University of Idaho
Cooperative
Extension System
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April 3, 2002

Dear Shareholder:

After making several visits to the area, and visiting with each of you about your irrigation system and its particular needs, it appears that with the proper water rotation system, the 62.5 inches available at the N-S division box from Weatherby springs should be sufficient to meet each of your irrigation needs. One important factor to note is that all or your water rights specify a certain number of miners inches of flow at a specified point of delivery (This varies somewhat depending on the property involved). Seepage losses from that point downstream mean that each shareholder will receive their full allocation minus seepage losses. The approach I took in developing the rotation was to group all the sprinkler irrigators in one set of days, and then give full flow to the downstream gravity irrigators for the appropriate number of days each. The rotation is based on the following factors:

Nick and Gwen Tzanakakis: 5.7 ac, **12 miners inches continuous flow**. The only outlet from the ditch is to the pump. Irrigation pressurization is by a 7.5 hp Paco pump at with nameplate rating of 145 gpm at 140 feet (60.6 psi) of total dynamic head. Actual system discharge and pressure will be reduced as the pump wears over time. Reported system discharge of 45-46 psi seems reasonable for this pump. System application rate is limited by the nozzle size of the stationary gun. The gun is a Nelson model 100 with 24 degree angle of trajectory and 0.8 inch diameter nozzle. Based on published Nelson specifications, this nozzle will deliver 118 gpm with a 250 foot wetted diameter at 40 psi or 130 gpm with a 265 foot wetted diameter at 50 psi. Therefore, at a system pressure of 45 psi, the discharge will be about 124 gpm (13.8 miners inches) with a wetted diameter of about 257 feet. With risers on a 100-foot spacing, this gives a gross application rate of 1.2 in/h. Assuming standard application efficiency of 70% for a big gun, the net application is 0.84 in/h. To meet ET of 0.35 inches per day, net application must be at least 1.75 inches. To accomplish this requires 1.75/ 0.84 or 2-hour sets. With 9 risers the actual run time required is 18 hours. With move time included, irrigation will occur over portions of 2 days. There will be no irrigation through the gated pipe except for a short period in case of pump failure. If the pump fails, they will notify all other share holders and only take water for one 24-h period in the 5-day rotation. **Actual usage: 124 gpm or 13.8 inches over parts of 2 days (water right allows 12 miner's inches of continuous flow)**

William Shappee: ¼ acre, **0.5 miners inches continuous flow**. Because 0.5 miners inches (4.5 gpm) is a very small flow, two other alternatives are 2.5 inches for 24 h or 5 inches for 12 h. Since the property has just sold, it is appropriate for the new owners to determine the time – flow combination that works best for them. Once this is decided, I will calculate the gate opening required, based on measured head, and the present gate can be locked at that opening if desired. Although the current outlet pipe from the ditch is larger than necessary to deliver the required flow, it is effective in preventing plugging with debris. Therefore, to deliver only the flow requested by the new owners, the current gate can be used as a metering gate, with a second gate installed immediately downstream as a

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shutoff gate. The metering gate can be left at the correct opening, and the shutoff gate closed when the specified hours of irrigation have elapsed. **Actual usage: probably 2.5 inches for 24 hours.**

Kent and Sharah Skaar: 6 acres, 10.5 miners inches continuous flow. They also have water from Big Bend ditch. Irrigation is by 5 hp pump with 22 5/32 inch diameter nozzles operating at 45 psi. This system has the capacity to apply 106 gpm or 11.7 miners inches. With nozzles on a 40 x 50 spacing, gross application rate is 0.23 in/h. Net irrigation is 0.23 x 0.7 or 0.16 in/h. To replace 1.75 inches of water use over a 5-day period requires 1.75/0.16 or 11 hours per set. With move time, only 2 sets can be run per day. With this arrangement, it takes more than 24-h to irrigate. (With only this water 4.4 acres could be irrigated in 2 days.) The inlet to this system from the supply ditch should have an orifice to limit flow to 12 inches and a shutoff gate just below the ditch, which should be closed on non-irrigating days. **Actual usage: 12 miners inches over parts of 2 days (water right allows 10.5 miners inches continuous flow).**

Betty Hoskovec: 8 acres, 14.5 miners inches continuous flow. Irrigation is by gravity flooding through several gates. A full head of water is required to push water through a flat section of supply ditch and to advance water to the bottom end of each set in a reasonable time. **Actual usage: 62.5 inches for 1 day plus 34-37 inches for 2 more days.**

Gene and Bev Lorranger: 18 acres, 25 miners inches continuous flow at the head gate. Irrigation is by gravity flooding through several gates. A full head of water is required to push water through a flat section of supply ditch and advance water to the bottom end of each set in a reasonable time. **Actual usage: 62.5 inches for 2 days.**

Schedule:

Day 1: Tzanakakis, Schappe and Skaar. Withdrawal is 28.3 miners inches. This leaves 34.2 miners inches to go downstream for gravity irrigation (Hoskovec) during an 18-hour period and the full 62.5 inch flow for the remainder of the day.

Day 2: Tzanakakis, and Skaar. Withdrawal is 25.8 miners inches. This leaves 36.7 miners inches to go downstream for gravity irrigation (Hoskovec) during a 16-hour period and the full 62.5 inch flow for the remainder of the day.

Day 3: Hoskovec only for 24 hours.

Day 4: Lorringer only for 24 hours.

Day 5: Lorringer only for 24 hours.

Additional Suggestions:

To assure maximum delivery of water to your division box, someone should check the main division box and measuring weir daily for debris. Even a small restriction in the weir overfall will cause less water to be delivered. According to water stains on the concrete, flow downstream of the weir has

been restricted at times in the past. If flow restriction raises the downstream water level at the weir to within 1 or two inches of the weir crest, a reduction in water delivery will occur. This situation violates the standard conditions for the weir and will result in less flow at the same upstream head.

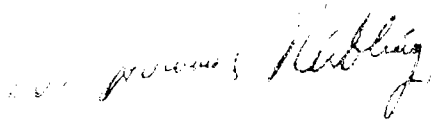
To minimize seepage in the ditch below the N-S 62.5 inch split, the ditch and any culverts should be clean of weeds and debris. The most efficient ditch cross section for delivering water along a fairly flat reach is a deep, narrow v-shape or narrow parabolic shape. A wide shallow ditch will increase wetted perimeter (the area of channel through which water can seep) and slow velocity. Avoid pools of deeper water caused by over-excavation of part of the channel. Ideally, the channel bottom should form a continuous straight line through culverts and channel sections. If this ditch carries considerable soil, sand or gravel, it may be necessary to over-excavate by several inches in channel sections prone to fill in. However, ditch cleaning should be minimized in sandy and gravelly soils like these. Over time, a thin layer of fine soil will deposit on the channel bottom, establish a surface seal, and limit seepage. Each time the ditch is cleaned, this seal is disturbed and seepage returns to a high level until a seal is re-established.

Because none of the flow in this ditch spills back to the river directly, you may want to consider lining the bottom with a 2-4 inch layer of manure and then compacting it. This is an old-fashioned, yet very effective way to seal ponds and slow flowing channels. Please visit with me before you do this to assure that conditions are really fully appropriate for manure use.

Alternatively, I can measure seepage in several of the channel sections after water is turned in this spring to determine if seepage is really a problem. If seepage is excessive, certain channel sections can be treated with manure, soil or other methods to reduce seepage.

I have enjoyed visiting with each of you and hope this schedule will work for you. If there are problems, I am certain they can be resolved. Please call me at (208) 736-3631 if you have questions.

Sincerely,



Dr. Howard Neibling, P.E.
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