fruit from each treatment-replicate was crushed and pressed separately and a 114-h/litre sample placed in separate fermentation tanks. Plot vines for any given treatment were hand-harvested before mechanical harvest. Cluster counts and weights were based on hand-harvested fruit. Post-harvest soluble solids measurements were based on samples taken from the fermentation tanks for each of the four replicates of each treatment.

Measurements of shoot length, node number and pruning weight all demonstrated the ability to control shoot growth by irrigation management. Plates 1 and 2 represent typical differences in canopy development between the HH and LL irrigation treatments.

Plate 1
Canopy characteristics of the high irrigation (HH) treatment, August 1996



Plate 2
Canopy characteristics of the continuously low (LL) treatment, August 1996



Data indicate that, regardless of the previous year's irrigation, there was essentially no difference in shoot length from bud break until approximately 30 d after bloom. This was despite significant differences in weather conditions over the four years and the lower irrigation in the LL and LH treatments. This suggests several things. First, water was not a limiting factor early in the season. Second, because there were nearly 20 nodes present by the time differences in shoot growth developed, there was sufficient leaf area to mature the crop. Third, as even the HH irrigation treatment showed a change in shoot length around 30 d after bloom, fruit set and early cluster development reduced shoot growth. In general, the HL vines stopped initiating nodes shortly after

the change in irrigation treatment, whereas there was an increase in shoot growth in the LH vines. Leaf area measurements also showed that the sizes of leaves up to about leaf-number 15 were similar regardless of irrigation treatment. This further supports the suggestion that early-season soil moisture was not limiting and that there was little difference in the water status of the irrigation treatments until late June or early July. Leaf area development was more sensitive to soil moisture depletion with differences occurring 10-14 d prior to differences in shoot elongation. Thus, changes in leaf area enlargement can serve as an early indicator of soil moisture depletion and, if carefully monitored, may be of use in scheduling irrigation. By mid- to late August, there was interior leaf senescence and defoliation in the HL treatment associated with water stress. However, in the LL vines there was less leaf senescence, indicating physiological adjustments resulting in increased WUE. From late July until the end of the season, following the change in irrigation, although there was no difference in soil moisture between the LH and HH treatments, the LH vines showed less stress as indicated by leaf and xylem water potential measurements. This is presumed to be the result of smaller canopy and physiological adjustments associated with the early-season low irrigation. Although the LL treatment often showed high levels of water stress, these vines showed less leaf senescence and loss than the HL vines.

The irrigation treatments had little effect on the number of clusters. The similarity in cluster number indicates that early-season low irrigation was not detrimental to the cluster initiation process.

During the first year of the study, which was very hot, the LL and LH vines averaged 1.5-2 t/ha less yield than the HH vines (Table 2).

Table 2
Fruit yield for each of the four irrigation treatments

Treatment	1992	1993	1994	1995	1996
	(t/ha)				
HL	9.2 ^{B*}	14.6 ^A	9.2 ^A	12.0 ^B	12.1 ^A
HH	10.6 ^A	16.3 ^A	9.2 ^A	9.2 ^A	14.3 ^A
LL	6.5 ^C	14.5 ^A	7.8 ^B	11.5 ^B	13.3 ^A
LH	6.7 ^C	15.2 ^A	7.1 ^B	12.0 ^B	13.3 ^A
* Numbers in a column followed by the same letter are not significantly different					

Higher yields in the HH vines were due primarily to larger berries. Throughout the study, there tended to be more berries per cluster in the LL and LH treatments.

Fruit and wine-quality analyses were based on harvesting the fruit from the different irrigation treatments at the same soluble solids content. Post-harvest soluble solids measurements were based on samples taken from 114-hl tanks for each of the four replicates of each treatment. There were no differences among treatments in any of the five years of the study (Table 3). In 1995, the HH treatment was harvested at about 22 percent soluble solids, while the other treatments were all near 23 percent. Late-season high irrigation (HH and LH) tended to delay harvest and lower the soluble solids slightly, throughout the study. In 1993, the HH vines were harvested nearly a week after the LH vines which tended to be the first to reach 23 percent soluble solids. In cool, wet years like 1995, earlier harvest can be an advantage by avoiding fruit-rot problems.

Table 3
Influence of the four irrigation treatments on fruit soluble solids

Treatment	1992	1993	1994	1995	1996
	(% soluble solids)				
HL	22.6 ^{A*}	22.5 ^A	22.6 ^A	23.2 ^A	22.4 ^A
HH	22.3 ^A	22.2 ^A	22.3 ^A	21.9 ^A	22.1 ^A
LL	22.9 ^A	23.0 ^A	23.2 ^A	23.3 ^A	22.9 ^A
LH	23.4 ^A	23.1 ^A	21.8 ^A	22.8 ^A	23.8 ^A
* Numbers in a column followed by the same letter are not significantly different					

The titratable acidity of 1995 tank samples was significantly higher in the HH and LH must (1.0) than in the HL and LL must (0.7) (Table 4). Although this was due in part to the lower soluble solids for the HH treatment in 1995, this trend was seen in at least four of the five years. The lack of significant effects in 1992 was probably due to the high temperatures that prevailed throughout the season. Differences were generally accompanied by lower pH in the HH and LH musts than in the HL and LL musts (Table 5). Fruit and must analyses over the past five years have shown similar results. The lack of differences in soluble solids, while consistent differences occurred in pH and acidity, seems to indicate the effect of irrigation practices on these fruit, and potentially on wine characteristics.

Table 4
Influence of the four irrigation treatments on fruit titratable acidity

Treatment	1992	1993	1994	1995	1996
	(mg tartaric acid equivalents per 100 ml of juice)				
HL	0.73 ^{A*}	0.75 ^{BC}	0.60 ^B	0.68 ^B	0.76 ^B
HH	0.81 ^A	0.93 ^A	1.07 ^A	1.01 ^A	1.03 ^A
LL	0.74 ^A	0.67 ^C	0.59 ^B	0.70 ^B	0.67 ^C
LH	0.68 ^A	0.78 ^B	0.90 ^A	0.96 ^A	0.84 ^B
* Numbers in a column followed by the same letter are not significantly different					

Table 5
Influence of the four irrigation treatments on fruit acidity (pH)

Treatment	1992	1993	1994	1995	1996
	(pH)				
HL	3.38 ^{A*}	3.28 ^A	3.40 ^A	3.41 ^A	3.17 ^{AB}
HH	3.31 ^A	3.11 ^B	3.27 ^A	3.16 ^B	3.10 ^B
LL	3.40 ^A	3.35 ^A	3.43 ^A	3.30 ^A	3.23 ^A
LH	3.41 ^A	3.28 ^B	3.29 ^A	3.20 ^B	3.13 ^B
* Numbers in a column followed by the same letter are not significantly different					

Vine evaluation during early August typically showed that treatments involving reduced irrigation had more lignified nodes than did HH. This was consistent over the five years of the study, indicating better cold hardiness during late summer and early fall. Although not important in most years, it could be a significant advantage in a year with an exceptionally early killing frost. Evaluations of cold hardiness of buds, undertaken each year from October to March, indicated no differences as a function of irrigation treatment.

The information produced by this study demonstrates that, given the variety and location, it is possible to produce a satisfactory crop of winegrapes with between 30 and 50 ha-cm of water per year including a post-harvest irrigation to bring the soil to a moisture level that will protect the root system from cold injury.

Several points from this study are applicable to vineyard water management in general. First, the water requirements of grapevines change as the season progresses and, second, their responses to changes in water availability at different stages of development are an important consideration.

The decision to adopt the concept of irrigation as a management practice should be based on well-defined objectives and on a clear idea of how irrigation management will overcome any problems. Where the problem is vine water stress, and irrigation water is available, the question is one of economics associated with the installation of an appropriate irrigation system and the expected improvement in vine growth and productivity. Depending upon when and why the stress occurs, soil and site characteristics, and grape variety, the decision to irrigate and the choice of irrigation system will vary significantly.

Based on information derived from this study, the only vine-related expense of using regulated deficit irrigation as a management tool is a potential loss of yield if stress becomes excessive. Leaving more buds at pruning can compensate for this, although it would be preferable to improve water management. Other costs are those associated with establishing, maintaining and operating the irrigation system. These costs require careful evaluation based on the potential for more consistent, balanced vine growth and fruit production of higher quality that would result in higher net returns to the grower. In addition to direct improvements in fruit quality, additional benefits observed in this and other studies include improved control of disease and pests. This is associated with a more open canopy that is less susceptible to pathogens and insects. Such an open canopy also facilitates better coverage with chemical sprays. In red varieties, there are increases in phenolics and tannins that contribute to flavour and complexity of the wine. Some remaining concerns include the development of undesirable flavour compounds in some white varieties and possible reduction in vine productivity. Additional studies are underway in Washington, United States of America, and at other North American locations in order to address these problems.

References

- Araujo, F., Williams, L.E., Grimes, D.W. & Matthews, M.A.** 1995a. A comparative study of young 'Thompson Seedless' grapevines under drip and furrow irrigation. I. Root and soil water distributions. *Scientia Horticulturae* 60: 235-249.
- Araujo, F., Williams, L.E., Grimes, D.W. & Matthews, M.A.** 1995b. A comparative study of young 'Thompson Seedless' grapevines under drip and furrow irrigation. II. Growth, water use efficiency and nitrogen partitioning. *Scientia Horticulturae* 60: 251-265.
- Bravdo, B.A. & Hepner, Y.** 1987. Irrigation management and fertigation to optimize grape composition and vine performance. *Acta Horticulturae* 206: 49-67.
- Bucks, D.A., French, O.F., Nakayama, F.S. & Fangmeier, D.D.** 1985. Trickle irrigation management for grape production. *Drip/Trickle Irrigation In Action* 1: 204-211.
- Christensen, P.L.** 1962. *Boron deficiency in vineyards in Fresno county*. Cooperative Extension Bulletin. Davis, California, United States of America, University of California.

Cline, R.A., Fisher, K.H. & Bradt, O.A. 1985. The effects of trickle irrigation and training system on the performance of Concord grapes. *Drip/Trickle Irrigation in Action* 1: 220-230.

During, H. 1986. ABA and water stress in grapevines. *Acta Horticulturae* **179**: 413-420.

Evans, R.G., Spayd S.E., Wample R.L., Kroeger M.W. & Mahan M.O. 1993. Water use of *Vitis vinifera* grapes in Washington. *Agricultural Water Management* 23: 109-124.

Falcetti, M., Stringari, G., Bogoni, M. & Scienza, A. 1995. Relationships among pedo-climatic conditions, plant available water and nutritional status of grapevines. *Acta Horticulturae* 383: 289-297.

FAO. 1977. *Guidelines for predicting crop water requirements* by J. Doorenbos & W.O. Pruitt. Irrigation and Drainage Paper 24. Rome.

Fourie, J.C. 1988. Herbigation in a vineyard through a microjet irrigation system. *South African Journal of Enology and Viticulture* 9: 37-42.

Goldberg, S.D., Rinot, M. & Karu, N. 1971. Effect of trickle irrigation intervals on distribution and utilization of soil moisture in a vineyard. *Soil Science Society of American Proceedings* 35: 127-130.

Goodwin, I. & P. Jerie. 1992. Regulated deficit irrigation: from concept to practice. *Wine Industry Journal* 7: 258-261.

Grimes, D.W. & Williams L.E. 1990. Irrigation effects on plant water relations and productivity of Thompson Seedless grapevines. *Crop Science* 30: 255-260.

Hardie, W.J. & Considine, J.A. 1976. Response of grapes to water deficit stress in particular stages of development. *American Journal of Enology and Viticulture* 27: 55-61.

Mullins, M.G., Bouquet, A., & Williams, L.E. 1992. *Biology of the grapevine*. Cambridge, United Kingdom, Press Syndicate of the University of Cambridge.

Nadal, M. & Arola, L. 1995. Effects of limited irrigation on the composition of must and wine of Cabernet Sauvignon under semi-arid conditions. *Vitis* 34: 151-154.

Neja, R.A., Wildman, W.E., Ayers, R.S., & Kasimatis, A.N. 1977. Grapevine response to irrigation and trellis treatments in the Salinas Valley. *American Journal of Enology and Viticulture* 28: 16-26.

Peacock, W.L., Rolston, D.E., Aljibury, F.K. & Rauschlolb, R.S. 1977. Evaluating drip, flood, and sprinkler irrigation of wine grapes. *American Journal of Enology and Viticulture* 28: 193-195.

Smart, R.E. & Coombe, B.G. 1983. Water relations of grapevines. In: T.T. Kozlowski ed. *Water deficits and plant growth, Vol. 7*. New York, United States of America, Academic Press.

Williams, L.E., Dokoozlian, N.K. & Wample, R.L. 1994. Grape. In: B. Schaffer & P.C. Andersen eds. *Handbook of environmental physiology of fruit crops, Volume 1, Temperate crops*, Boca Raton, Florida, United States of America, CRC Press.

Williams, L.E. & Matthews, M.A. 1990. Grapevine. *In*: B.A. Stewart and D.R. Nielsen eds. *Irrigation of agricultural crops, agronomy Monograph No. 30*, Madison, Wisconsin, United States of America, ASA-CSSA-SSSA.



EXHIBIT B

Netafim dripline specifications.

<http://www.netafimusa.com/agriculture/products/tritonx-tech>

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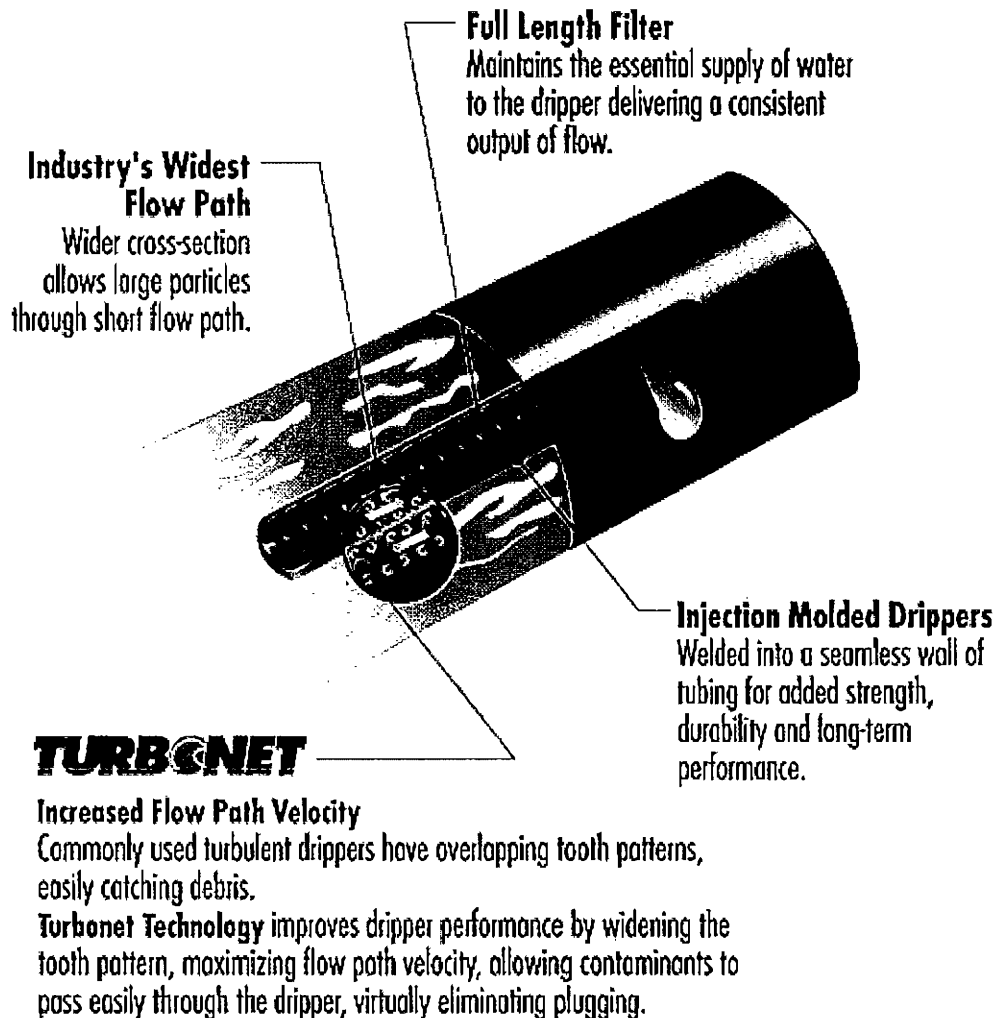
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Triton X Technical

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Product Brochure



Specifications

- Wall thickness (mil):

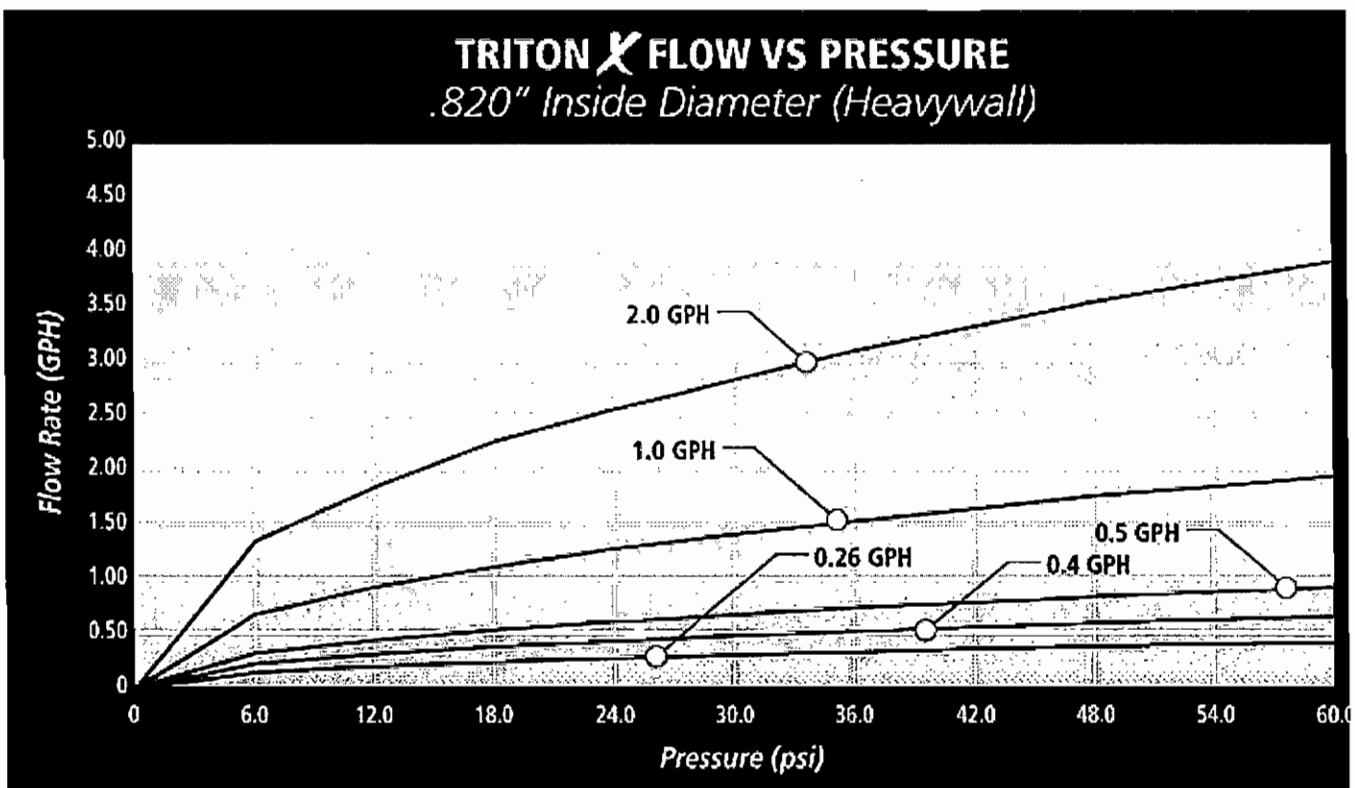
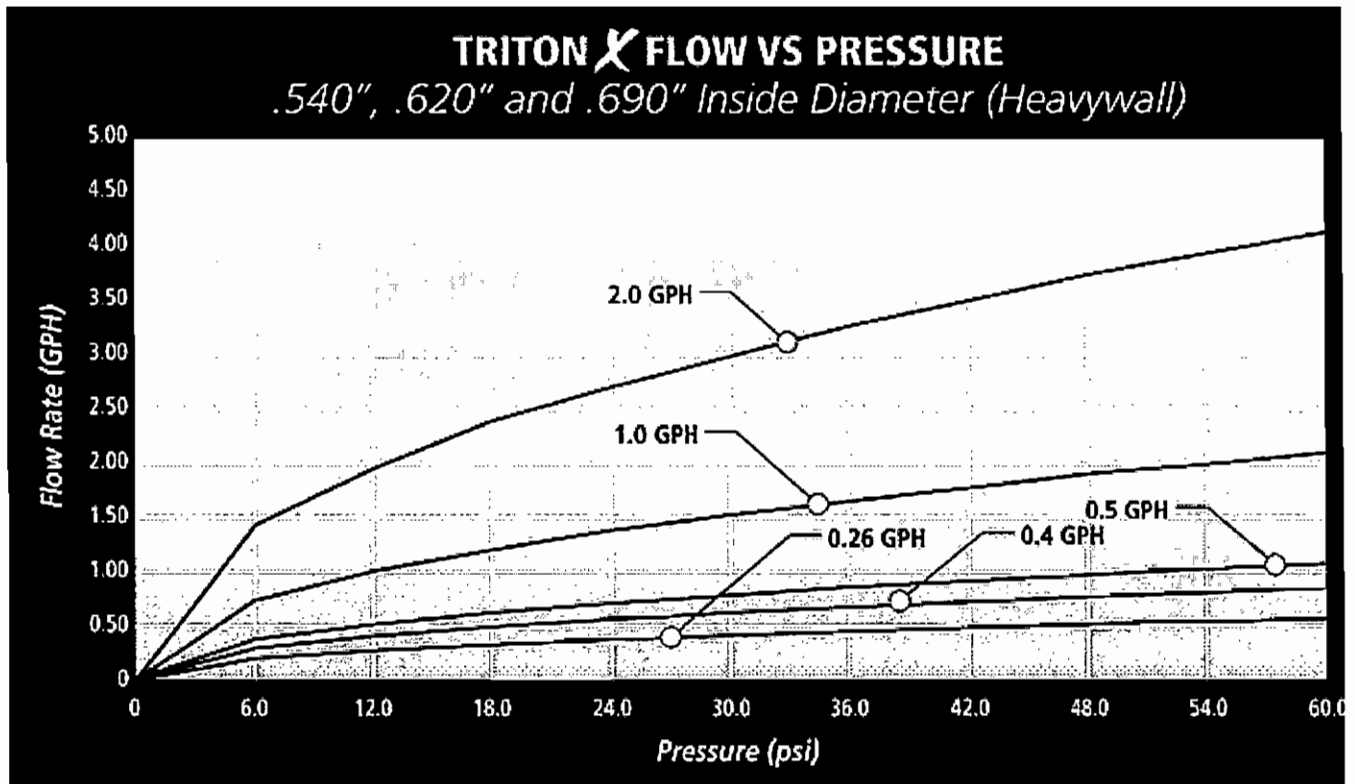
- 0.540" (45 mil)
- 0.620" (45 mil)
- 0.690" (48 mil)
- 0.820" (60 mil)
- Nominal flow rates (mil): 0.26, 0.4, 0.5, 1.0, 2.0
- Common spacings: 18", 24", 30", 36", 42", 48", 60"
- Recommended filtration: 120 mesh
- Recommended operating pressure: 10 to 30 psi

TRITON X Dripper Data / Lightwall Less Than 45 mil

<i>Dripper GPH</i>	<i>Exponent (x)</i>	<i>Constant (k)</i>	<i>Required Filtration</i>
0.26	.46	.0779	120
0.4	.46	.117	120
0.5	.46	.158	120
1.0	.46	.312	120
2.0	.46	.624	120

TRITON X Dripper Data / Heavywall 45 mil and Greater

<i>Dripper GPH</i>	<i>Exponent (x)</i>	<i>Constant (k)</i>	<i>Required Filtration</i>
0.26	.46	.0817	120
0.4	.46	.125	120
0.5	.46	.164	120
1.0	.46	.327	120
2.0	.46	.655	120



Heavywall Dripperline

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EXHIBIT C

Picture of New Holland tractor with in-row and between-row tillers for weed management.

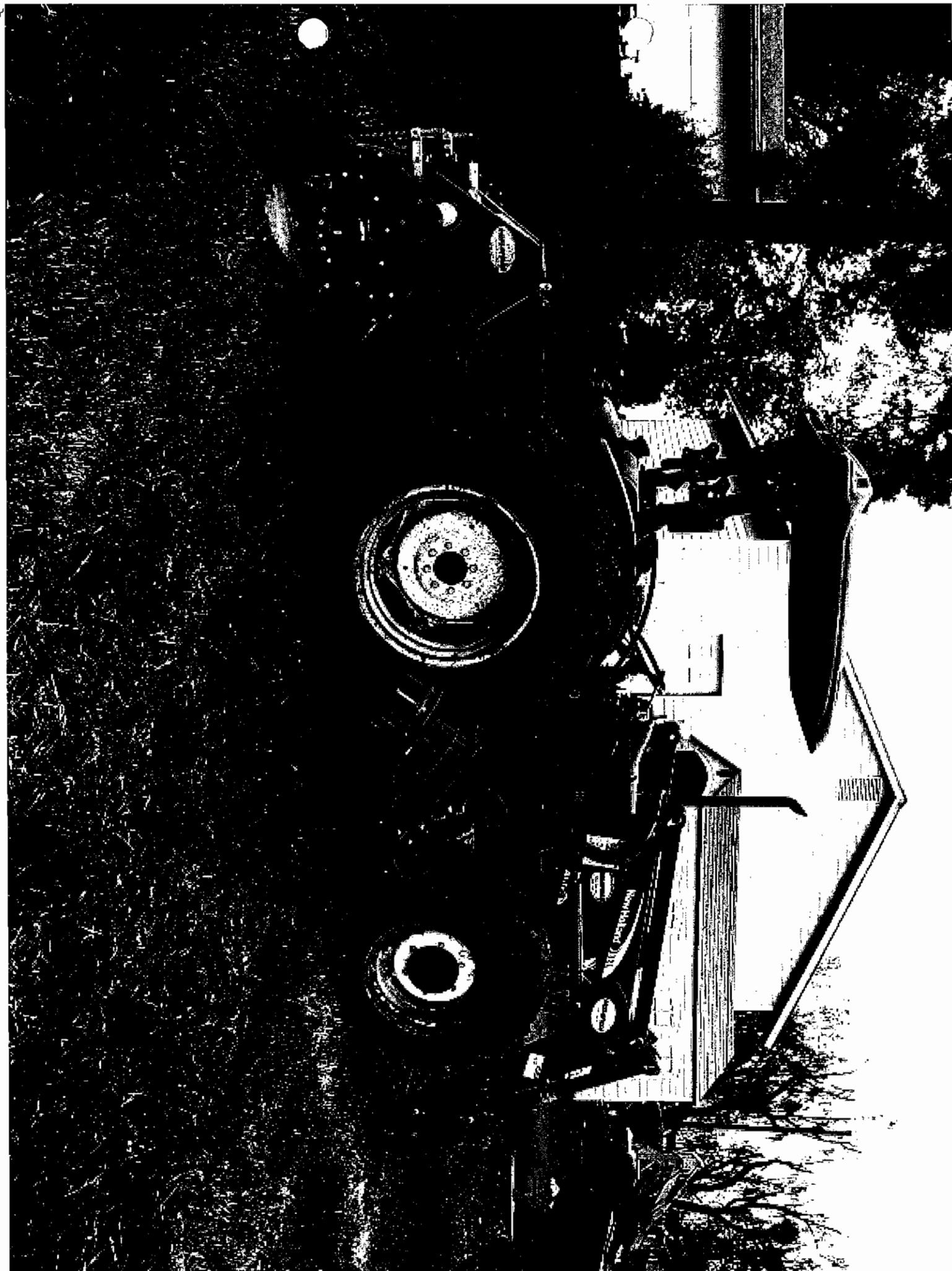


EXHIBIT D

Picture of Toro vineyard maintenance vehicle.

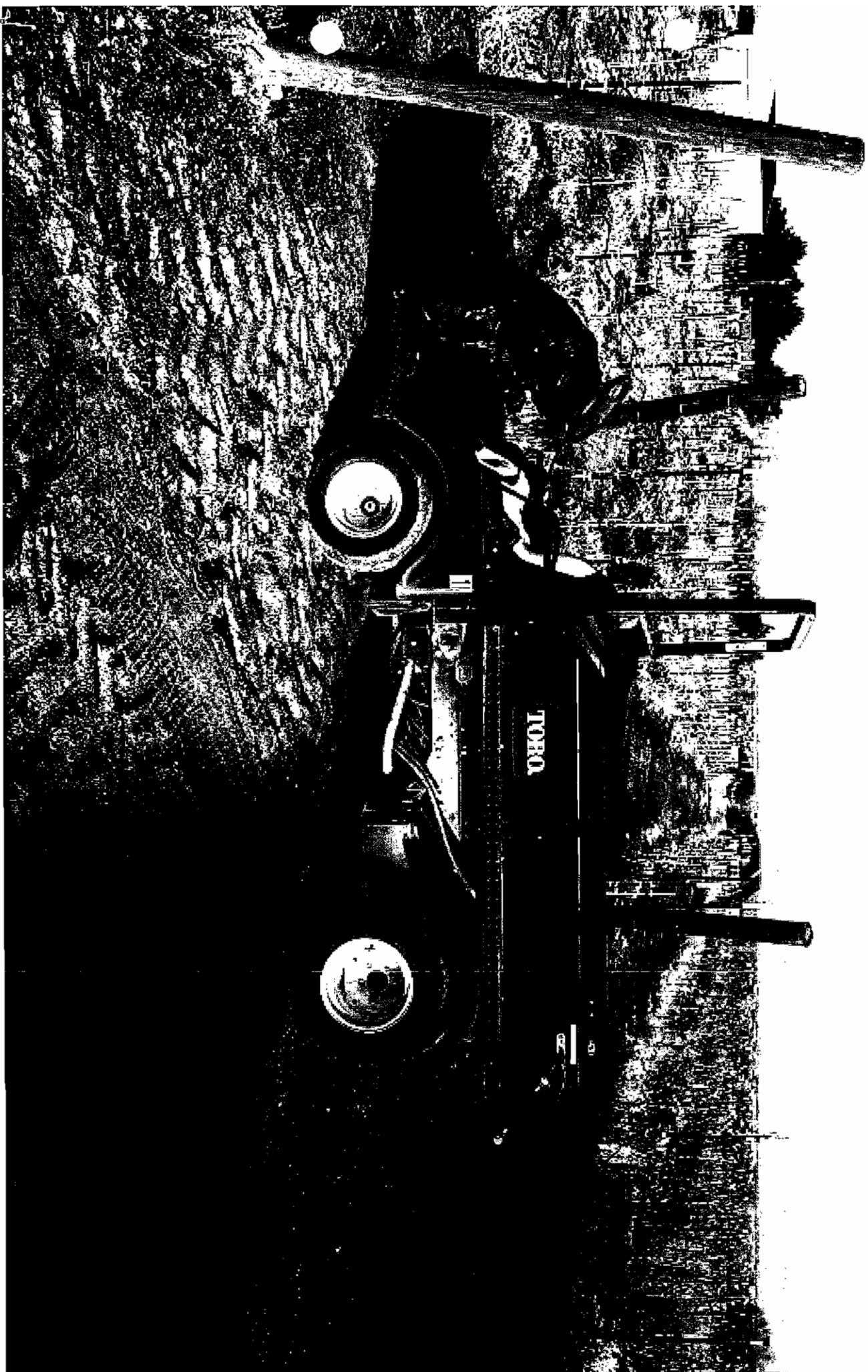


EXHIBIT E

Pictures of vineyard.









EXHIBIT F

Picture of dripline and trellis.



EXHIBIT G

Davis Creek Cellars: Customer for Tempranillo graps for '08 and '09.

<http://www.daviscreekcellars.com/>

Davis Creek Cellars
429 Main Street, Suite 101
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Marsing, ID 83639
ph: 208-794-2848
info@daviscreekcellars.com

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Our Wines

Davis Creek Cellars' wines are made from Northwest grown grapes. Most of them come from the Snake River Valley.

Reds are fermented in small batches, and then aged in French and/or American oak barrels. Whites are all cool fermented to preserve crispness.

2007 Cabernet Sauvignon

Our latest vintage of Cabernet comes from the Williamson Vineyard on the Sunny Slope. aged for 14 months in 50% new French oak and 50% older American Oak, this cabernet is still fruity with hints of black cherry. Finish is smoky and spicy with hints of black pepper and aniseed.

45 cases produced

\$29 / bottle

2008 Pinot Grigio

Our Second Vintage of Pinot Grigio comes from the Pontin Vineyard of Prosser, Washington. This light and fruity wine has hints of lemon, melon and pear and would pair well with salmon and pineapple-melon salsa.

140 cases produced

\$16 / bottle

Bronze @ 2009 Idaho Wine Competition

2007 Late Harvest Syrah

Our 2007 Late Harvest Syrah came in as 31 brix fruit and from fermentation on has had hints of chocolate and raspberry in both the nose and mouth. This rich dessert wine would be wonderful with dark chocolate mousse and fresh Northwest raspberries. Our first vintage of this wine comes from Skyline Vineyards south of Nampa, Idaho.

93 cases produced

\$20 / bottle

Bronze @ Idaho Wine Fest

2008 Chardonnay

2008 Malbec

Our second vintage of Malbec comes from the Pontin Vineyard located in the Yakima Valley. It was aged for 8 months in French oak but is still very fruity in both the nose and mouth with hints of strawberry, cherry, and tart pomegranate. This wine would pair well with bbq pork tenderloin.

52 cases produced

\$22 / bottle

2008 Tempranillo

Our second vintage of Tempranillo comes from the Wood River Vineyard near Homedale as well as Windy Ridge Vineyard South of Meridian. This wine was aged in French oak for 8 months giving it a light smoky finish. The nose is cherry and rhubarb while the taste is mild cherry and red raspberry with hints of cocoa.

98 cases produced

\$22 / bottle

2008 Rose of Syrah

2008 Two Vineyard Cuvee Viognier

Our first vintage is a 50/50 blend of Williamson and Sawtooth fruit. It is a crisp blend of citrus, peach and apricot that pairs well with baked chicken or cod.

140 cases produced

\$16.00 / bottle

2008 Boise Blanco Riesling

Our first vintage of late harvest Riesling salutes the City of Boise with a nose like honey and the sweet, refreshing taste of apricot, peach and pineapple. This wine pairs well with strawberry shortcake or local cheeses as a light appetizer.

110 cases produced

\$20.00 / bottle

Coming Fall 2009:

2008 **UP A CREEK!** Syrah

2008 Petite Sirah

Coming Winter 2010:

2008 Syrah

2008 Merlot

2008 Cabernet Sauvignon

2008 **South Mountain Red**



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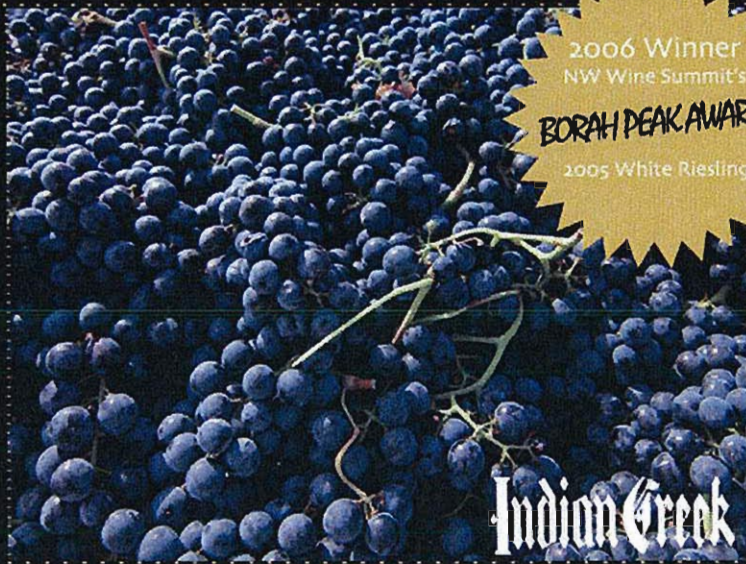
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EXHIBIT H

Indian Creek Winery: Customer for Tempranillo grapes for '08 and '09.

DRY

earthy

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2006 Winner
NW Wine Summit's
BORAH PEAK AWARD
2005 White Riesling

TOASTY

sweet

soft

Indian Creek

crisp

"IDAHO WINERY OF THE YEAR" • *Snake River Valley* •
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oaky

spicy

Debi Cline

From: lahansen@netzero.net
Sent: Monday, November 30, 2009 4:46 PM
To: Jo Beeman
Subject: Fw: Hansen Vineyard

----- Forwarded Message -----

From: "ICWinery" <bill@indiancreekwinery.com>
To: <lahansen@netzero.com>
Subject: Hansen Vineyard
Date: Fri, 27 Nov 2009 14:43:24 -0700

Indian Creek Winery has purchased Hansen Tempranillo grapes during vintage years 2008 and 2009.

Cheers

William N. Stowe
Owner, Indian Creek Winery

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EXHIBIT I

Report of expert witness (ERO Resources).



ERO Resources Corp.
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www.eroresources.com
eroboise@eroresources.com

November 30, 2009

Josephine Beeman
Beeman & Associates
409 West Jefferson Street
Boise, Idaho 83702

RE: Water Supply and Impact Analysis
Hansen Application for Permit 63-33064

Dear Ms. Beeman:

The following water supply and impact analysis is provided for the Idaho Department of Water Resources (IDWR) hearing scheduled for December 3, 2009 in the matter of Protested Application for Permit 63-33064 in the name of Lawrence and Kay Hansen (Application). The Hansen's supporting information included with the Application is referenced.

I. Introduction

This brief introduction is followed by a ground water supply evaluation, an evaluation of potential impacts to existing water rights, and conclusions regarding the water supply and impact analyses for application 63-33064.

The Application proposes 0.12 cfs for the irrigation of 6 acres in Sec 31 T3N, R1E near the intersection of Locust Grove and Amity Road in Ada County. The Application seeks standard irrigation rates, which is 0.02 cfs per acre (one miner's inch per acre). The applicant intends to use the water to irrigate a vineyard. The Applicant also proposes 0.04 cfs for commercial purposes associated with a winery. The total diversion rate is 0.16 cfs.

During the May 6, 2009 pre-hearing conference, the Hansen's made an offer to modify the Application to reduce the diversion rate and annual volume. The settlement offer was refused. The December 3rd hearing will consider the standard irrigation rate and commercial use applied for.

The Hansen's will use an existing well to divert ground water for the intended uses. Ground water provides the quality of water needed for the drip irrigation system. The place of use is within the Boise-Kuna Irrigation District (BKID) service area and is being assessed for 6.16 acres. The Application includes a statement from the Hansen's describing access to surface water and why surface water is not suitable. The points the Hansen's identify include:

- The place of use is located on a hill and does not have direct access to the irrigation ditch.
- Surface water is available via a buried pipe, but it delivers a high-volume, low pressure supply that overwhelms the demand.
- An overflow system would be needed to route most of the water to waste. The wastewater would be routed to a low lying area that currently has flooding problems.
- Adding additional waste water would likely exacerbate problems.
- Flood and sprinkler irrigation is not suitable for growing grapes.
- Seeds, debris, and sand normally found in surface water supplies will clog the emitters of the drip system.

For these reasons, ground water is the preferred source.

II. Ground Water Supply Evaluation

IDWR must determine if the proposed use under Application 63-33064 will reduce the quantity of water under existing water rights

a) Ground Water Available for Appropriation

This area of the Treasure Valley is open for appropriation of new water rights in accordance with IDWR Memorandum Amended Application Processing No. 59, dated February 22, 2008.

b) Hydrogeologic Setting and Water Levels

A report titled "Ground-Water Conditions in the Area Northeast of Kuna West-Central Ada County, Idaho" (Baker, 1993) provides a summary of the hydrogeology of the area. The primary aquifer material in the area is composed of fine-grained lake sediments (clay and sand). Well logs in the area of the Hansen's application are consistent with this description. Appendix A contains well logs in the area from 1971 to 2007. The Baker report focuses on the declines of the shallow ground water table observed in the study area and concludes that reductions in surface water use, conversions to sprinklers and changes in land use have reduced the recharge to the shallow aquifer.

Baker's description of the aquifer is consistent with the general description of the Treasure Valley Aquifer (Petrich, 2004). As described in the Treasure Valley Hydrologic Project, the shallowest portion of the aquifer is unconfined and is recharged from irrigation and precipitation. Changes in irrigation practices and development have lowered the water level in the shallowest portion of the aquifer. The middle zone or regional aquifer of the Treasure Valley Aquifer is a transition zone

into a confined aquifer system of interbedded clays, sands, and gravels. In general terms, the middle zone is between 100 and 400 feet deep. The middle zone of the aquifer is generally known to have an adequate supply to meet current demand and has stable water levels (Petrich, 2004b). However, as described in Petrich 2004b:

ground water level declines were observed in individual wells in other areas, including the area between Eagle, west Boise, Meridian, and Kuna. Most of the long-term declines in these wells have been less than 10 feet. Reasons for the declines may include increased withdrawals from the measured wells (very few of the monitoring wells are dedicated to monitoring alone), increased nearby withdrawals, and/or changes in local infiltration rates. Further investigation of these apparent declines is warranted to determine if they reflect local (near-well) or regional conditions.

The Hansen well is 306 feet deep, which is deep enough to be within the middle zone of the Treasure Valley Aquifer. However, the Baker 1993 study identifies three wells within 2-miles of Hansen's well that have experienced approximately 14 feet of water level decline between 1970 and 1993. Baker's conclusions are based on two data points at each location, so I have some reservations whether these wells accurately characterize the water level changes in the middle zone or represent a localized issue.

During the May 6th pre-hearing conference, there was a discussion of at least one well in the vicinity of the Hansen's property that was deepened due to declining water levels.

The nearest ground water monitoring wells listed in the IDWR database are 1 to 3 miles away from the Hansen well. The recorded depth to water in the nearest monitoring wells ranges from 30 to 50 feet, which is substantially shallower than the local depth to water in wells that are located 290 to 1500 feet away from the Hansen's well (see Table 1). The depth to water within ¼ mile of the Hansen's well ranges from 108 to 180 feet, which is different than the depth to water observed at the IDWR monitoring wells, therefore, no interpretation was made to the water level trends of the IDWR wells.

c) Review of Nearby Wells

Figure 1 shows the location of the Hansen's well relative to other wells within an approximately ¼ mile radius. 16 wells have well driller logs on file with the IDWR. Herb Nitz's well is shown, but no well log was found. There are other wells nearby, but with no well driller reports on file with IDWR. Figure 1 and Table 1 include information such as:

- Current name or name of owner at the time of drilling,
- Physical location
- Total Depth

- Open Interval of well
- Depth to Water
- Year drilled

The Ada County Assessors online property information database was used to associate certain driller reports with addresses.

Table 1 is a summary of data collected from the well driller reports, the Ada County Assessor, USGS topographic maps, and IDWR shapefiles. The distance from each well to the Hansen well was estimated using GIS practices. Several homeowners in the vicinity of the Applicants have split their lots and developed new homes and wells between 2002 and 2007.

As shown in Table 1, most wells are between 200 and 300 feet deep. The wells constructed from about 1992 to present use 5-foot or 10-foot screens as the inlet. The older wells use an open bore or open pipe as the inlet, which is less efficient compared to a screened inlet. The recently constructed wells place the open intervals in water producing sand layers. Wells drilled after 2002 have generally targeted a sand layer 240 to 260 feet below ground. Some individual sand layers can be correlated between wells, but the lateral extent of the sand layers cannot be predicted with the information available.

The depth to water ranged from 108 to 180 feet at the time of drilling.

III. Potential Impact to Existing Water Rights

IDWR must determine if the water supply is insufficient for the proposed use under Application 63-33064.

a) Theis Analysis

A Theis Analysis can be used to examine the extent of water level drawdown at different radii from a pumping well. A Theis Analysis is an accepted method by IDWR for this level of evaluation. The Theis Analysis relates the theoretical drawdown as a function of discharge, aquifer transmissivity, and aquifer storage properties. There are a number of parameters, including hydraulic conductivity, storativity, aquifer thickness, and discharge that need to be quantified for the analysis.

b) Components of Theis Analysis

Hydraulic Conductivity

Hydraulic Conductivity describes the rate at which water can move through the aquifer. This value is usually determined from aquifer tests. A few of the nearby wells had pump tests performed by the well driller (Appendix A) that provide a very basic understanding of the productivity of the aquifer. For lack of a formal aquifer test, the well driller's pump test data were used to determine hydraulic conductivity.

The Crofts well (Table 1) was pumped at a rate of 75 gpm for 2 hours and had a measured drawdown of 10 feet. The Crofts' well was selected due to the relatively higher pumping rate used during the test, which makes for a better comparison to the diversion rate listed on the Application (54 gpm). Using simplified assumptions, this drawdown rate roughly estimates a hydraulic conductivity value (aquifer thickness = 20 feet) of 45 ft/day, using the equation:

$$T/b = K = 264 * \frac{Q}{\Delta s} * \frac{1}{b} * \frac{ft^3}{7.48 gal} * \frac{1440 min}{day}$$

where

T = Transmissivity (ft²/day)

b = Aquifer thickness (20 ft)

K = Hydraulic conductivity (ft/day)

Q = Discharge (75 gpm)

Δs = Drawdown per log cycle of pumping time (ft)

The development of the equation is beyond the scope of this report.

The lithologic descriptions found on the well driller reports list fine to coarse sand as the water bearing intervals. Typical values of hydraulic conductivity for fine to coarse sands range between 0.013 to 1,337 ft/day (Driscoll, 1986). A value of 45 ft/day will be used in the analysis. A higher value would result in less drawdown.

Storativity

The aquifer is interbedded with clays and sands and may be partially confined. A typical storativity value for a fully confined aquifer is on the order of 0.005 or less (unitless). Typical values for an unconfined aquifer can range between 0.02 and 0.3 (Driscoll, 1986). For modeling purposes, storativity is assumed to range from 0.005 to 0.1.

Aquifer Thickness

The sand layers encountered in the area range in thickness from a couple of feet to over 30 feet (see Appendix A). The sand layer thickness that most wells are completed in is unknown, because the bottoms are not identified. Based on the

thickness of the sand layers encountered, a typical water producing sand layer is assumed to be 20 feet thick.

Discharge

The Theis Analysis requires a continuous pumping rate through the duration of the time period analyzed. A continuous pumping rate is calculated by estimating the annual volume and determining what rate would produce that volume. The actual pumping rate of water will vary throughout the irrigation season.

For example, the season of use for irrigation listed on the Application is 259 days (March 1 to November 15). The maximum volume of water allowed for irrigation under the application is 4.5 ac-ft per acre or 27 ac-ft per year for irrigation for the 6 acres in the Application. A continuous pumping rate of 0.053 cfs diverts 27 ac-ft in 259 days. The irrigation demand of the entire vineyard is estimated to be 3 ac-ft/season (see Hansen's supporting information in the Attachment to the Application).

Hansen's currently have a pump that can produce 18 gpm (0.04 cfs). If run continuously for 365 days, it could produce 29.2 ac-ft per year. After accounting for the estimated irrigation demand, there is 26.2 ac-ft for commercial uses or extra irrigation water for extreme circumstances. The Theis Analysis will consider the 29.2 ac-ft/yr annual volume.

A continuous diversion rate of 0.04 cfs for 365 days to produce 29.2 ac-ft/yr is used in the analysis.

c) Conclusions from Theis Analysis

The Theis Analysis results are shown in Table 2. The calculated drawdown due to a continuous pumping rate of 0.04 cfs at a radius of 300 feet ($K = 45$ ft/day, $s = 0.005$) is 2.3 feet. The calculated drawdown at 1,000 feet is 1.5 feet.

If storativity equaled 0.1, drawdown at 300 feet is calculated to be 1.3 feet and at 1,000 feet is 0.6 feet. Drawdown effects diminish as the distance from the pumping well increases.

IV. Conclusions Regarding Water Supply and Impact Analyses for Application 63-33064

Application for Permit 63-33064 seeks 0.12 cfs of ground water for the irrigation of 6 acres in Section 31 T3N, R1E in Ada County and 0.04 cfs for commercial use. The Application seeks standard irrigation rates of 1 miner's inch per acre.

There are several wells within a ¼-mile radius of the Hansen's well that utilize the same aquifer. Most of the nearby wells completed after 2002 target water bearing sand layers approximately 240 to 260 feet below ground. Older wells in the area are generally shallower and are completed as open pipes. The Hansen's well is 306 feet deep; no information is available on how the well was constructed.

A study by IDWR (Baker, 1993) concludes that the shallow aquifer in West-Central Ada County has experienced water level declines of approximately 14 feet between 1970 and 1993 due to changes in irrigation practices and development of residential wells. According to the well driller reports in Appendix A, the subsurface lithology is comprised of interbedded clay and sand, suggesting that wells greater than 200 feet may be in the middle zone of the Treasure Valley Aquifer isolated from the shallow aquifer. It is difficult to determine if the declines in the shallow aquifer discussed by Baker (1993) are relevant to the wells in the middle zone near the Hansen's.

This area of the Treasure Valley is open for new appropriations of ground water rights.

A Theis Analysis was used to estimate the potential drawdown at different distances from the Applicant's well. A range of parameter values was used because site-specific values are not available. Actual drawdown effects may be better or worse than what was calculated due to ground water movement, recharge, different aquifer characteristics, different season of use, and different demand than assumed.

The estimated drawdown due to a continuous pumping rate of 0.04 cfs for an annual volume of 29.2 ac-ft in 365 days is 2.3 feet at 300 feet radius and 1.5 feet at a 1,000 feet radius ($s = 0.005$). If storativity equaled 0.1, the calculated drawdown at 300 feet and 1,000 feet radius is 1.3 and 0.6 feet, respectively. The drawdown effects diminish with larger radial distances from the pumping well.

Additional factors, such as recharge, ground water movement, less demand, longer season of use, and more favorable aquifer characteristics act to reduce the drawdown effect. These other factors will likely make the drawdown effect undetected at the nearby wells.

The adequacy of ground water supply, the small increase in aquifer demand, and the current status of appropriations in the basin provide a basis for the IDWR to approve the Application.

V. References:

Baker, Steve. 1993. *Ground-Water Conditions in the Area Northeast of Kuna West-Central Ada County, Idaho*. Idaho Department of Water Resources. Report dated May.

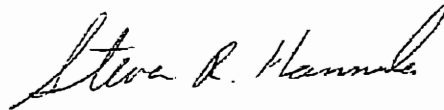
Driscoll, Fletch. 1986. *Groundwater and Wells*. 2nd edition. Johnson Filtration Systems Inc. St. Paul, Minnesota.

IDWR Memorandum No. 59. *Processing of Applications to Appropriate Water in the Lower Boise River Basin*, dated February 22, 2008.

Petrich, Christian. 2004. *Simulation Of Ground Water Flow In The Lower Boise River Basin*. Idaho Water Resources Research Institute Research Report. IWRRI-2004-02.

Petrich, Christian. 2004b. *Treasure Valley Hydrologic Project Executive Summary*. Idaho Water Resources Research Institute Research Report. IWRRI-2004-04.

Regards,

A handwritten signature in cursive script, reading "Steve R. Hannula".

Steven R. Hannula

Table 1 Construction Summary of Wells Near the Hansen Well (Sec 31, T3N, R1E Ada County)

Name	Address	Depth Drilled ft	Depth to Water ft	First Water ft	Pump Test Rate gpm	Time hr	Drawdown ft	Year Drilled	Distance from Hansen ft	Type of Inlet	Open Interval
Herb Lloyd	1360 Tanya Lane	159	115		20	40	2	1977	915	Open bore	148-159
Arnold	SWNW Sec 32	191	116		7	2	15	1971	1070	Open pipe	190-191
Smith	SWNW Sec 32	191	123		30	1	10	1973	1280	Open bore	187-191
Amundson	SWNW Sec 32	197	118					1972	1100	Perforated 186-190	184-197
Amundson	1730 Suzan	205	135		30			1992	1170	10' x 5" Screen	190-205
Nolan	1130 Tanya Ln	250	120		50	3		2005	1300	10' x 5" screen	239-249
Crofts	1770 Mary Lane	256	108		30	2	10	2002	770	4.5" PVC Screen	249-256
Moorehouse	1473 Mary Lane	256	139	36	30	2		2007	290	5' x 5" screen	251-256
Clapson	5175 Locust Grove	260	130	130	75	2	10	2002	960	10' x 5" screen	250-260
Harris	SWNW Sec 32	269	125		40	1	10	1973	760	Open bore	223-269
Developer	1650 Suzan	275	117	120	80	0.25		1996	980	5' x 5" screen	270-275
Jobe (Replacement)	5495 Locust Grove	295	130		15	14		1983	470	Open pipe	293-295
Stuart (Jobe original?)	SENE Sec 31	300	180					1966	470	Gravel Pack & Perf Pipe	Gravel 224 - Pipe 260-300
Ralph	SWNW Sec 32	318	140		30	1	10	1992	1500	10' x 5" Screen	307-317
All American	1270 Tanya Lane	345	120	142	60	0.5		2006	1200	10' x 5" Screen	335-345
Fred Nitz	5325 Locust Grove	360	135		100	2		1992	500	5' x 5" screen	351-356
H. Nitz	5445 Locust Grove								350		
Hansen	1440 Mary Ln	306	130		30			1963	0	?	?

Highlighted rows reflect the available information of the protestant's wells.

Table 2 Drawdown Estimates Resulting from Diversions Under the Hansen Application for Permit

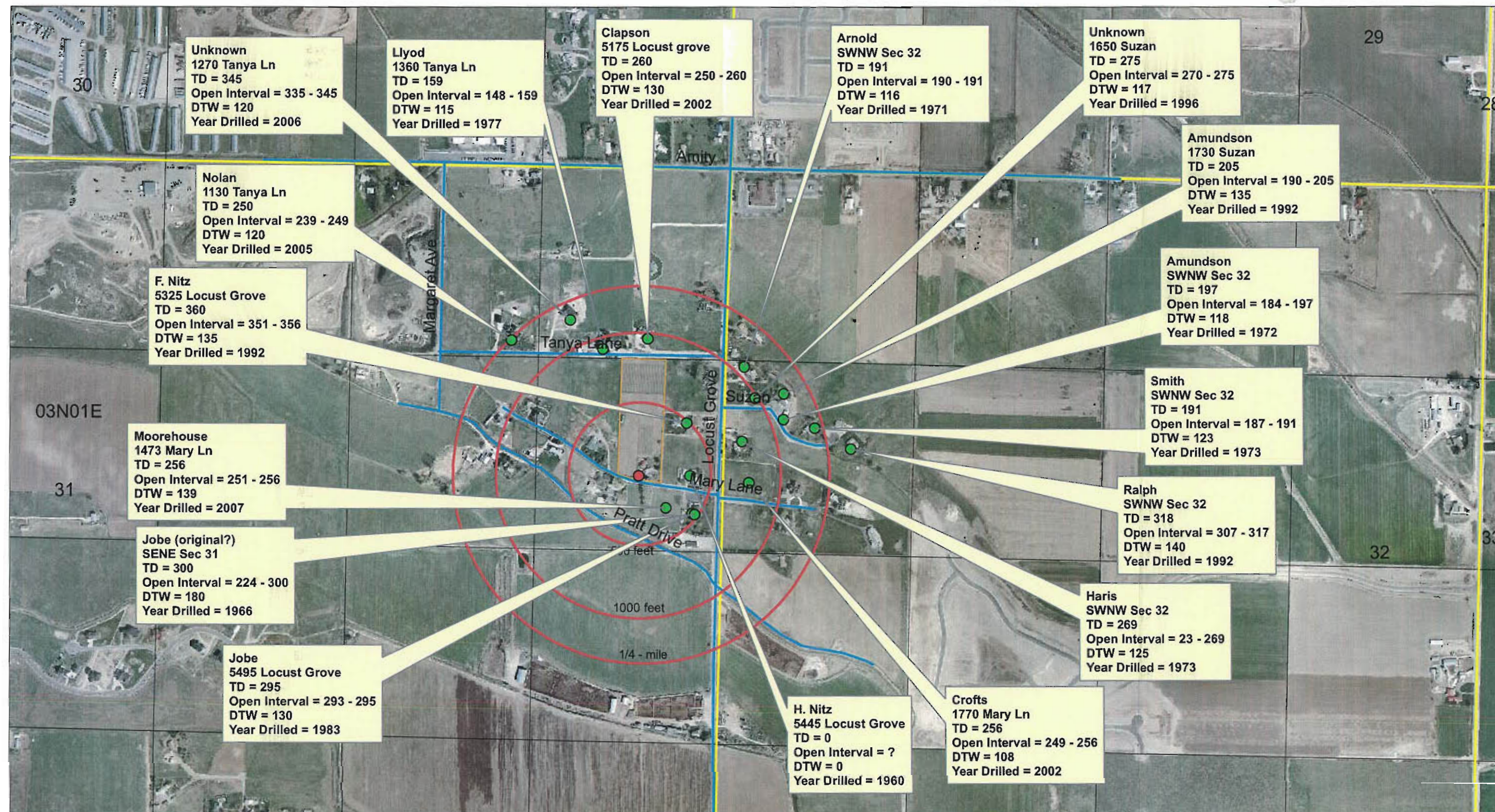
Diversion Rate	Duration	Storativity	Hydraulic Conductivity	Distance	Drawdown
cfs	days	unitless	ft/day	ft	ft
0.04	365	0.1	45	300	1.3
(18 gpm)				500	1.0
				1000	0.6
				1320	0.5
		0.005	45	300	2.3
				500	2.0
				1000	1.5
				1320	1.4

Assumptions:

Annual commercial volume is unknown.

Current pump can produce 18 gpm (0.04 cfs)

Continuous pumping for 365 days produces 29.2 ac-ft



Hansen Location Map and Nearby Wells

Legend

- Nearby_Wells
- Hansen_Well
- Roads
- Radial_Distance
- Hansen Property

Figure 1

Section 31, T3N, R1E
Ada County, Idaho

0 500 1,000
Feet



Prepared for: Hansen
File: z:\projects\3764
November 30, 2009

ERO

Appendix A
Well Driller Reports

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water, 10 days after the completion or abandonment of the well.

RECEIVED

[illegible]

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE COPY TO THE DEPARTMENT

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

[illegible]

USE ADDITIONAL SHEETS IF NECESSARY. FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

[illegible]

USE ADDITIONAL SHEETS IF NECESSARY

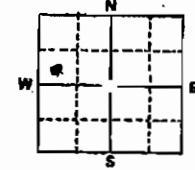
FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR
BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

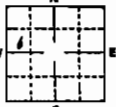
State law requires that this report be filed with the State Reclamation Engineer
within 30 days after completion or abandonment of the well.

1. WELL OWNER Name <u>Walter Arrundson</u> Address <u>4220 S. 5 mile Road Boise</u> Owner's Permit No. _____		7. WATER LEVEL Static water level <u>118'</u> feet below land surface Flowing? ☐ Yes ☐ No G.P.M. flow _____ Temperature _____ ° F. Quality _____ Artesian closed-in pressure _____ p.s.i. Controlled by ☐ Valve ☐ Cap ☐ Plug																																																											
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Abandoned (describe method of abandoning) _____		8. WELL TEST DATA ☐ Pump ☒ Bailor ☐ Other <table border="1"><thead><tr><th>Discharge G.P.M.</th><th>Draw Down</th><th>Hours Pumped</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></tbody></table>		Discharge G.P.M.	Draw Down	Hours Pumped																																																							
Discharge G.P.M.	Draw Down	Hours Pumped																																																											
3. PROPOSED USE ☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal ☐ Industrial ☐ Stock		9. LITHOLOGIC LOG <u>328120</u> <table border="1"><thead><tr><th rowspan="2">Hole Diam.</th><th colspan="2">Depth</th><th rowspan="2">Material</th><th colspan="2">Water</th></tr><tr><th>From</th><th>To</th><th>Yes</th><th>No</th></tr></thead><tbody><tr><td>6"</td><td>0</td><td>5</td><td>Soil & gravel</td><td> </td><td> </td></tr><tr><td> </td><td>5</td><td>40</td><td>Baldy sand</td><td> </td><td> </td></tr><tr><td>5/8"</td><td>40</td><td>140</td><td>sand & clay</td><td> </td><td> </td></tr><tr><td>1 1/2"</td><td>140</td><td>160</td><td>clay</td><td> </td><td> </td></tr><tr><td>1 1/2"</td><td>160</td><td>172</td><td>clay</td><td> </td><td> </td></tr><tr><td>1 1/2"</td><td>172</td><td>181</td><td>hard steel</td><td> </td><td> </td></tr><tr><td>1 1/2"</td><td>181</td><td>187</td><td>clay</td><td> </td><td> </td></tr><tr><td>1 1/2"</td><td>187</td><td>197</td><td>clay</td><td> </td><td> </td></tr></tbody></table>		Hole Diam.	Depth		Material	Water		From	To	Yes	No	6"	0	5	Soil & gravel				5	40	Baldy sand			5/8"	40	140	sand & clay			1 1/2"	140	160	clay			1 1/2"	160	172	clay			1 1/2"	172	181	hard steel			1 1/2"	181	187	clay			1 1/2"	187	197	clay		
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4. METHOD DRILLED ☒ Cable ☐ Rotary ☐ Dug ☐ Other		10. Work started <u>Feb 3/1922</u> finished <u>Feb 22/1922</u>																																																											
5. WELL CONSTRUCTION Diameter of hole <u>6 1/2</u> inches Total depth <u>197</u> feet Casing schedule: ☐ Steel ☐ Concrete <table border="1"><thead><tr><th>Thickness</th><th>Diameter</th><th>From</th><th>To</th></tr></thead><tbody><tr><td><u>2 1/2</u> inches</td><td><u>6</u> inches</td><td><u>41</u> feet</td><td><u>190</u> feet</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table> Was a packer or seal used? ☐ Yes ☒ No Perforated? ☒ Yes ☐ No How perforated? ☐ Factory ☐ Knife ☒ Torch Size of perforation <u>5/8</u> inches by <u>2 1/2</u> inches <table border="1"><thead><tr><th>Number</th><th>From</th><th>To</th></tr></thead><tbody><tr><td><u>30</u> perforations</td><td><u>186</u> feet</td><td><u>190</u> feet</td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></tbody></table> Well screen installed? ☐ Yes ☒ No Manufacturer's name _____ Type _____ Model No. _____ Diameter _____ Slot size _____ Set from _____ feet to _____ feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☒ Yes ☐ No Size of gravel _____ Placed from <u>184</u> feet to <u>194</u> feet Surface seal? ☒ Yes ☐ No To what depth <u>197</u> feet Material used in seal ☐ Cement grout ☒ Puddling clay		Thickness	Diameter	From	To	<u>2 1/2</u> inches	<u>6</u> inches	<u>41</u> feet	<u>190</u> feet																	Number	From	To	<u>30</u> perforations	<u>186</u> feet	<u>190</u> feet							11. DRILLER'S CERTIFICATION This well was drilled under my supervision and this report is true to the best of my knowledge. <u>Pete Cope Drilling Co 213</u> Driller's or Firm's Name Number <u>Box 561 Meridian Idaho</u> Address <u>Pete Cope Feb 24 22</u> Signed By Date																							
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USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORTUSE TYPEWRITER OR
BALLPOINT PENState law requires that this report be filed with the Director, Department of Water Resources
within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>Walt Amundson</u> Address <u>1730 Susan Meridian 83642</u> Drilling Permit No. <u>67-92-W-253</u> Water Right Permit No. _____	7. WATER LEVEL Static water level <u>135'</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature _____ °F. Quality _____ Describe artesian or temperature zones below.																																																																																								
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Well diameter increase ☐ Modification ☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)	8. WELL TEST DATA ☐ Pump ☒ Baller ☐ Air ☐ Other _____ <table border="1"><thead><tr><th>Discharge G.P.M.</th><th>Pumping Level</th><th>Hours Pumped</th></tr></thead><tbody><tr><td><u>30' 6pm</u></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></tbody></table>	Discharge G.P.M.	Pumping Level	Hours Pumped	<u>30' 6pm</u>																																																																																				
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5. WELL CONSTRUCTION Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____ Thickness _____ Diameter _____ From _____ To _____ <u>250</u> inches <u>6</u> inches + <u>1</u> feet <u>190</u> feet _____ inches _____ inches _____ feet _____ feet _____ inches _____ inches _____ feet _____ feet Was casing drive shoe used? ☒ Yes ☐ No Was a packer or seal used? ☐ Yes ☒ No Perforated? ☐ Yes ☒ No How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun Size of perforation? _____ inches by _____ inches Number _____ From _____ To _____ _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet Well screen installed? ☒ Yes ☐ No Manufacturer <u>Johnson</u> Type <u>Stainless</u> Top Packer or Headpipe <u>10' 5" Head Pipe</u> Bottom of Tailpipe <u>0</u> Diameter <u>6"</u> Slot size <u>35</u> Set from <u>190</u> feet to <u>205</u> feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____ Placed from _____ feet to _____ feet Surface seal depth <u>20'</u> Material used in seal: ☐ Cement grout ☒ Bentonite ☐ Pudding clay ☐ _____ Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☐ Overbore to seal depth Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata Describe access port _____																																																																																									
6. LOCATION OF WELL Sketch map location must agree with written location.  Subdivision Name <u>Uppine</u> Lot No. <u>4</u> Block No. _____ County <u>Ada</u> SW 1/4 NW 1/4 Sec. <u>32</u> , T. <u>3</u> N ☒ S ☐ E ☒ W ☐	11. DRILLER'S CERTIFICATION I/we certify that all minimum well construction standards were complied with at the time the rig was removed. Firm Name <u>Skarwater Drilling</u> Firm No. <u>382</u> Address <u>628 4th St. Ext</u> Date _____ Signed by Drilling Supervisor <u>Brad Hanson</u> and _____ (Operator) _____ (If different than the Drilling Supervisor)																																																																																								

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

835958
Office Use Only
Well ID No. 406443
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 _____ 1/4 _____ 1/4 _____
Lat: : : Long: : :

1. WELL TAG NO. D D0041912
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name PAT NOLAN
Address 10625 S. LONE TREE
City BOISE State ID Zip 83709

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 3 North ☒ or South ☐
Rge. 1 East ☒ or West ☐
Sec. 31 1/4 SE 1/4 NE 1/4 SW 1/4
Gov't Lot _____ County ADA 160 acres
Lat: : : Long: : :
Address of Well Site TANJA LN. City MERIDIAN
(Give at least name of road + Distance to Road or Landmark)
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
<u>5/8 BENTONITE</u>	<u>0</u>	<u>19</u>	<u>750 lbs.</u>	<u>10" OVERBORE</u>

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 228'
Was drive shoe seal tested? ☐ Y ☒ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
<u>6"</u>	<u>1 1/2</u>	<u>228</u>	<u>250</u>	<u>STEEL</u>	☒	☐	☒	☐
<u>5"</u>	<u>214</u>	<u>239</u>	<u>258</u>	<u>STEEL</u>	☐	☒	☒	☐
<u>5"</u>	<u>249</u>	<u>250</u>	<u>250</u>	<u>STEEL</u>	☐	☒	☒	☐

Length of Headpipe 24.9 Length of Tailpipe 1.0
Packer ☒ Y ☐ N Type RUBBER K-PACKER

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method _____
Screen Type & Method of Installation JOHNSON / WASHDOWN

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
<u>239</u>	<u>249</u>	<u>.020</u>	<u>304</u>	<u>5"</u>	<u>S.S.</u>	☐	☒

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
<u>N/A</u>				

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

120 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

12. WELL TESTS:

☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
<u>50</u>			<u>3 hrs.</u>

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____

13. LITHOLOGIC LOG: (Describe repairs or abandonment) Depth first Water Encounter _____

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
<u>10"</u>	<u>0</u>	<u>2</u>	<u>TOP SOIL</u>		☒
	<u>2</u>	<u>6</u>	<u>HARD PAN</u>		☒
	<u>6</u>	<u>19</u>	<u>GRAVEL</u>		☒
<u>6"</u>	<u>19</u>	<u>54</u>	<u>GRAVEL</u>		☒
	<u>54</u>	<u>66</u>	<u>SANDY RED CLAY</u>		☒
	<u>66</u>	<u>79</u>	<u>SANDY CLAY w/ SAND</u>		☒
	<u>79</u>	<u>114</u>	<u>COARSE SAND w/ GRAVEL</u>		☒
	<u>114</u>	<u>125</u>	<u>SANDY CLAY w/ SAND</u>		☒
	<u>125</u>	<u>186</u>	<u>SANDY CLAY</u>		☒
	<u>186</u>	<u>206</u>	<u>BEN. COARSE SAND</u>	☒	
	<u>206</u>	<u>211</u>	<u>SANDY CLAY</u>		☒
	<u>211</u>	<u>221</u>	<u>BEN. COARSE SAND</u>	☒	
	<u>221</u>	<u>229</u>	<u>BEN. SANDY CLAY</u>		☒
	<u>229</u>	<u>250</u>	<u>WHITISH SAND</u>	☒	

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OCT 12 2005

WATER RESOURCES
WESTERN REGION

Completed Depth 250' (Measurable)
Date: Started 9/14/05 Completed 9/16/05

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name DENNIS PHIPPS WELL DRILLING INC. Firm No. 332

Principal Driller Mark Phipps Date 9/19/05

and Driller or Operator II _____ Date _____

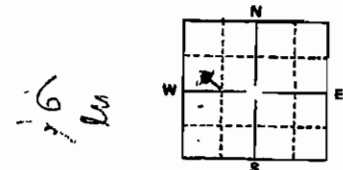
Operator I _____ Date _____

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>Joe Harris</u> Address <u>Meridian, Idaho 83642</u> Owner's Permit No. _____		7. WATER LEVEL Static water level <u>125</u> feet below land surface Flowing? ☐ Yes ☒ No G.P.M. flow _____ Temperature _____ ° F. Quality _____ Artesian closed-in pressure _____ p.s.i. Controlled by ☐ Valve ☐ Cap ☐ Plug																																																																																									
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Abandoned (describe method of abandoning) _____		8. WELL TEST DATA ☐ Pump ☐ Bailer ☒ Other Discharge G.P.M. _____ Draw Down _____ Hours Pumped _____																																																																																									
3. PROPOSED USE ☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal ☐ Industrial ☐ Stock		9. LITHOLOGIC LOG <u>028117</u> <table border="1"><thead><tr><th rowspan="2">Hole Diam.</th><th colspan="2">Depth</th><th rowspan="2">Material</th><th colspan="2">Water</th></tr><tr><th>From</th><th>To</th><th>Yes</th><th>No</th></tr></thead><tbody><tr><td>9"</td><td>0</td><td>2</td><td>Topsoil</td><td></td><td>X</td></tr><tr><td>9"</td><td>2</td><td>20</td><td>Clay and boulders</td><td></td><td>X</td></tr><tr><td>6"</td><td>20</td><td>24</td><td>Brown sand</td><td></td><td>X</td></tr><tr><td>6"</td><td>24</td><td>50</td><td>Cemented gravel</td><td></td><td>X</td></tr><tr><td>6"</td><td>50</td><td>55</td><td>Sand (brown)</td><td></td><td>X</td></tr><tr><td>6"</td><td>55</td><td>120</td><td>Sandy clay</td><td></td><td>X</td></tr><tr><td>6"</td><td>120</td><td>150</td><td>Brown sand</td><td></td><td>X</td></tr><tr><td>6"</td><td>150</td><td>175</td><td>Sandy clay</td><td></td><td>X</td></tr><tr><td>6"</td><td>175</td><td>212</td><td>Heaving sand</td><td></td><td>X</td></tr><tr><td>6"</td><td>212</td><td>220</td><td>Brown clay</td><td></td><td>X</td></tr><tr><td>6"</td><td>220</td><td>223</td><td>Brown sand and gravel</td><td>X</td><td></td></tr><tr><td>6"</td><td>223</td><td>246</td><td>Brown sand</td><td>X</td><td>X</td></tr><tr><td>6"</td><td>246</td><td>261</td><td>White & grey sand</td><td>X</td><td>X</td></tr></tbody></table>		Hole Diam.	Depth		Material	Water		From	To	Yes	No	9"	0	2	Topsoil		X	9"	2	20	Clay and boulders		X	6"	20	24	Brown sand		X	6"	24	50	Cemented gravel		X	6"	50	55	Sand (brown)		X	6"	55	120	Sandy clay		X	6"	120	150	Brown sand		X	6"	150	175	Sandy clay		X	6"	175	212	Heaving sand		X	6"	212	220	Brown clay		X	6"	220	223	Brown sand and gravel	X		6"	223	246	Brown sand	X	X	6"	246	261	White & grey sand	X	X
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4. METHOD DRILLED ☐ Cable ☒ Rotary ☐ Dug ☐ Other																																																																																											
5. WELL CONSTRUCTION Diameter of hole <u>6</u> inches Total depth <u>223</u> feet Casing schedule: ☒ Steel ☐ Concrete Thickness _____ Diameter _____ From _____ To _____ <u>250</u> inches <u>6</u> inches + <u>1</u> feet <u>223</u> feet _____ inches _____ inches _____ feet _____ feet _____ inches _____ inches _____ feet _____ feet _____ inches _____ inches _____ feet _____ feet _____ inches _____ inches _____ feet _____ feet Was a packer or seal used? ☐ Yes ☒ No Perforated? ☐ Yes ☒ No How perforated? ☐ Factory ☐ Knife ☐ Torch Size of perforation _____ inches by _____ inches Number _____ From _____ To _____ _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet Well screen installed? ☐ Yes ☒ No Manufacturer's name _____ Type _____ Model No. _____ Diameter _____ Slot size _____ Set from _____ feet to _____ feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☐ Yes ☒ No Size of gravel _____ Placed from _____ feet to _____ feet Surface seal? ☒ Yes ☐ No To what depth <u>20</u> feet Material used in seal ☐ Cement grout ☒ Puddling clay																																																																																											
6. LOCATION OF WELL Sketch map location must agree with written location.  County <u>Ada</u> <u>SW 1/4 NW 1/4 Sec. 32 T. 3 N. 1 E. 1</u>		10. Work started <u>6/22/73</u> finished <u>6/23/73</u>																																																																																									
		11. DRILLER'S CERTIFICATION This well was drilled under my supervision and this report is true to the best of my knowledge. Frank Skinner Well Drilling 212 Driller's or Firm's Name Number Rt. 3, Meridian, Idaho 83642 Address Signed By <u>Frank Skinner</u> <u>2-12-74</u>																																																																																									

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

Form 238-7
3/96

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

057391

Office Use Only		
Inspected by		
Twp	Rge	Sec
1/4	1/4	1/4
Lat	:	Long
:	:	:

1. DRILLING PERMIT NO. 63-96-W-0650-000

Other IDWR No

2. OWNER:

Name MERT HOMES (LAPS)
Address 1560 NORTH CRESTMONT STE E
City MERIDIAN State ID Zip 83642

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location

N		Twp. <u>3</u>		North ☒ or South ☐	
E		Rge <u>1</u>		East ☒ or West ☐	
S		Sec. <u>32</u>		NW 1/4 1/4 1/4 1/4	
		Gov't Lot		County <u>ADA</u>	
		Lat		Long	

Address of Well Site 1650 SUZAN DR
City MERIDIAN

Lt. Blk. Sub Name

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT Sacks or Pounds	METHOD
Material	From	To		
BENTONITE	0	18	500*	OVERBORE

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 269

Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	269	26	STEEL	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 10 Length of Tailpipe

9. PERFORATIONS/SCREENS

☐ Perforations Method
☒ Screens Screen Type HOUSTON

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
170	175	.020		5"	SS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

117 ft below ground Artesian pressure lb.
Depth flow encountered ft Describe access port or control devices:

11. WELL TESTS:

☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Pumping Level	Time
80			1/4 HR

Water Temp 60° Bottom hole temp.

Water Quality test or comments: 3-IRON/8 PH/16 GRUS

Depth first Water Encountered 120

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
10	0	1	TOP SOIL		
	1	6	HARD PAN		
	6	18	SAND & GRAVEL		
	18	36	SAND		
	36	42	CLAY		
	42	47	SANDY CLAY		
	47	59	SAND		
	59	62	SANDY CLAY		
	62	78	SAND		
	78	92	CLAY		
	92	120	SAND		
	120	146	CLAY		
	146	157	SAND		
	157	181	SANDY CLAY		
	181	187	SAND		
	187	191	CLAY		
	191	197	SAND		
	197	220	CLAY		
	220	223	SAND		
	223	267	CLAY		
	267	269	SAND		
	269	271	CLAY		
	271	275	SAND		

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OCT 28 1996

OCT 08 1996

MICROFILMED

Department of Water Resources

WATER RESOURCES
WESTERN REGION

OCT 06 1996

Completed Depth 275 (Measurable)

Date: Started 8-30-96 Completed 9-3-96

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Adams Pump Drilling Firm No 0457

Firm Official Dave Adams Date 9-6-96

and Supervisor or Operator W. B. Adams Date 9-6-96

(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources
within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>GEORGE STEWART</u> Address <u>5495 SLAUGHTER GROVE, MERIDIAN ID.</u> Owner's Permit No. <u>63-83-C-0044-200</u> ⁸³⁶⁴²	7. WATER LEVEL Static water level <u>130</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature <u>55</u> °F. Quality <u>GOOD</u>																																																																																																												
2. NATURE OF WORK ☒ New well ☐ Deepened ☒ Replacement ☐ Abandoned (describe method of abandoning) <u>WELDED</u> <u>CAP ON EXISTING WELL</u>	8. WELL TEST DATA ☒ Pump ☐ Bailor ☐ Air ☐ Other _____ <table border="1" style="width: 100%; border-collapse: collapse;"><tr><th>Discharge G.P.M.</th><th>Pumping Level</th><th>Hours Pumped</th></tr><tr><td><u>15</u></td><td><u>130</u></td><td><u>14</u></td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></table>	Discharge G.P.M.	Pumping Level	Hours Pumped	<u>15</u>	<u>130</u>	<u>14</u>																																																																																																						
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4. METHOD DRILLED ☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary ☒ Cable ☐ Dug ☐ Other _____	RECEIVED JUN 7 1984 Department of Water Resources Western Regional Office MICROFILMED																																																																																																												
5. WELL CONSTRUCTION Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____ <table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th>Thickness</th><th>Diameter</th><th>From</th><th>To</th></tr></thead><tbody><tr><td><u>2.50</u> inches</td><td><u>6</u> inches</td><td><u>1</u> feet</td><td><u>293</u> feet</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table> Was casing drive shoe used? ☒ Yes ☐ No Was a packer or seal used? ☐ Yes ☒ No Perforated? ☐ Yes ☒ No How perforated? ☐ Factory ☐ Knife ☐ Torch Size of perforation _____ inches by _____ inches Number _____ From _____ To _____ _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet _____ perforations _____ feet _____ feet Well screen installed? ☐ Yes ☒ No Manufacturer's name _____ Type _____ Model No. _____ Diameter _____ Slot size _____ Set from _____ feet to _____ feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____ Placed from _____ feet to _____ feet Surface seal depth <u>18'</u> Material used in seal: ☐ Cement grout ☒ Puddling clay ☐ Well casings Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata Describe access port _____	Thickness	Diameter	From	To	<u>2.50</u> inches	<u>6</u> inches	<u>1</u> feet	<u>293</u> feet													10. Work started <u>8-21-83</u> finished <u>9-7-83</u>																																																																																								
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6. LOCATION OF WELL Sketch map location must agree with written location. N W E S Subdivision Name _____ Lot No. _____ Block No. _____ County <u>ADA</u> <u>SE 1/4 NE 1/4 Sec. 31, T. 3 N. R. 1 E.</u>	11. DRILLERS CERTIFICATION <u>22</u> I/We certify that all minimum well construction standards were compiled with at the time the rig was removed. Firm Name <u>COONSE WELL DR.</u> Firm No. <u>409</u> Address <u>BOISE, ID.</u> Date <u>9-10-83</u> Signed by (Firm Official) <u>Ang E. Coonse</u> and (Operator) _____																																																																																																												

REPORT OF WELL DRILLER
State of Idaho

OCT 19 1966

Department of Reclamation

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:

Name Vanita StuartAddress Route 1Meridian, Idaho

Owner's Permit No. _____

NATURE OF WORK (check): Replacement well ☐New well ☒ Deepened ☐ Abandoned ☐

Water is to be used for: Domestic

METHOD OF CONSTRUCTION: Rotary ☒ Cable ☐Dug ☐ Other _____

(explain)

CASING SCHEDULE: Threaded _____ Welded ☒

5" "Diam. from 0 ft. to 260 ft.

6-5/8" "Diam. from 260 ft. to 300 ft.

"Diam. from _____ ft. to _____ ft.

"Diam. from _____ ft. to _____ ft.

Thickness of casing: 10ga Material:

Steel ☒ concrete ☐ wood ☐ other ☐

(explain)

PERFORATED? Yes ☒ No ☐ Type ofperforator used: machine

Size of perforations: 1/8" by 3"

1920 perforations from 260 ft. to 300 ft.

perforations from _____ ft. to _____ ft.

perforations from _____ ft. to _____ ft.

perforations from _____ ft. to _____ ft.

WAS SCREEN INSTALLED? Yes ☐ No ☒

Manufacturer's name _____

Type _____ Model No. _____

Diam. Slot size Set from _____ ft. to _____ ft.

Diam. Slot size Set from _____ ft. to _____ ft.

CONSTRUCTION: Well gravel packed? Yes ☒No. ☐ size of gravel 3/8 Gravel

placed from 224 ft. to _____ Surface seal

provided? Yes ☐ No ☐ To what depth?

ft. Material used in seal: _____

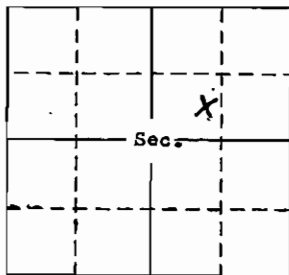
Did any strata contain unusable water? Yes ☐No. ☐ Type of water: _____

Depth of strata _____ ft. Method of sealing

strata off: _____

Surface casing used? Yes ☐ No ☐Cemented in place? Yes ☐ No ☐

Locate well in section

LOCATION OF WELL: County AdaNE 1/4 Sec. 31 T. 3 N. R. 1 E. BM

Use other side for additional remarks

Size of drilled hole: 12 1/4" Total
depth of well: 300' Standing water
level below ground: 180' Temp.
Fahr. _____ Test delivery: _____ gpm
or _____ cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:

Length of time of test: _____ Hrs. _____ Min.

Drawdown: _____ ft. Artesian pressure: ft.

above land surface Give flow _____ cfs

or _____ gpm. Shutoff pressure: _____

Controlled by: Valve ☐ Cap ☐ Plug ☐No control ☐ Does well leak around casing?Yes ☐ No ☐ MATERIAL 108447 WATER

FROM TO YES OR NO

FEET FEET

0	7	Top Soil - hardpan	no
7	10	Boulders	no
10	13 1/2	Boulders	no
13 1/2	17	Boulders	no
17	18	Boulders	no
18	21	Boulders	no
21	24 1/2	Boulders	no
24 1/2	28	Boulders	no
28	31	Boulders	no
31	34	Boulders	no
34	35	Boulders	no
35	38	Boulders	no
38	41 1/2	Boulders	no
41 1/2	45	Boulders	no
45	48	Boulders	no
48	51 1/2	Boulders	no
51 1/2	55	Boulders	no
55	58	Boulders - Sand	no
58	64	Boulders - Sand	no
64	67	Boulders - sand	no
67	80	Boulders - sand	no
80	83 1/2	Boulders - sand	no
83 1/2	90	Sand - Clay	no
90	97	Boulders - sand	no
97	100	Boulders - sand	no
100	105	Boulders - clay	no
105	108	Boulders - clay	no
108	112	Boulders - clay	no
112	115	Boulders - clay	no
115	117 1/2	Boulders - clay	no
117 1/2	132	Sand - clay	no
132	136	Boulders - clay	no
136	138	Boulders - clay	no
138	140	Boulders - Clay	no
140	143	Boulders - clay	no
143	145 1/2	Boulders - clay	no
145 1/2	155	Sand - brown clay	no
155	175	Sand - brown clay	no

Work started: 10/3/66

Work finished: 10/11/66

Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.

Name: B & M Well Drilling Co., Inc.Address: Caldwell, IdahoSigned by: Russell HarvintonLicense No. 221 Date: 10/18/66

USGS

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

837943

Office Use Only
Well ID No. 408365
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 _____ 1/4 _____ 1/4 _____
Lat: _____ Long: _____

1. WELL TAG NO. D0042400
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name All American
Address 4067 S Nickle Creek
City Meridian State Id. Zip 83642

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub or Directions to well.
Twp 3 North ☒ or South ☐
Rge 1 East ☒ or West ☐
Sec 31 1/4 NE 1/4 NE 1/4
Gov't Lot _____ County Ada
Lat: _____ Long: _____
Address of Well Site 1370 Tonya Lane
City Meridian
(Give at least name of road + Distance to Road or Landmark)
Lt. _____ Blk _____ Sub Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
<u>Reton-15</u>	<u>0</u>	<u>20</u>	<u>800</u>	<u>Slow Pour</u>

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 315
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
<u>6"</u>	<u>0</u>	<u>319'</u>	<u>25G</u>	<u>Steel</u>	☒	☐	☒	☐

Length of Headpipe 31' Length of Tailpipe 0
Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method _____
Screen Type & Method of Installation Wash

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
<u>345</u>	<u>335</u>	<u>15"</u>	<u>5</u>	<u>5"</u>	<u>SS</u>	☐	☒

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

120 ft below ground Artesian pressure _____ lb
Depth flow encountered _____ ft Describe access port or control devices: _____

12. WELL TESTS:

☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
<u>60</u>		<u>300</u>	<u>1/2</u>

Water Temp _____ Bottom hole temp. 60°
Water Quality test or comments: Iron 1.0 PH 7.5 60 and 5
Depth first Water Encounter 142'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology Water Quality & Temperature	Y	N
<u>10</u>	<u>0</u>	<u>5</u>	<u>Top Soil</u>		
<u>10</u>	<u>5</u>	<u>20</u>	<u>Gravel</u>		
<u>10</u>	<u>20</u>	<u>55</u>	<u>Gravel</u>		
<u>12</u>	<u>55</u>	<u>62</u>	<u>Gravel + Sand</u>		
	<u>62</u>	<u>92</u>	<u>Sand</u>		
	<u>92</u>	<u>140</u>	<u>Clay with Sand Strips</u>		
	<u>140</u>	<u>142</u>	<u>Sand</u>		X
	<u>142</u>	<u>170</u>	<u>Clay with Sand Strips</u>		
	<u>170</u>	<u>241</u>	<u>Sand w/ some gravel</u>		X
	<u>241</u>	<u>243</u>	<u>Clay</u>		
	<u>243</u>	<u>265</u>	<u>Sand w/ gravel - 25 g/m</u>		
	<u>265</u>	<u>280</u>	<u>Sand w/ gravel + clay Strips</u>		X
	<u>280</u>	<u>290</u>	<u>Sand w/ gravel + clay</u>		
	<u>290</u>	<u>314</u>	<u>Clay</u>		
	<u>314</u>	<u>314</u>	<u>Sand Little water</u>		X
	<u>314</u>	<u>322</u>	<u>Clay</u>		
	<u>322</u>	<u>336</u>	<u>Blue Clay</u>		
	<u>336</u>	<u>345</u>	<u>Sand</u>		

RECEIVED

JAN 18 2006

WATER RESOURCES
WESTERN REGION

RECEIVED

JAN 24 2006

WATER RESOURCES
WESTERN REGION

Completed Depth 345' (Measurable)
Date: Started 1/12/06 Completed 1/15/06

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed

Company Name ABC Well Drilling + Pump Firm No 6021
Principal Driller Andy Rose Date 1/9/06
and Driller or Operator Randy Payne Date 1/9/06
Operator Andrew Robinson Date 1/9/06
Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

USE TYPEWRITER OR
BALLPOINT PEN

State law requires that this report be filed with the Director, Department of Water Resources
within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>Fred Nitz</u> Address <u>S. Locust Grove (Meridian)</u> Drilling Permit No. <u>63-42-W-0942-000</u> Water Right Permit No. _____	7. WATER LEVEL Static water level <u>135</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature _____ °F. Quality _____ Describe artesian or temperature zones below.																																																																																																																																														
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Well diameter increase ☐ Modification ☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)	8. WELL TEST DATA ☐ Pump ☐ Baller ☒ Air ☐ Other _____ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Discharge G.P.M.</th> <th>Pumping Level</th> <th>Hours Pumped</th> </tr> </thead> <tbody> <tr> <td><u>100 GPM</u></td> <td><u>200 ft</u></td> <td><u>2 hrs</u></td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Discharge G.P.M.	Pumping Level	Hours Pumped	<u>100 GPM</u>	<u>200 ft</u>	<u>2 hrs</u>																																																																																																																																								
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<u>19</u>	<u>250</u>	<u>253</u>	<u>Light white sand some pebbles</u>		☒																																																																																																																																										
<u>20</u>	<u>253</u>	<u>264</u>	<u>Sandy light Brown Clay</u>		☒																																																																																																																																										
<u>21</u>	<u>264</u>	<u>285</u>	<u>Light Brown sand</u>		☒																																																																																																																																										
<u>22</u>	<u>285</u>	<u>303</u>	<u>Light Blue sand</u>		☒																																																																																																																																										
<u>23</u>	<u>303</u>	<u>320</u>	<u>Sandy light Blue Clay</u>		☒																																																																																																																																										
<u>24</u>	<u>320</u>	<u>321</u>	<u>Light Blue sand</u>		☒																																																																																																																																										
<u>25</u>	<u>321</u>	<u>335</u>	<u>Sandy light Blue Clay</u>		☒																																																																																																																																										
<u>26</u>	<u>335</u>	<u>336</u>	<u>Light Blue sand</u>		☒																																																																																																																																										
<u>27</u>	<u>336</u>	<u>360</u>	<u>White sand & Gravel/Boulders</u>		☒																																																																																																																																										
4. METHOD DRILLED ☐ Rotary ☐ Air ☐ Auger ☐ Reverse rotary ☒ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)	5. WELL CONSTRUCTION Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Thickness</th> <th>Diameter</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td><u>250</u> inches</td> <td><u>6</u> inches</td> <td><u>1</u> feet</td> <td><u>349</u> feet</td> </tr> <tr> <td><u>166</u> inches</td> <td><u>5</u> inches</td> <td><u>336</u> feet</td> <td><u>351</u> feet</td> </tr> <tr> <td><u>166</u> inches</td> <td><u>5</u> inches</td> <td><u>356</u> feet</td> <td><u>358</u> feet</td> </tr> </tbody> </table> Was casing drive shoe used? ☒ Yes ☐ No Was a packer or seal used? ☐ Yes ☒ No Perforated? ☐ Yes ☒ No How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun Size of perforation? _____ inches by _____ inches <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Number</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>_____ perforations</td> <td>_____ feet</td> <td>_____ feet</td> </tr> <tr> <td>_____ perforations</td> <td>_____ feet</td> <td>_____ feet</td> </tr> <tr> <td>_____ perforations</td> <td>_____ feet</td> <td>_____ feet</td> </tr> </tbody> </table> Well screen installed? ☒ Yes ☐ No Manufacturer <u>Houston</u> Type <u>Stainless Steel</u> Top Packer or Headpipe <u>336 ft</u> Bottom of Tailpipe <u>358 ft</u> Diameter <u>5"</u> Slot size <u>30</u> Set from <u>351</u> feet to <u>356</u> feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____ Placed from _____ feet to _____ feet Surface seal depth <u>16</u> Material used in seal: ☐ Cement grout ☐ Bentonite ☒ Puddling clay ☐ _____ Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata Describe access port _____	Thickness	Diameter	From	To	<u>250</u> inches	<u>6</u> inches	<u>1</u> feet	<u>349</u> feet	<u>166</u> inches	<u>5</u> inches	<u>336</u> feet	<u>351</u> feet	<u>166</u> inches	<u>5</u> inches	<u>356</u> feet	<u>358</u> feet	Number	From	To	_____ perforations	_____ feet	_____ feet	_____ perforations	_____ feet	_____ feet	_____ perforations	_____ feet	_____ feet																																																																																																																		
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6. LOCATION OF WELL Sketch map location must agree with written location. Subdivision Name _____ Lot No. _____ Block No. _____ County <u>Ada</u> Address of Well Site <u>Same as above</u> (give at least name of road) <u>SE</u> 1/4 <u>NE</u> 1/4 Sec. <u>31</u>, R. <u>1</u>, E. ☒ or W ☐	10. Work started <u>11/3/92</u> finished <u>11/24/92</u> 11. DRILLER'S CERTIFICATION I/We certify that all minimum well construction standards were complied with at the time the rig was removed. Firm Name <u>Boise Valley Pumping</u> Firm No. <u>207</u> Address <u>2550 S. Gardner</u> Date <u>3/4/93</u> Signed by Drilling Supervisor <u>[Signature]</u> and (Operator) <u>[Signature]</u> (If different than the Drilling Supervisor)																																																																																																																																														

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

EXHIBIT J

Resume of Steven R. Hannula (ERO Resources).

REPRESENTATIVE PROJECTS *Steven R. Hannula*

Water Rights

Water Right Assistance, Paramount Subdivision, Meridian, ID

Provided expertise in water right appropriations, transfers, and expert testimony to enable subdivision developers to comply with state law while operating the subdivision's irrigation and pond system.

Water Right Assistance to Dairies in Middleton, Parma, Mountain Home, and Boise, ID

Ensured adequate coverage to various dairy operations including acquisition of new lands/water rights, transferring water rights to new facilities, providing technical assistance in the Snake River Basin Adjudication to ensure properly filed claims, and obtaining new drilling permits for new wells.

Water Right Inventories, Canyon County, ID

Investigated the water right and water resource assets associated with two large farms being evaluated for potential acquisition. Each water right was studied to ensure accuracy and legitimacy, deficiencies were noted, and plans were provided to align the water rights to the current operations.

Water Resource Management

Stream Bank Restoration, Featherville, ID

Provided the engineering report and application to the Army Corps of Engineers to seek authorization to stabilize a stream bank along the South Fork of the Boise River.

Long-Term Monitoring of Geothermal Well, Boise, ID

Installed and maintain a datalogger in a Boise Front Geothermal well to collect water level data. Baseline data are reported to the Idaho Department of Water Resources to contribute to the on-going Boise Front Geothermal Study.

Water Quality

Arsenic Rule Compliance Public Drinking Water System, Boise, ID

Prepared the engineering report and operations and maintenance manual for permitting a point-of-use treatment strategy to address arsenic levels that exceed the drinking water standard.

Storm Water Pollution Control Plan (SWPCP), Ontario OR

Prepared the SWPCP for a gravel and concrete batch plant as part of the Oregon Department of Environmental Quality authorization to operate under the 1200-A permit; will also provide annual reports to remain in compliance. Prepared the Wastewater Management Plan for the Water Pollution Control Facility (WPCF) permit. To remain in compliance with the WPCF permit, semi annual reports are being provided.

Wastewater Lagoon Leak Test, Kuna, ID

Conducted multiple leak tests to comply with the IDEQ requirements for continued operation of wastewater lagoons. Using specialized equipment to monitor weather, water levels, and evaporation and technical analysis of the collected data, demonstrated that the lagoons do not leak beyond allowed limits

Water Supply

Public Water System Modification for Subdivision, Meridian, ID

Provided project management and engineering services to prepare a well site evaluation, engineering report, and plans and specifications for a new public water supply well.

Long Term Water Level Monitoring for various Public Water Systems

Installed and maintained dataloggers in public water supply and observation wells to establish baseline water level conditions, track long-term water level fluctuations, and document impacts to local water resources as subdivisions expand.

Steven R. Hannula *Hydrogeologist - Engineer*



BACKGROUND

Steve is a hydrogeologist, professional engineer, and professional geologist in ERO Resources Corporation's Boise, Idaho office. He has experience in water rights and water resource investigations, ground water characterization, and hydrogeologic conceptual model design. Steve has consulted for a variety of clients from large mining companies to large dairies, irrigation districts, land developers, and individual homeowners. Steve's niche within ERO and in Idaho is his familiarity with water rights and water resources.

Education

M.E. 1995, Geological Engineering, Colorado School of Mines

B.S. 1989, Geology, University of Wisconsin Oshkosh

Licensure

Professional Civil Engineer, Idaho #11805

Professional Geologist Idaho # 1098

SUMMARY OF EXPERIENCE

Water Rights Investigations. Steve facilitates the sale and transfer of water rights for clients by providing consulting and engineering services to water right owners, sellers, and buyers throughout Idaho. In recent years, work focused on ensuring water rights were accurately claimed in the Snake River Basin Adjudication. Other water rights work is centered on helping investors and developers to understand the water resources, water rights, proper management of the water right asset, and the limitations and possible liabilities associated with water right acquisitions.

Water Resource Management. Steve provides consulting and engineering services for a wide range of clients and projects, including wastewater evaporation ponds, water amenities for subdivisions, storm water runoff issues, geothermal resources and stream bank restoration.

Water Quality. Steve helps clients with water quality issues, including compliance monitoring of public water systems, preparation of storm water runoff plans, and establishing a baseline understanding for future Total Maximum Daily Load (TMDL) limitations. He has performed numerous leak tests on wastewater lagoons and prepared wastewater management plans.

Water Supply. Steve is experienced in preparing well site evaluations and engineering reports for modifying public water systems. He has installed and maintained water level monitoring devices for several clients, to track impacts to the water resource, and is familiar with new well construction.

Boise-Kuna Irrigation District

P.O. Box 330
129 North School Ave
Kuna, ID 83634 (208) 922-5608

November 04, 2009

Lawrence A Hansen
1440 E Mary Ln
Meridian, ID 83642-0000

Acct. No.: 60-2

Acres: 6.16

Address:

1440 E Mary Ln
Meridian, ID 83642-0000

Legal Description:

Tract B
Baker Acreage Tracts
Sec. 31 3N 1E

Delinquencies

2008 Delinquency (Must be paid in Full)	0.00
2008 - Filing Fees	0.00
Interest due as of 11/04/2009	0.00
Total, Delinquencies:	0.00

Fall Assessment

2008 - Unpaid Excess	0.00
2009 - Unpaid Toll	0.00
2009 - PUIS 200.00 per acre	0.00
2009 - District Assessment 2.00 per acre	12.32
2009 - Assessment Expense Fund 10.00 per acct	10.00
Total, Fall Assessment:	22.32

Spring Assessment

2009 - Excess @ \$ 14.00 per acre ft.	0.00
2010 - Toll @ \$ 62.00 per acre	381.92
**** Power Credit \$ 17.00 per acre	-104.72
Total, Spring Assessment:	277.20

TOTAL AMOUNT DUE: 299.52

#3701 1/18

A penalty of 2% is added to the delinquent amount and the total amount bears interest of 1% per month (12% per annum) until paid. NO WATER DELIVERY WILL BE MADE UNTIL PAID IN FULL. NO FURTHER NOTICE OF AMOUNT DUE WILL BE SENT. Checks accepted only subject to final payment thereof.

Thank You!

Lauren S. Boehlke
Secretary-Treasurer

Delinquent Payment

Acct. No.: 60-2

Name: Lawrence A Hansen

Date Due: Dec 20, 2009

Amount: 0.00

Boise-Kuna Irrigation District

Fall Payment

Acct. No.: 60-2

Name: Lawrence A Hansen

Date Due: Dec 20, 2009

Amount: 22.32

First half becomes delinquent if not paid on or before December 20th

Boise-Kuna Irrigation District

Spring Payment

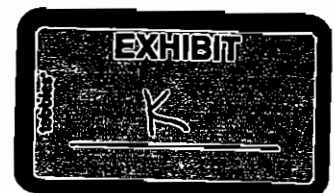
Acct. No.: 60-2

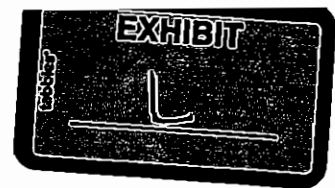
Name: Lawrence A Hansen

Amount: 277.20

Due 7 days prior to ordering water

Boise-Kuna Irrigation District





FPS GROWER AGREEMENT

THIS AGREEMENT is made this 6th day of March, 20 07, by and between Larry A. Hansen ("Grower") and the Regents of the University of California ("University"), in behalf of its Foundation Plant Services ("FPS").

WHEREAS, FPS desires to provide for the propagation and distribution of certain special clones of various plant materials maintained at the University's Davis campus, and

WHEREAS, Grower desires to propagate and sell said clones;

NOW, THEREFORE, the parties agree as follows:

1. FPS shall deliver to Grower all those materials listed on the order form that are currently available. After delivery, FPS shall send Grower an invoice for the materials supplied; said invoice shall then become a part of this Agreement. All materials are shipped F.O.B. Davis. Buyer agrees to pay all costs of transportation and assumes all risks during shipment. A storage charge may be made for material not picked up within 30 days of notification that material is ready.
2. Grower agrees to pay for said materials at FPS prices on the date of the order by sending checks made payable to The Regents of the University of California to FPS, University of California, One Shields Ave., Davis, 95616-8600. A 50% prepayment (100% for foreign orders) should be sent with the order; the balance is due within sixty (60) days after delivery. FPS may charge for costs incurred if order is changed by customer.
3. ~~Grower also agrees to pay to FPS by May 15 of each year a user fee of two cents (\$.02) for each propagative unit from all generations propagated from FPS grape materials which are sold, exchanged, or retained by Grower during the preceding calendar year, along with documentation from Grower's records supporting the amount of Grower's payment. A propagative unit is defined for purposes of this Agreement as the smallest vegetative unit used to produce a new plant, or as any unit derived in any way from the plant material provided hereunder, including transfer of genetic material whether by traditional breeding or biotechnology techniques including, but not limited to a cutting, rooting, benchgrafted vine, graftstick, or budstick or transfer of genetic material by any means. The user fee will not be charged for UC-patented material; charges for UC-patented items will be covered by a patent license agreement.~~
4. Grower shall maintain FPS identification in her/his plantings under this Agreement and shall, in accordance with generally accepted accounting standards, maintain records of all propagative units for which user fees are required. Plantings and records, including registration and certification records of the California Department of Food and Agriculture, shall be open to inspection and audit by an authorized FPS representative during normal business hours.
5. This Agreement shall be in effect for a term of ninety-nine (99) years from the date of execution or the life of the planting, whichever is longer, and shall be binding on the heirs, successors and assigns of the parties.
6. GROWER AGREES TO PURCHASE ALL PLANT MATERIAL "AS IS" AND "WITH ALL FAULTS."

AS TO REGISTERED MATERIAL, THE UNIVERSITY HAS ATTEMPTED TO LOCATE AND IDENTIFY PLANT MATERIAL WHICH IS TRUE TO VARIETY AND HAS TESTED NEGATIVE ON SPECIFIC VIRUS INDICATORS. THE UNIVERSITY MAKES NO WARRANTY, EXPRESS OR IMPLIED, REGARDING PLANT MATERIAL SOLD HEREUNDER.

THE UNIVERSITY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY FURTHER OBLIGATION OR LIABILITY ON THE PART OF THE UNIVERSITY. THE UNIVERSITY FURTHER DISCLAIMS LIABILITY FOR ANY LOSS OR DAMAGE, CONSEQUENTIAL OR OTHERWISE, RESULTING FROM DAMAGED OR DEFECTIVE PLANT MATERIALS.

IT IS UNDERSTOOD AND AGREED THAT THE UNIVERSITY WILL NOT BE RESPONSIBLE FOR ANY LOSS SUSTAINED BY REASON OF DEFECTS OR PROBLEMS DEVELOPED OR DISCOVERED AFTER THE PLANT MATERIALS PROVIDED HEREUNDER HAVE MATURED. THE UNIVERSITY IS NOT RESPONSIBLE FOR ANY LATENT DEFECT IN PLANT MATERIALS SOLD. THE UNIVERSITY IS NOT RESPONSIBLE FOR ANY GENETIC DEFECT OR OTHER DEFECT WHICH OCCURS OR WHICH BECOMES MANIFEST AFTER THE SALE OF PLANT MATERIALS OR WHICH OCCURS OR BECOMES MANIFEST IN PROGENY OF MATERIALS SOLD HEREUNDER.

IT IS UNDERSTOOD AND AGREED THAT IN NO CASE WILL THE PURCHASER OF PLANT MATERIAL BE ENTITLED TO OTHER THAN A REFUND OF THE PURCHASE PRICE THEREOF OR, AT THE OPTION OF THE UNIVERSITY, REPLACEMENT OF PLANT MATERIALS.

7. This constitutes the entire understanding between the parties of this matter and supersedes all other agreements, written or oral, between the parties.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date above written.

GROWER

Larry A. Hansen
Signature

THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA

V. V. Christ
Business Office/Distribution Manager, FPS

FOUNDATION PLANT SERVICES
 UNIVERSITY OF CALIFORNIA, ONE SHIELDS AVE., DAVIS, CA 95616-8600
 PHONE: (530) 752-3590 FAX: (530) 752-2132 EMAIL: fps@ucdavis.edu WEB: <http://fps.ucdavis.edu>

FPS ORDER ACKNOWLEDGEMENT

Date: 3/26/07

Order #: 7035

Ordered by: Larry Hansen
 Windy Ridge Estate Vineyard

Please refer to the above order
 number when inquiring about
 your order

Dear FPS Customer:

This is to acknowledge receipt of your request for plant material. Please carefully note the items checked below to ensure that all requirements have been met for your order, and respond as soon as possible to any additional items required. Your order will be confirmed when all of the checked items have been taken care of.

- ☒ Your order has been confirmed—all required materials have been received.
- ☒ Enclosed is University receipt #1007224 for your check in the amount of \$2,000.00.
- ☒ Enclosed is your copy of the signed order form, including the grower agreement and warranty/disclaimer statement.
- ☐ In response to your preliminary phone order, ordering materials are enclosed. You must complete the order form, sign the Grower Agreement on the second page of both copies (or on the reverse of the white and pink carbonless forms), and return both copies to FPS before your order can be confirmed or shipped.
- ☐ We have received a FAX, E-mail or photocopy of your order form. Before your order can be confirmed, you must mail us the original of your order form signed on the reverse side of both pages on the pink and white form, or two copies of the standard form with original signatures on the Grower's Agreement (second page) of both copies.
- ☐ Your order form is being returned for signature. You must sign the Grower Agreement on the reverse of both pages (white and pink) if using the NCR form, or on both copies of the standard form (printed off the website) and mail it back to FPS before your order can be confirmed.
- ☐ A 50% prepayment is required on all domestic orders (100% for foreign orders). Please forward your check in the amount of \$ _____, payable to "UC Regents," so that we may continue to process your order.
- ☐ A minimum order charge will apply to your order: \$100.00 for grape material and pistachio budwood; \$25.00 for fruit tree budwood and seed, pistachio seed and rose material.
- ☐ One or more items you have requested (marked "Not Available" on your copy of the order form) are not available at this time from FPS, either because they are not included in our collection, the plants are too immature to collect propagating material from, or all available material is sold out for the current season. If none of the items requested can be supplied, we are returning your order form (and prepayment if included).
- ☐ One or more items you have requested (marked "On Hold" on your copy of the order form) are currently on HOLD in our collection because: (1) all source vines are incorrectly identified and scheduled for removal; (2) the identity of source vines is in question; (3) all source vines are known to be infected with serious virus disease; or (4) there is a suspicion of serious disease in source vines. These items will not normally be supplied, and crop manager must approve any exceptions.
 - ☐ See attached sheet for more information

☐ PLEASE SEE REVERSE SIDE FOR ADDITIONAL IMPORTANT INFORMATION
 AND/OR REQUIREMENTS

☐ One or more items you have requested (marked "Provisional" on your copy of the order form) currently have "provisional" Foundation stock status, meaning that source plants have tested negative on all CDFA-prescribed disease tests, have been planted in a Foundation block at FPS, and are awaiting professional identification before they can achieve full Foundation status. CDFA currently allows Provisional Foundation stock to be planted in registered increase blocks with the understanding that, should source plants later prove to be incorrectly identified, CDFA may require removal of these materials from an increase block. If source plants prove to be true to variety, they are advanced to full Foundation stock status, and Foundation stock tags can be issued retroactively for the material upon request. The customer assumes all risk associated with the purchase of Provisional materials. FPS does not give replacements or refunds for Provisional materials later found to be incorrectly identified or diseased. UNLESS FPS IS NOTIFIED WITHIN 10 DAYS OF THIS NOTICE THAT PROVISIONAL MATERIALS ARE NOT ACCEPTABLE, AVAILABLE PROVISIONAL MATERIALS WILL BE SUPPLIED TO FILL THIS ORDER.

☐ One of more items you have requested (marked "Nonregistered" on your copy of the order form) are not currently available as California Foundation (registered) stock. Roses, pistachio and sweet potatoes are not part of a CDFA registration & certification program. For grape and tree material, nonregistered status indicates one or more of the following: (1) virus testing of source plants has not yet been completed; (2) the only source plants are diseased; (3) identity of source plants is suspected or known to be incorrect; and (4) the only plants of a selection are in a permanently non-registerable block that does not meet CDFA isolation requirements. Nonregistered materials are not eligible for planting in CDFA registered increase blocks. UNLESS FPS IS NOTIFIED WITHIN 10 DAYS OF THIS NOTICE THAT NON-REGISTERED MATERIALS ARE NOT ACCEPTABLE, AVAILABLE NON-REGISTERED MATERIALS WILL BE SUPPLIED TO FILL THIS ORDER.

☐ See attached sheet for more information

☐ One or more items you have requested (marked "Quarantined" on your copy of the order form) are currently in Federal quarantine at FPS and may not be distributed at this time. These items will not be supplied.

☐ One or more items you have requests (marked "UC-Patented" on your copy of the order form) are University of California patented varieties which can be distributed only to those with formalized license agreements with the University. Before any material of these items can be supplied, FPS must receive written authorization from UC intellectual property officials that you are currently licensed to receive them. To request licensing, contact:

___ UC Office of Technology Transfer, Univesity of California, 1111 Franklin St., Fifth Floor,
Oakland, CA 94607-5200 Phone: (510) 587-6000 FAX: (510) 587-6090

___ Michael Carriere Email: Michael.Carriere@ucop.edu

___ Bill Tucker Email: William.Tucker@ucop.edu

___ UC Davis Technology Transfer Center, 508 Second St., Suite 202, Davis, Ca 95616-4692
Phone: (530) 757-3471 FAX: (530) 758-3276

___ Clint Neagley Email: chneagley@ucdavis.edu

☐ One or more items you have requested (marked "Patented" or "Proprietary" on your copy of the order form) are privately-owned varieties which may not be distributed without written permission from the owner. You will need to contact the owner listed below and ask them to forward written permission to FPS to release these materials. Material will not be supplied if written permission is not received.

Variety: _____

Owner of Proprietary Variety: _____

Contact Person: _____

Phone Number: _____

☐ Please see attached sheet for additional information pertaining to your order.

If you have any questions about your order or this acknowledgement, please contact Tracy Pinkelton or Cheryl Covert at the FPS office, (530) 752-3590.

THANK YOU FOR YOUR ORDER!

FOUNDATION PLANT SERVICES
UNIVERSITY OF CALIFORNIA, ONE SHIELDS AVE., DAVIS, CA 95616-8600
PHONE: (530) 752-3590 FAX: (530) 752-2132 EMAIL: fps@ucdavis.edu WEB: <http://fps.ucdavis.edu>

FPS PLANT MATERIAL ORDER FORM

NO ORDER WILL BE PROCESSED UNLESS THE BUYER COMPLETES THE FRONT PAGE OF THIS FORM, SIGNS THE GROWER AGREEMENT ON THE REVERSE SIDE OF BOTH PAGES (PINK AND WHITE), AND RETURNS THE ENTIRE SET TO FPS ALONG WITH THE REQUIRED PREPAYMENT.

[illegible]

☐ Check here if this material is for inclusion in a California State Registration and Certification Program so proper tags can be furnished.

Ordered by (PLEASE PRINT):

COMPANY NAME: Windy Ridge Estate Vineyard
CONTACT PERSON: Larry Hansen
MAILING ADDRESS: 1440 E Mary Ln.
Meridian ID 83642 USA
CITY STATE ZIP COUNTRY

PHONE NUMBER: Wax 208-396-4416 cell

FAX NUMBER: _____

EMAIL ADDRESS: lalan sen@netzero.com

Amount of Prepayment Enclosed: \$_____

Tax Exempt Resale # (rose material only) _____

(please indicate which items ordered are for resale and which are not)

Ship to (Street Address, if different than mailing address):

Inland Desert Nursery Inc.
65710 N. Hysler Rd.
Benton City, WA. 99320

If Airfreight, nearest international airport: _____

Ship via: ☐ PICK UP AT FPS ☐ UPS NEXT DAY
☐ GROUND UPS ☒ UPS 2ND DAY
☐ INTERNATIONAL EXPRESS COURIER

ALL MATERIALS ARE SHIPPED F.O.B. DAVIS, CALIFORNIA.
BUYER AGREES TO PAY ALL COSTS OF TRANSPORTATION
AND ASSUMES ALL RISK OF LOSS DURING SHIPMENT.

Revised October 23, 2003

= SUMMARY OF CHARGES =

Order #: 7035

FOUNDATION PLANT SERVICES
University of California, Davis
Davis, CA 95616
(530) 752-3590

Page 1

Customer:
WINDY RIDGE ESTATE VINEYARD
1440 E. MARY LN.
MERIDIAN, ID 83642

FPS Invoice #: FPM05890

Invoice Date: 05/21/2007

Ship Date: 03/28/2007

Ship Via: UPS 2ND DAY

Phone: (208) 396-4416
Contact: LARRY HANSEN

Payment(s):

03/16/2007 2000.00 CK#: 1853 Rec#: 1007224

Total Payment(s): \$2,000.00

Line	Description	Unit Cost	Cost
1	GRAPE: TEMPRANILLO 03		
	500.00 CUTTINGS ordered	70.00 #2 CUTTINGS SUPPLIED	\$ 2.7500 \$ 192.50
		225.00 CUTTINGS SUPPLIED	\$ 3.0000 \$ 675.00
2	GRAPE: TEMPRANILLO 05		
	500.00 CUTTINGS ordered	70.00 #2 CUTTINGS SUPPLIED	\$ 2.7500 \$ 192.50
		70.00 CUTTINGS SUPPLIED	\$ 3.0000 \$ 210.00
3	GRAPE: TEMPRANILLO 11		
	500.00 CUTTINGS ordered	55.00 #2 CUTTINGS SUPPLIED	\$ 2.7500 \$ 151.25
		105.00 CUTTINGS SUPPLIED	\$ 3.0000 \$ 315.00

CHARGES:

TOTAL TAXABLE MATERIAL: \$0.00
TOTAL NON-TAXABLE MATERIAL: \$1,736.25

PACKING AND HANDLING: 173.63
SHIPPING: 65.49
SALES TAX: 0.00
PHYTO Fee: 22.00

SUBTOTAL: \$1,997.37
Pre-Payments: (2,000.00)
REFUND DUE: (\$2.63)

LARRY A. HANSEN
KAY M. HANSEN
1440 E MARY LANE
MERIDIAN, ID 83642

359

6/29/2008

vices

NIA 95616-8600

is.edu

UCDAVIS

Pay to the order of

U.C. Regents

\$ 11,666

Eleven and 66/100

Dollars

Security Features
Detailed on Back

PROGRESSIONS CREDIT UNION
2919 E. MISSION AVE., SPOKANE, WA 99202

SMART CHOICE

For Windy Ridge

Kay M. Hansen

FORM

REPORT FOR:

☐ REQUEST REMOVAL FROM USER FEE LIST
(Removal request form will be mailed to you)

☐ CHECK FOR ADDRESS CORRECTION:

Company Name

Name of Person Completing Form:

Kay Hansen

Mailing Address

Phone Number: (208) 884-0118

City

State ZIP

COUNTRY

Email Address:

USER FEE REPORT: (If no user fees are owed for calendar year 2007, please mark "0" & return)

Number of Propagative Units Sold, Used or Exchanged in
Calendar Year 2007 Under FPS Grower Agreement:

583
(Number)

propagative units @ \$1.02/unit

=

\$

11,666

Amount Being Reported For Other Calendar Year:
[please specify year]

()
Year

(Number)

propagative units @ \$ /unit

=

\$

TOTAL AMOUNT =

\$

11,666

**PAYMENT MAY BE MADE BY CHECK OR MONEY ORDER, IN U.S. DOLLARS,
PAYABLE TO "UC REGENTS" AND REMITTED TO THE ABOVE ADDRESS**



Foundation Plant Services

UNIVERSITY OF CALIFORNIA • ONE SHIELDS AVENUE • DAVIS, CALIFORNIA 95616-8600

PHONE: (530) 752-3590 • FAX: (530) 752-2132 • WEB: <http://fps.ucdavis.edu>

UCDAVIS

FPS GRAPEVINE USER FEES & HOW THEY ARE ASSESSED

As a customer who has purchased grapevine material from FPS, you are required to report each year the number of propagative units sold, exchanged or retained for your own use during the preceding calendar year and to pay a User Fee of two cents (\$.02) per each propagative unit. User fees are a major source of revenue for our program. They help to offset the high cost of testing, maintaining and distributing small quantities of many types and varieties of plant material, and are the largest single source of support for our grape clean stock program.

At the time you purchased your grape material from FPS, you signed the "FPS Grower Agreement" on the reverse side of your order form, which includes an agreement to pay annual user fees to FPS. FPS User Fees represent income which goes directly to support the FPS grape program, and should not be confused with other types of assessments, such as nursery assessments due to the California Dept. of Food & Agriculture (CDFA) or royalties payable to the UC Office of Technology Transfer for propagation of UC-patented grape varieties. FPS User Fees are not charged on UC-patented materials, since support comes indirectly to FPS from patent royalties paid on these materials.

Each year in late April or early May you will receive a report form and be asked to report the number of propagative units you have sold, exchanged or retained for your own use during the previous calendar year (January 1st-December 31st), and to mail in your payment if applicable. The reporting cycle was set up for April/May each year to allow customers adequate time to compile their records from the previous calendar year before being asked to report. If for some reason you need to report user fees for a calendar year other than the one specified on the report form, there is a space on the form immediately below the line for the present reporting year where you can indicate the year, number of propagative units and amount of off-cycle user fees due. If no user fees are due for the present reporting period, you should note "-0-" on the report form and return it to FPS to avoid receiving additional notices.

The obligation to report and/or pay FPS user fees applies to all purchasers of FPS material, whether they be nurseries, growers, wineries, hobbyists or other entities. All categories of customers can potentially increase their FPS materials, so all are asked to report. User fees apply to both certified and noncertified propagations made from FPS materials, as well as to private proprietary materials maintained by FPS. The requirement to report user fees continues for the life of your vines, applies to all generations of propagations, and even continues with a new owner in the event you sell the property on which the vines are growing.

Continued On Reverse➡

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

FOUNDATION PLANT SERVICES
ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8600
TELEPHONE: (530) 752-3590
FAX: (530) 752-2132
E-MAIL: fps@ucdavis.edu
WEB: <http://fps.ucdavis.edu>

May 19, 2008

TO: FPS GRAPE PROGRAM CUSTOMERS

RE: USER FEES FOR THE 2007 CALENDAR YEAR

The Foundation Plant Services Grape program is one of the cornerstones of the grape industry. We set a world standard for grape clean stock collections, serving as the major public collection of virus tested, commercial grapevines in the United States.

Our grape clean stock program is entirely self supporting. No funding is received to support our program except that which is generated annually through sales, grants and user fees. The single most important source of income to support this program is user fees, the money that comes back to our program over the years for plants propagated from our materials.

This letter is to remind you that calendar year 2007 user fees are due on July 1, 2008. An explanation of the user fee system and a form for reporting user fees are enclosed. I want to remind all of our customers - nurseries, growers and wineries - that these fees are due each year on the plants you propagate from FPS material covered under the grower agreement contract. This applies to plants propagated for your direct use in a vineyard as well as those intended for nursery sales. These fees are a part of the contract "FPS Grower Agreement" which is signed by all our customers before they receive orders.

The user fees we receive are the key to our efforts to improve our program by bringing in new grape selections, using the latest technology for disease testing, maintaining detailed records on our collection, organizing workshops for industry, and keeping our FPS Foundation Vineyard in excellent condition.

We all are working together to keep our industry competitive with the best grape growers and winemakers in the world. I believe that the FPS grape program contributes a great deal to the quality of grape production in our vineyards and our long-term ability to adapt to changes in both vineyard conditions and market pressures. I want to thank all of you for your support over the years and to remind you of the important role played by your user fees in maintaining our programs.

Sincerely,

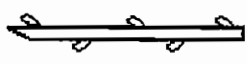
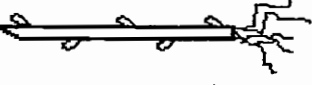
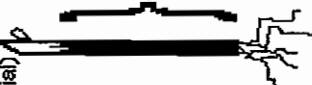
A handwritten signature in black ink, appearing to read 'Deborah A. Golino'.

Deborah A. Golino
Director, FPS

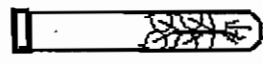
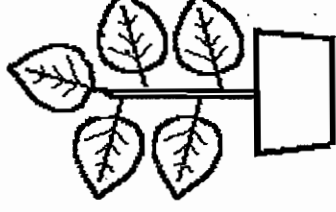
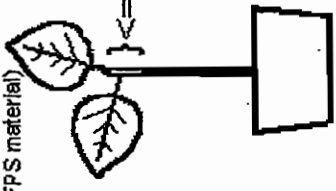
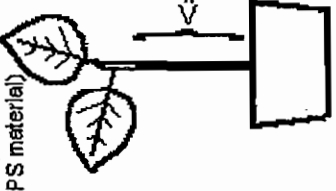
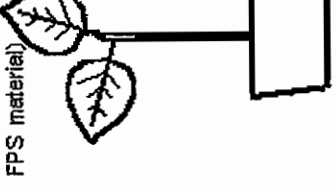
Enclosures

FPS USER FEES FOR VARIOUS TYPES OF PROPAGATIVE UNITS

TRADITIONAL PROPAGATION:

2¢		Unrooted, ungrafted 5-bud cutting
2¢		Graftstick or budstick to be sold
2¢		5-bud rooted cutting or rooting
.4¢		Rooted benchgraft (dormant or green)
2¢		Rooted benchgraft (dormant or green)
2.4¢		Rooted benchgraft (dormant or green)

NON-TRADITIONAL PROPAGATION:

2¢		Micropropagated plant (own rooted)
2¢		Mist propagated plant/ potted plant (own rooted)
.4¢		Green grafted plant (dormant or green)
2¢		Green grafted plant (dormant or green)
2.4¢		Green grafted plant (dormant or green)



Inland Desert Nursery, Inc.
32508 W. Kelly Rd
Benton City, WA 99320

Invoice

Date	Invoice #
3/31/2008	07-8603

Bill To

Larry Hansen
1440 E. May Lane
Meridian, ID. 83642

Ship To

Larry Hansen
1440 E. May Lane
Meridian, ID. 83642

Phone #

P.O. Num.	Terms	Due Date	Rep.	Delivered	Via	Ordered	Product
	Net 30	4/30/2008	KCJ	3/28/2008	Pick-Up	02/28/08	
Quantity	Type	Description				Price Each	Amount
150	#1Reg	Tempranillo WW #01 2 yr. - CJ				1.75	262.50
75	#2Reg	Tempranillo MA #02 - RA				1.70	127.50
175	#1C	Cabernet Sauvignon H #08 2yr - AR				1.75	306.25
118	#1CC	Tempranillo NYL H5,V7 Hansen #03				1.50	177.00
17	#2CC	Tempranillo NYL H5,V7 Hansen #03				1.45	24.65
20	#3CC	Tempranillo NYL H5,V7 Hansen #03				1.25	25.00
63	#1CC	Tempranillo NYL H5,V8 Hansen #03				1.50	94.50
20	#2CC	Tempranillo NYL H5,V8 Hansen #03				1.45	29.00
27	#3CC	Tempranillo NYL H5,V8 Hansen #03				1.25	33.75
19	#1CC	Tempranillo NYL F9,V5 Hansen #05				1.75	33.25
10	#2CC	Tempranillo NYL F9,V5 Hansen #05				1.70	17.00
11	#3CC	Tempranillo NYL F9,V5 Hansen #05				1.50	16.50
68	#1CC	Tempranillo NYL F9,V6 Hansen #05				1.50	102.00
27	#2CC	Tempranillo NYL F9,V6 Hansen #05				1.45	39.15
21	#3CC	Tempranillo NYL F9,V6 Hansen #05				1.25	26.25
120	#1CC	Tempranillo NYL F3,V10 Hansen #11				1.50	180.00
29	#2CC	Tempranillo NYL F3,V10 Hansen #11				1.45	42.05
13	#3CC	Tempranillo NYL F3,V10 Hansen #11				1.25	16.25
Subtotal: Apply Assessment to Total Cost of Vines							1,552.60
5% WSDA Plant Improvement Assessment Fee						5.00%	77.63

Please remit to the above address with invoice # on check.

Total

C=CERTIFIED REG=REGULAR

Payments/Credits

Phone #

Fax #

E-mail

Balance Due

509.588.6615

509.588.4526

sales@idnursery.com

www.idnursery.com

Please sign and return copy to seller acknowledging acceptance of sales agreement on reverse.

Buyer's Signature

(Acceptance of order will constitute acceptance of our terms and conditions of sale, whether or not a signed order.)