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MAR 06 2007

Permit No: 65-13588

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STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 65-13588

Exam Date: 7/23/1999

1. Current Owner: JACK D WARD
DBA WARD S GREENHOUSE
1722 BANKS LOWMAN RD
GARDEN VALLEY ID 83622
(208)462-3486

2. Accompanied by: DAVE AND DOUG WARD

Phone No: SAME AS ABOVE

Address: SAME AS ABOVE

Relationship to Permit Holder: CO-OWNERS OF BUSINESS

3. SOURCE

SPRINGS

TRIBUTARY

SOUTH FORK PAYETTE RIVER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: SEE ATTACHED OVERLAP ANALYSIS SHEET

2. Other water rights with the same point of diversion: SEE ATTACHED OVERLAP ANALYSIS SHEET

C. DIVERSION AND DELIVERY SYSTEM

1. LOCATION OF POINT(S) OF DIVERSION:

SPRINGS	L2 SW1/4SW1/4NE1/4	Sec. 10,	Twp 08N,	Rge 05E, B.M.
BOISE County				
SPRINGS	L2 SE1/4SW1/4NE1/4	Sec. 10,	Twp 08N,	Rge 05E, B.M.
BOISE County				
SPRINGS	L9 SW1/4SE1/4NE1/4	Sec. 10,	Twp 08N,	Rge 05E, B.M.
BOISE County				
SPRINGS	L2 SW1/4SW1/4NE1/4	Sec. 10,	Twp 08N,	Rge 05E, B.M.
BOISE County				

Method of Determination: Visual inspection and use of 2004 aerial photography in ArcVies

2.

PLACE OF USE: COMMERCIAL

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
08N	05E	9				X													

Method of Determination: Visual inspection and use of 2004 aerial photography in ArcVies

Place of use is located in HES 494

3. YES Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.

YES Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.

YES Aerial Photo Attached (required for irrigation of 10+ acres).

YES Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
EAST PUMP STATION EAST PUMP	US ELECTRIC	15 Hp	ID # Z12Z278R060F	BERKLEY	MODEL # F407A
EAST PUMP STATION WEST PUMP	US ELECTRIC	15 Hp	ID # Z12Z278R060F	BERKLEY	MODEL # F407A
3 HP SUBMERSIBLE PUMP	GRUNDFOS	3 Hp	MODEL # 2823028110	GRUNDFOS	MODEL # 40S30-9
1 HP SUBMERSIBLE PUMP	GRUNDFOS	1 Hp	MODEL # 2823028110	GRUNDFOS	MODEL # 40S10-3
WEST PUMP STATION EAST HOT WATER PUMP	US ELECTRIC	15 Hp	MODEL # 4VE215TTDW7 022AA	BERKLEY	MODEL # B22PLS
WEST PUMP STATION EAST HOT WATER PUMP	US ELECTRIC	15 Hp	MODEL # 4VE215TTDW7 022AA	BERKLEY	MODEL # B22PLS

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

<u>Measurement Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
N/A						

2. Measurements: Measurements were made using a theoretical calculation. The pumps were not all operating at full capacity. It would have caused some serious crop damage to run the hot water system at full capacity during the time of the field exam. Therefore, a theoretical calculation was used.

E. FLOW CALCULATIONS

YES Additional Computation Sheets Attached

Measured Method:

Please see attached sheet for calculations. This permit is recommended for 0.63 cfs

F. VOLUME CALCULATIONS**1. Volume Calculations for Irrigation:**

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{O.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses:

Please see attached sheet for calculations. This permit is recommended for 457.2 afa

G. NARRATIVE/REMARKS/COMMENTS

The water for this permit is diverted from 4 points along the shores of the South Fork of the Payette River. The first point of diversion I have referred to as the East Pump Station located in the SENE Lot 9. There are multiple springs that come to a single point and are diverted by one of two 15 Hp pumps. Some of the springs may have been channeled to this location, but there was no evidence of piping, ditches or other delivery type devices. The water from the east pump station is diverted into a mainline that follows the river to a second pump location in the SWNE Lot 2. This pump is a 3 Hp submersible pump that diverts a single spring into a mainline. The mainline from this pump travels north and joins the mainline from the East Pump Station and goes north up out of the canyon and then turns west running parallel to the highway.

The West Pump Station is located in the SWNE Lot 2, and has two 15 Hp pumps that divert into a mainline that travels north. Like the East Pump Station these pumps could divert several individual springs, but there is only one point of withdrawal. There is another 1 Hp pump in the SWNE Lot 2 that diverts from a single spring and diverts the water into a mainline that travels west to the West Pump Station where it joins with the mainline from the West Pump Station and travels north where it meets the mainline from the East Pump Station and the 3 Hp pump. From this point the mainline continues to travel west parallel of the highway to a home where a portion of the water is diverted to the home for heating purposes. This use is covered under water right 65-7903. The mainline continues on until it reaches the greenhouse.

At the greenhouse the water is diverted into a holding tank where it is mixed with cold water if necessary to control the temperature and is then run through the green houses. This is a closed loop type system and water then comes back to the mixing basin, where it is either mixed with fresh hot water or used for irrigation purposes. Please see diagram of distribution system.

There are several water rights that overlap this place of use. Please see the discussion memo that goes over the overlapping water right in more detail.

I recommend that this permit be licensed as shown in this report. I would include conditions similar to the following:

This right when combined with water rights 65-509, 65-7167 and 65-7903 are limited to a diversion rate of 1.96 cfs and 498.2 afa.

The heat value of the water used under this right must be used for heating purposes prior to being diverted from any other uses.

65-509, 65-7903 and 65-7167 are diverted from these points of diversion.

This right doesn't grant right away across the lands of another.

The place of use is located in HES 494 according to the current plat maps. I also used the most current plat maps to determine the lot numbers for the individual points of diversions. Please see attached plat maps.

PLEASE NOTE: There was not a measurement device installed on the hot water mainline. The owner did have a measurement device on the coldwater line. They were informed at the time of the exam to one of these units in place. No follow up has been done to check if the device has been installed.

Have conditions of permit approval been met? ____ Yes X No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
COMMERCIAL	01/01 to 12/31	0.630 CFS	457.20 AF
<u>Totals:</u>		0.630 CFS	457.20 AF

2. Recommended Amendments

____ Change P.D. as reflected above ____ Add P.D. as reflected above ____ None

____ Change P.U. as reflected above ____ Add P.U. as reflected above ____ Other

I. AUTHENTICATION

DANIEL A. NELSON – SENIOR AGENT

Field Examiner's Name

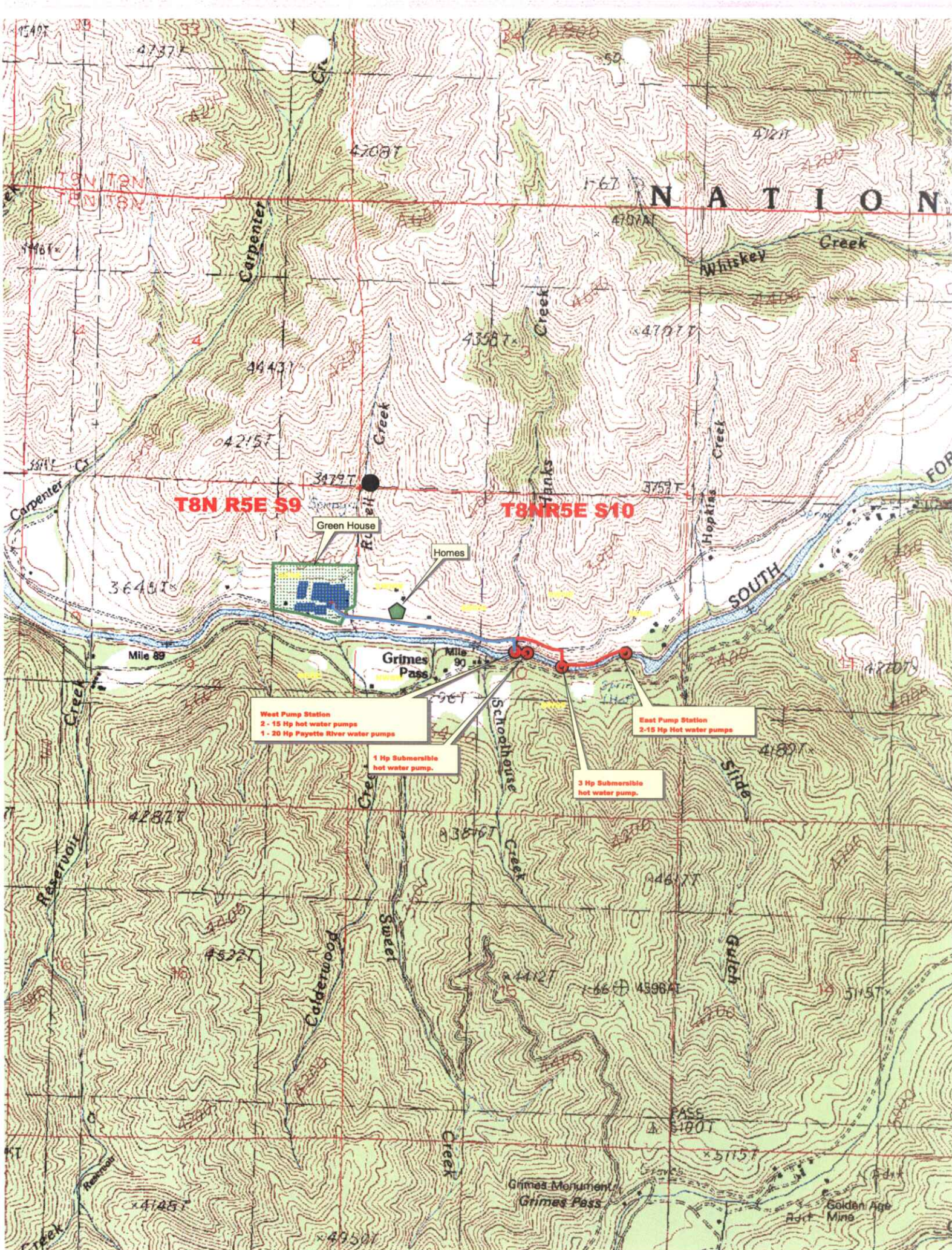
Daniel A. Nelson

Date

2-9-2007

Reviewer

Date



T8N R5E S9

T8NR5E S10

Green House

Homes

SENE

SWNW

SENW

SWNE

SENE

NESE

NWSW

NWSE

West Pump Station
2 - 15 Hp hot water pumps
1 - 20 Hp Payette River water pumps

East Pump Station
2-15 Hp Hot water pumps

**1 Hp Submersible
hot water pump.**

**3 Hp Submersible
hot water pump.**

GOV'T
LOTS

S9

HES 494

T8NR5E S10

Green House

Homes

GOV'T
LOT 2

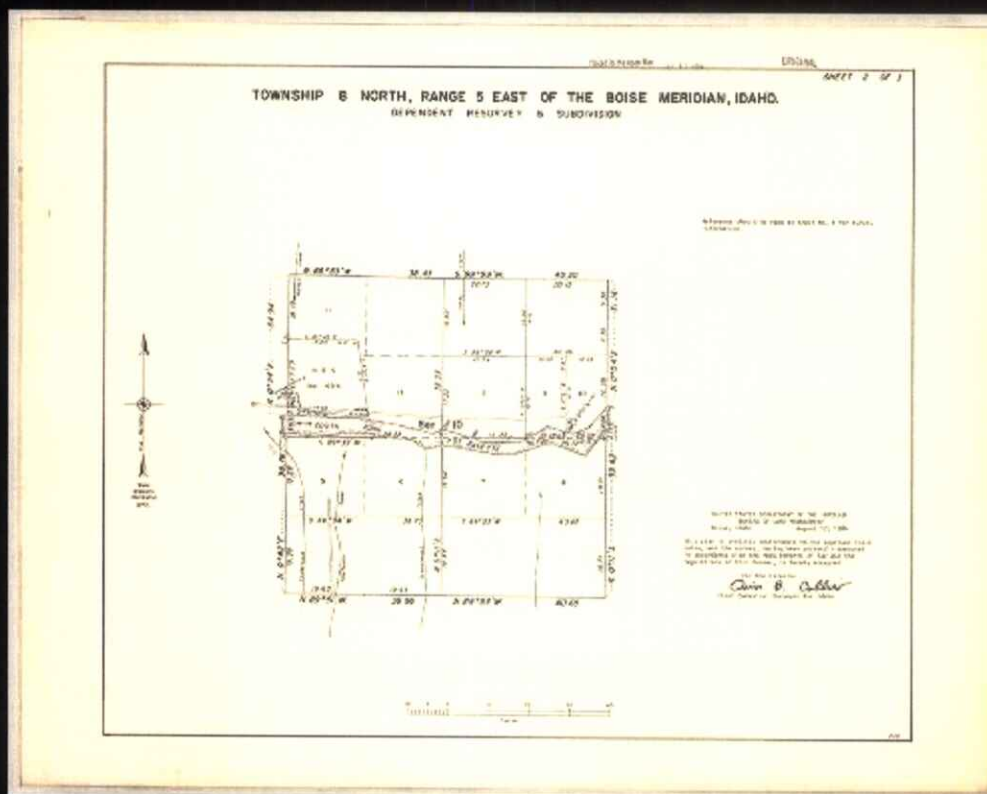
GOV'T
LOT 9

West Pump Station
- 15 Hp hot water pumps
- 20 Hp Payette River water pumps

1 Hp Submersible
hot water pump.

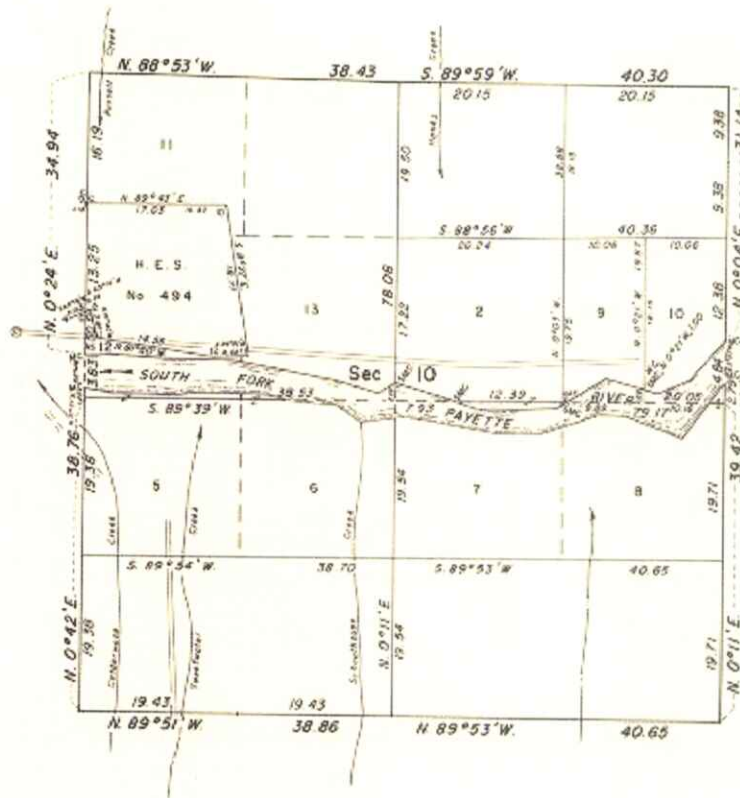
East Pump Station
2-15 Hp Hot water pumps

3 Hp Submersible
hot water pump.



Dependent Resurvey
& subdivisions & sections.
1984

Reference should be made to Sheet No. 10 for information.

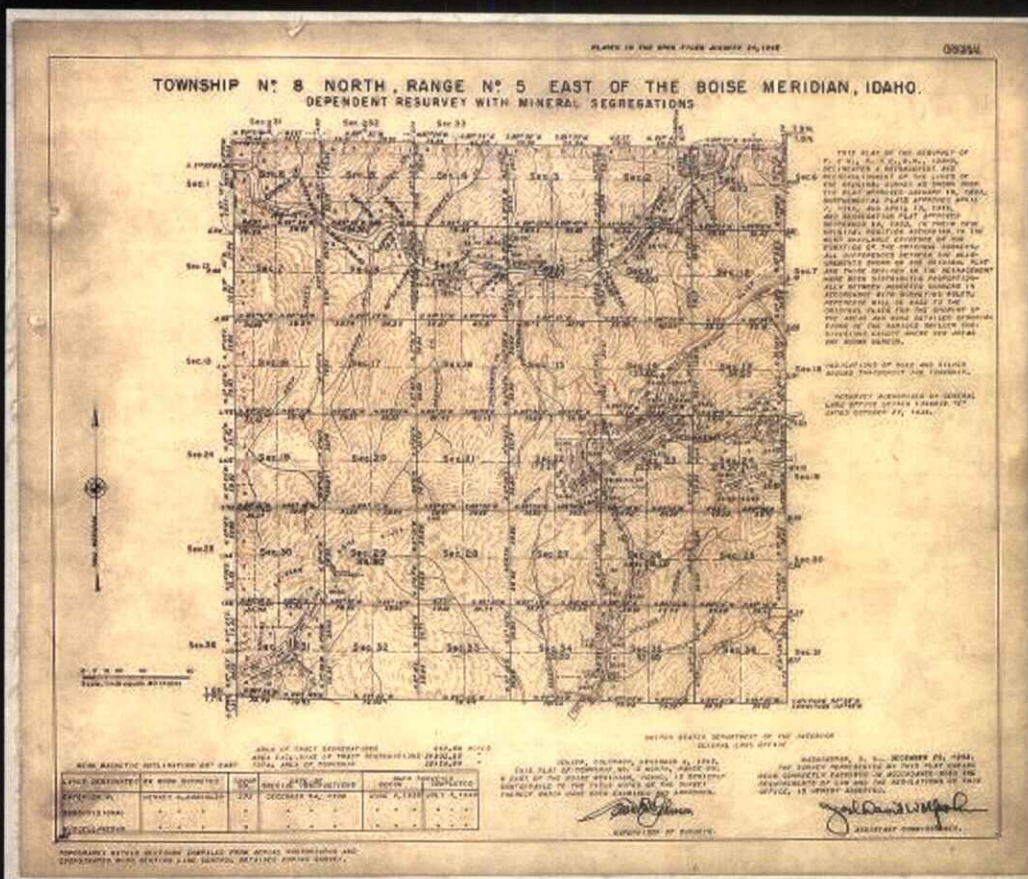


UNITED STATES DEPARTMENT OF THE
BUREAU OF LAND MANAGEMENT
Boise, Idaho August 1,

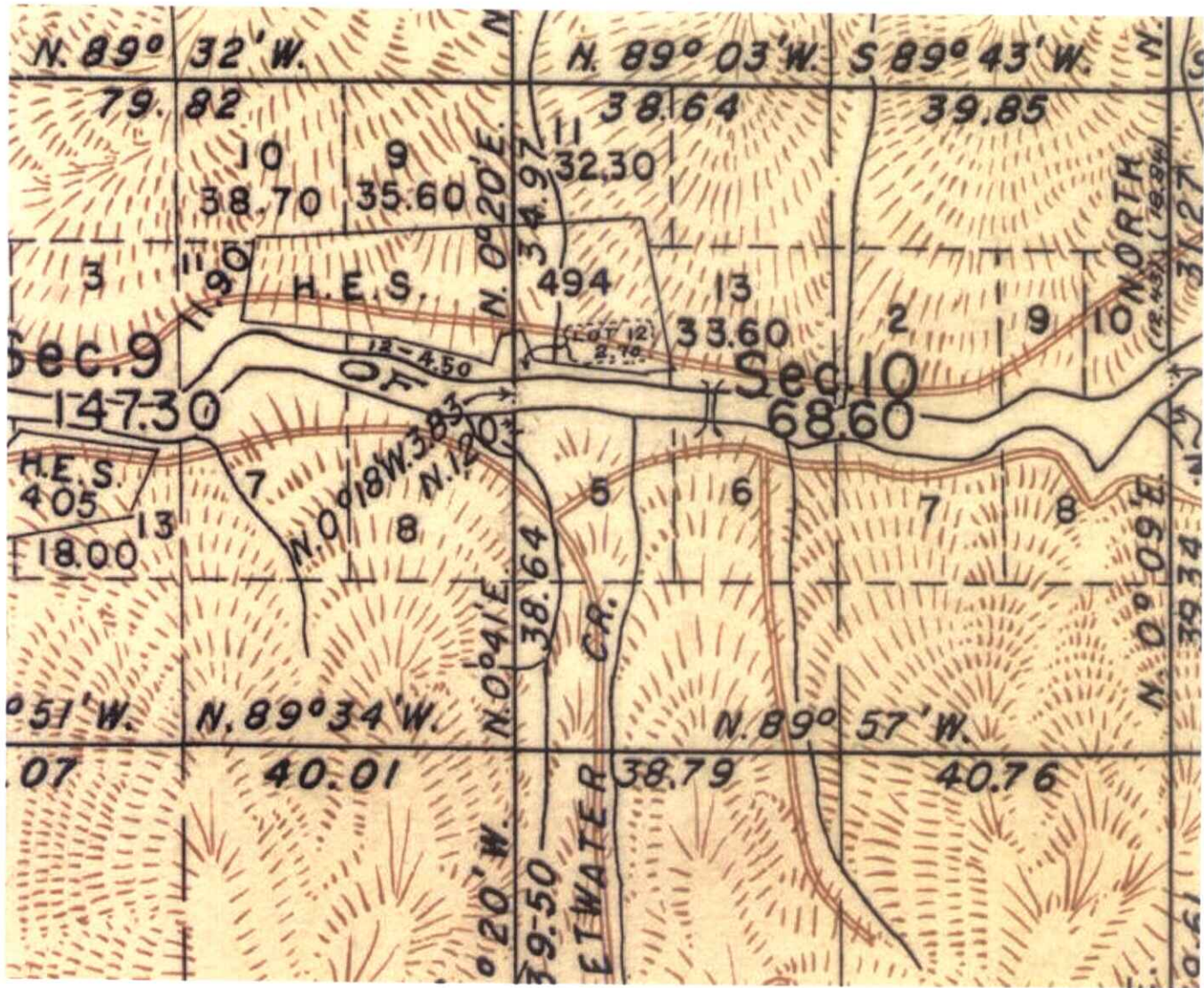
This plat is strictly conformable to the
rules, and the survey, having been correct
in accordance with the requirements of law
regulations of this Bureau, is hereby approved.

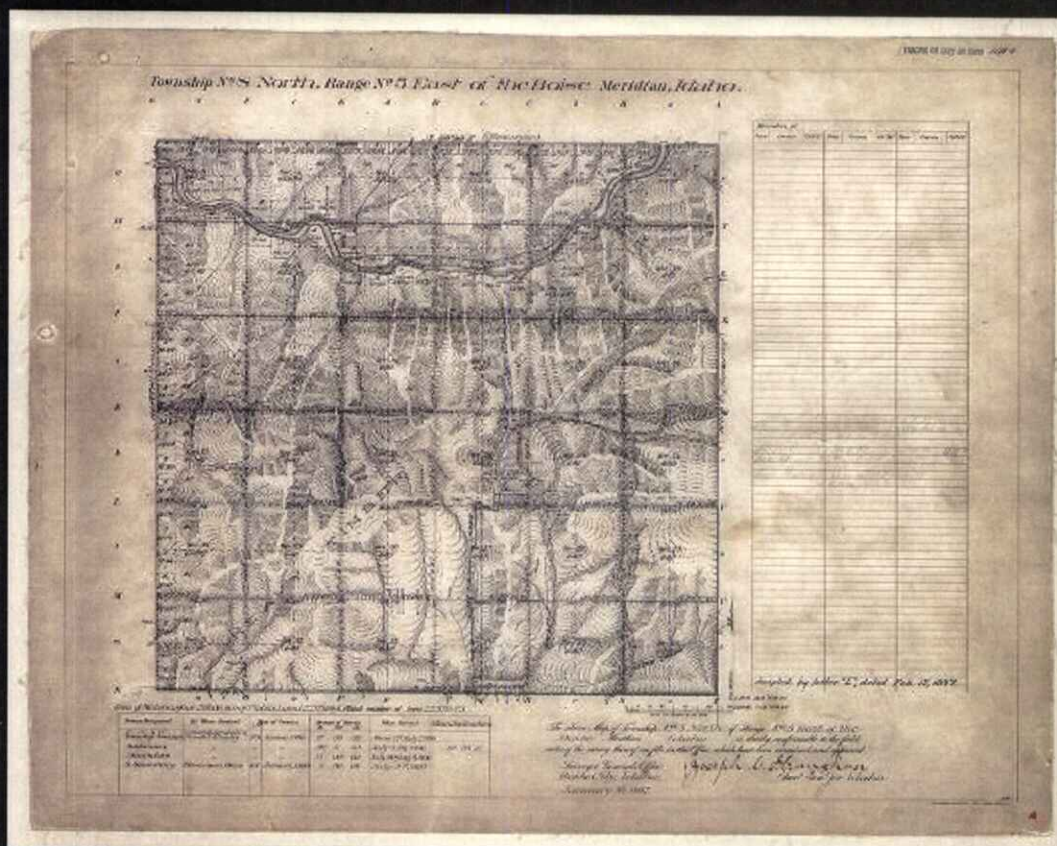
For the Director

Orin B. Cobb
Chief Cadastral Surveyor for Idaho

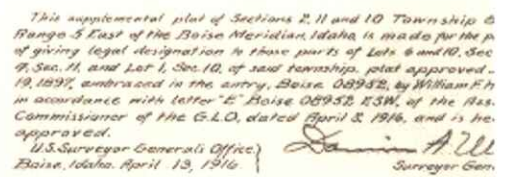


Dependent Resurvey
1943





Original Survey



SUPPLEMENTA 1
PLAT 1916

T8N R5E S9

Green House

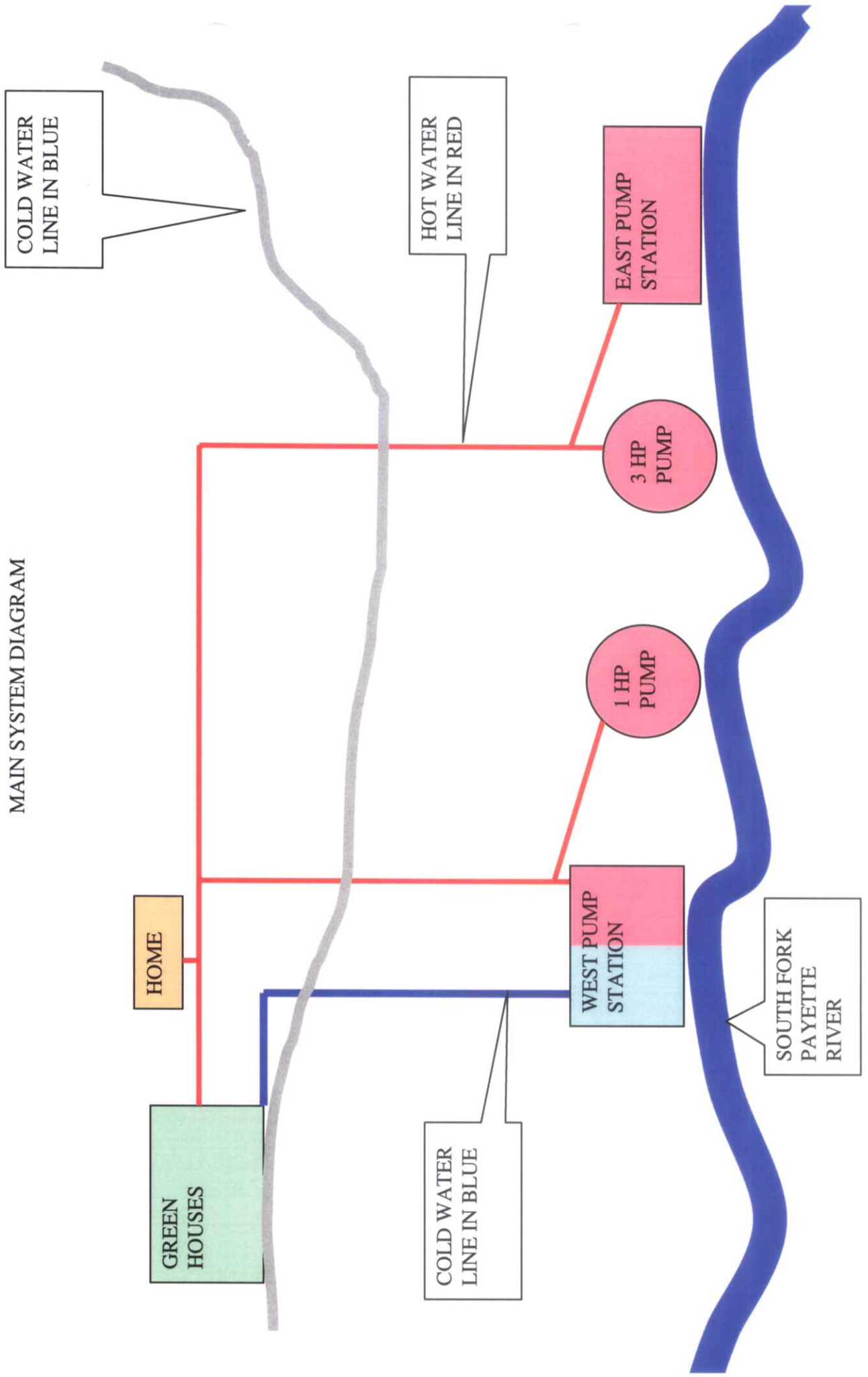
SENE

SWN

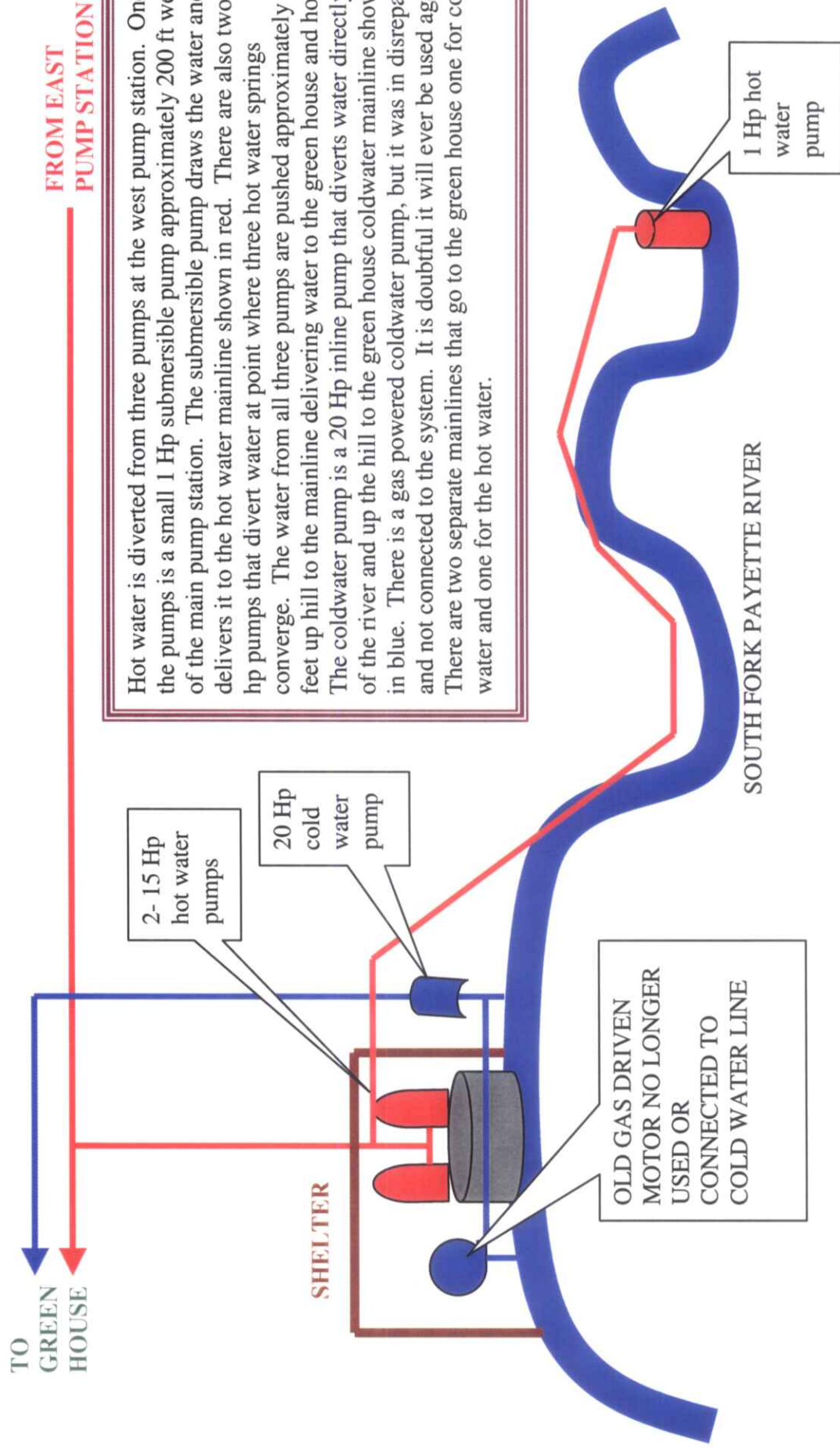
NESE

NWS

MAIN SYSTEM DIAGRAM



WEST PUMP STATION



Hot water is diverted from three pumps at the west pump station. One of the pumps is a small 1 Hp submersible pump approximately 200 ft west of the main pump station. The submersible pump draws the water and delivers it to the hot water mainline shown in red. There are also two 15 hp pumps that divert water at point where three hot water springs converge. The water from all three pumps are pushed approximately 120 feet up hill to the mainline delivering water to the green house and home. The coldwater pump is a 20 Hp inline pump that diverts water directly out of the river and up the hill to the green house coldwater mainline shown in blue. There is a gas powered coldwater pump, but it was in disrepair and not connected to the system. It is doubtful it will ever be used again. There are two separate mainlines that go to the green house one for cold water and one for the hot water.

EAST PUMP STATION

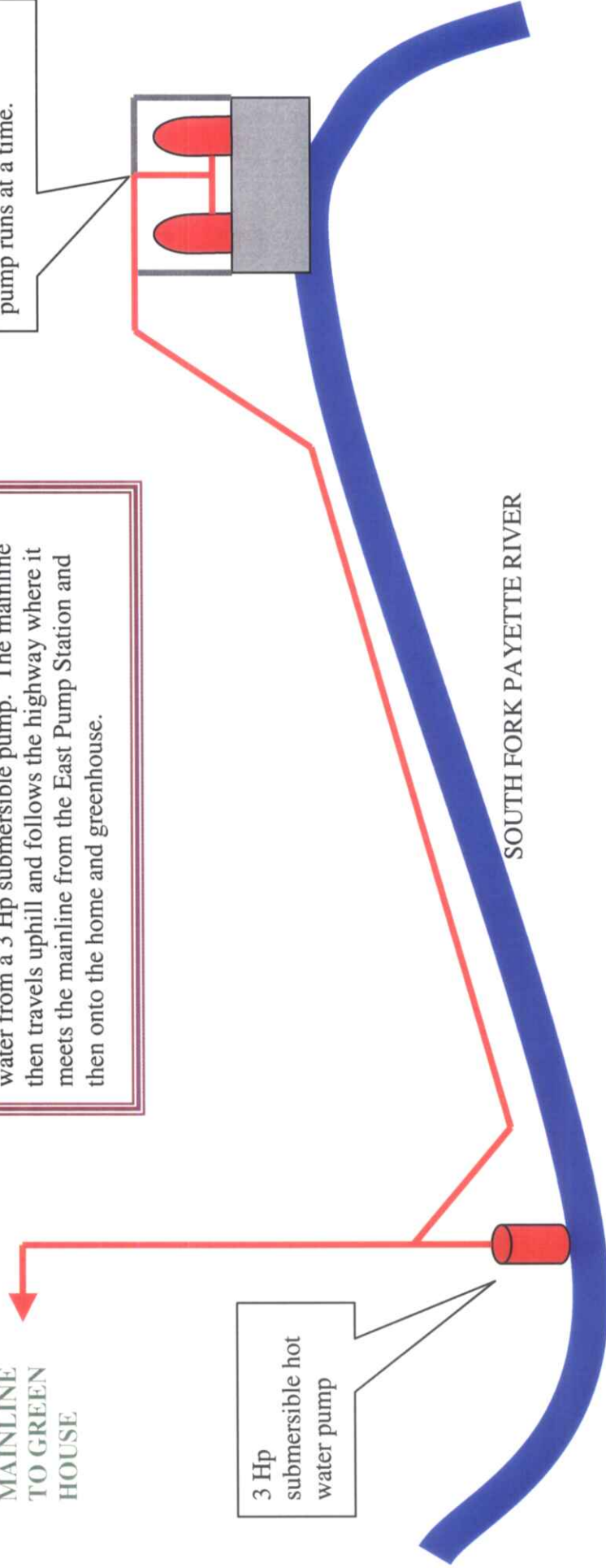
At the West Pump Station, hot water is diverted from the springs by one of two 15 Hp turbine pumps. The water is then sent through a mainline that joins with the water from a 3 Hp submersible pump. The mainline then travels uphill and follows the highway where it meets the mainline from the East Pump Station and then onto the home and greenhouse.

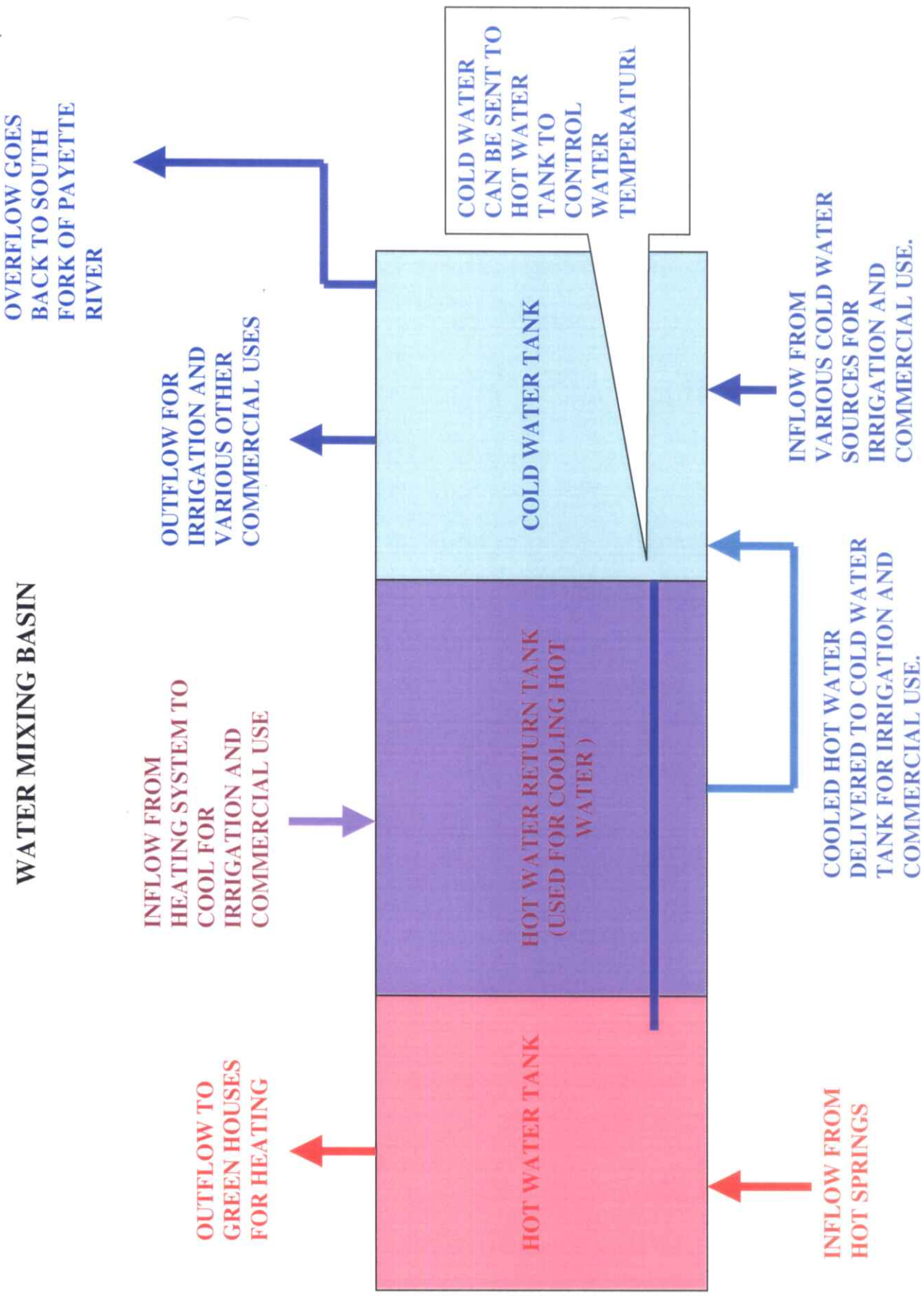
MAINLINE
TO GREEN
HOUSE

3 Hp
submersible hot
water pump

East Pump Station: 2-15 Hp
hot water pumps. Only one
pump runs at a time.

SOUTH FORK PAYETTE RIVER





OVERLAPPING WATER RIGHTS FOR 65-13588

This facility has several water rights from several different sources. Most of these sources are water rights for coldwater sources. All of the water rights that come from a spring source are direct overlapping water rights for this source except for the one right out of Rane Spring. Rane Spring is a cold water spring used for in-house use for the homes. Below is a table of all the water rights that overlap the place of use.

WATER RIGHT	SOURCE	USE	RATE (CFS)	VOLUME (AFA)
65-503	HANKS CREEK	IRRIGATION	0.04	
65-509	SPRING	INDUSTRIAL	0.21	
65-5638	RUSSELL CREEK	IRRIGATION	0.24	
65-5639	RANE SPRING	DOMESTIC	0.02	1.2
65-5640	UNNAMED STREAM	IRRIGATION DOMESTIC	0.04	1.2
65-7167	SPRING	COMMERCIAL HEATING	0.12	4.2
65-7903	SPRING	COMMERCIAL HEATING	1.00	5.3
65-7904	HANKS CREEK	COMMERCIAL	0.08	16.7
65-13344A	SOUTH FORK OF THE PAYETTER RIVER	COMMERCIAL	1.00	

PLEASE NOTE: In the table above, the water rights that use hot water for commercial or heating are highlighted in red. The rights highlighted in blue are for commercial use using coldwater sources. The water rights in green are for irrigation only, and the water right highlighted in brown is for domestic use only.

All of the above rights except for 65-5639 directly overlap the place of use. Water rights 65-509, 65-7167, and 65-7903 all use the same springs as listed on this right. In reviewing these three rights, the volumes and descriptions of these rights seem nonsensical. Water right 65-509 lists the use as industrial, but has a condition that the use is for heating of the greenhouse.

Water right 65-7167 has both a commercial and heating component, but no volume is given to the commercial component, but a volume of 4.2 afa is given to the heating component. This right is condition saying both the heating and the commercial use is for the greenhouse. I assume that since the heat value is required to be used first, then the total volume allowed for the commercial uses cannot exceed volume given to the heating component.

Water right 65-7903 also has a commercial and heating component. However, on this right the heating component is for the domestic home, and the commercial component is for the greenhouse. The conditions on this right say the commercial use is for heating the greenhouse. However, the volume is only on the heating component.

In essence, the vague nature of the volume amounts for these rights prevent the ability of a regulatory agent to determine the actual volume allowed from these springs. I have determined the total volume used for heating purposes on these rights is 498.2 afa. This permit needs to have a condition that when 65-509, 65-7167, and 65-7903 are combined that they be limited to the total volume diverted of 498.2 afa.

Steve Lester only measured 1.01 cfs on this system during his field exam on water right 65-7903. However, it does appear as though not all of the springs were measured at that time. Therefore, I have to assume that 65-509, 65-7167, and 65-7903 have additive diversion rates and the owner currently has the ability to divert 1.33 cfs from these springs under existing decrees. I measured a total of 1.96 cfs from all of the points of diversion delivering hot water to the greenhouses. In order to keep with the additive trend, I am forced to recommend that this permit be limited to 0.63 cfs. This will limit the total volume I can allow on this permit, but the vague nature of the other rights should allow the owner to divert the full 498.2 as needed.

All of the other rights listed in the table do directly overlap the place of use, but they are used for irrigation and cold water commercial uses, and shouldn't directly affect the rates and volumes of this right. Some of the sources listed on the table are no longer used, due to a mudslide in 1994 that destroyed their pipelines and altered the flow of those streams significantly. The two main sources used now are the Hanks Creek rights and South Fork of the Payette River rights.

There is nothing in the overlapping rights that show cause to not license this right, but conditions should be added to better define the volumes and rates the owner should be allowed to use from these hot springs.

FLOW RATES FOR HOT WATER USE FROM SPRINGS FOR WARD GREEN HOUSES PERMIT # 65-13588

In reviewing this system, I found that there are two pumping stations that divert water from several springs along the shores of the South Fork of the Payette River. I have referred to these stations as the west and east pumping stations. Cold water is also diverted through a separate pump and mainline at the west pump station, but it is permitted under a different water right. There are two hot water submersible pumps outside the pumping stations, but they join into the same mainline and then travel up out of the canyon to highway that leads to the greenhouse. The hot water mainline comes out of the canyon at two points.

Please see the narrative for a more accurate description of the system. I will begin showing the allowable diversion rates and volumes and then discuss my final recommendations.

HOT WATER SYSTEM:

Diversion Rates – There are 6 pumps diverting water from numerous hot water springs along the shore of the South Fork of the Payette River. Only 5 of these pumps are used at any one time. A theoretical calculation was done on all of the pumps, and the system capacity shown below.

East Pump Station (1 of 2 15 Hp pumps used at capacity)	= 0.50 cfs
3 Hp Submersible Pump	= 0.11 cfs
West Pump Station (2 – 15 Hp pumps used at capacity)	= 1.28 cfs
<u>1 Hp Submersible Pump</u>	<u>= 0.05 cfs</u>
TOTAL	= 1.94 cfs

While calculating the volume required to heat the greenhouses. The calculation sheets show that a maximum diversion rate of 1.86 cfs would be required to heat the houses. Adding in the 0.04 cfs and 0.12 cfs for heating the homes under water rights 65-7167 and 65-7903, this diversion rate seems reasonable.

Volume Rates – The water from these springs is mainly used for heating of the green houses. However, after the heat value is used, it is mixed with the other coldwater sources and used for irrigation and other commercial uses. All of the commercial uses for bathrooms and such would not exceed 13,000 gallons per day or 14.6 afa ($13,000 \times 365 / 325850 = 14.6$ afa), and the irrigation uses shouldn't exceed yearly uses. I considered that the standard field headgate requirement for this area is 3.5 afa for 231 days. Extending the season to year round use, would allow an irrigation requirement of 5.5 afa per acre ($3.5 \times 365 / 2.31 = 5.5$ afa year round use). Taking an irrigation requirement of 5.5 afa for the entire 4 acre complex, the total irrigation volume needed would be approximately 22 acre feet. The other commercial uses besides heating would come to approximately 37 afa, which is well below the heating use shown below.

In calculating the volume required for heating this facility, I had to determine the facility area, days used per season, source temperature, and outside temperatures. The owner provided the square footage of all of the green houses, which total 166,445 square feet. The owner also gave me a source temperature of 125 degrees, but the owner's facility is listed on the Geo-Heat Center web page as having a source temperature of 138 degrees. I decided it was best to go with temperature listed by Geo-Heat Center page, since it was most likely to be accurate.

The outside temperature was difficult to determine, since this area laid in-between most of the comparison areas listed on the worksheet. Therefore, I looked up the area on the Yahoo Web site and found the average High and Low temperatures in summer and winter. I averaged the high and low temperatures to get an average temperature for these times of the year. Unfortunately, the web site didn't have a temperature for Spring and Fall, so I averaged the winter temperatures and summer temperatures to determine the average temperatures for the both the fall and spring. I then need to determine the number of days of each season, so I divided the year into four parts to determine the days used for each season ($365 / 4 = 92$ days for summer, 92 days for winter, and 181 days for fall and spring combined). Please see my calculation sheets to see the volume calculations for the volume. The total volume needed for this facility is calculated below:

Heating during Spring and Fall months	= 159.4 afa
Heating during Summer months	= 0 afa
<u>Heating during Winter months</u>	<u>= 338.8 afa</u>
TOTAL	= 498.2 afa

The 498.2 afa is the maximum amount of water needed to maintain the heating of this facility. The actual annual volume shouldn't be limited to specific months, because there could be times that heating water would be needed in the summer months. There will also be times that this amount of water will be rarely used. However, Diversion rates required for this type of system match very closely to the pump capacity, so I believe the volume listed above should be adequate for this facility.

RECOMMENDATION FOR HEATING USE – I recommend that the commercial/heating use from these springs be limited to 1.96 cfs and 498.2 afa. Water rights 65-509, 65-7167 and 65-7903 are also diverted from these springs. The amount decreed to these rights when combined was 1.33 cfs without any combined use limits, so this permit should be limited to the balance of 0.63 cfs ($1.96 \text{ cfs} - 1.33 \text{ cfs} = 0.63 \text{ cfs}$). A diversion rate of $0.63 \text{ cfs} \times 1.9835 \times 365 = 457.2 \text{ afa}$, so the diversion rate listed on this right could supply the most of the volume requirement if needed. However, water rights 65-7167 and 65-7903 already allow a volume of 4.2 afa and 5.3 afa for commercial uses, but water right 65-509 has no volume limitation. Therefore the commercial use for this permit should be limited to the maximum volume the above diversion rate can supply or 457.2 afa. Therefore this permit should be limited to the following with the following limiting conditions:

0.63 cfs and 457.2 afa Commercial use from 1/1 to 12/31

When rights 65-509, 65-7167 and 65-7903 are combined they are limited to a total diversion rate of 1.96 cfs and 498.2 afa for heating and commercial purposes.

The heat value of the water used under this right shall be used for heating prior to being diverted for any other commercial use.

GROUNDWATER THEORETICAL ANALYSIS

East Pump Station FILE: 65-13588
 2-15 Hp pumps. DATE: 7-23-1999
 ONLY 1 pump BY: DAN NELSON
 used at a time
 Both pumps identical.

THEORETICAL RATE OF FLOW: $Q = \frac{(8.8 \times (\text{HP}) \times (\text{EFF.}))}{\text{TDH}}$

Q = CFS

HP = Total Brake Horsepower of pumping plant (including booster)

Eff. = Pumping plant efficiency (assume 70% or 0.70)

TDH = Total dynamic head = [(LIFT) + (PSI X 2.31)]

LIFT = Depth to water in FEET from land surface to pumping water level

PSI = Pumping pressure measured in PSI near pump (if open discharge assume [0])

$$Q = \frac{(8.8) \times (15 \text{ Hp.}) \times (0.70) = 92.4}{\frac{[(13) + (75 \text{ psi.} \times 2.31)] = 186.25}{} = 0.50 \text{ cfs} = 223 \text{ gpm.}$$

LIFT FROM:

Measurement (X)

Owner ()

Area estimate ()

Well Logs ()

Booster (Y) (N)

PSI FROM:

Measurement ()

Owner ()

Estimate (X)

Owner Gage ()

NOTES ON PUMP:

Motor Make, Serial or ID

Pump Make, Serial or ID, rating

REMARKS: AT THE EAST PUMP STATION THERE ARE
 2 - identical ~~15~~ 15Hp pumps. ONLY ONE PUMP
 IS USED AT THIS STATION AT ANY GIVEN
 TIME. I MEASURED THE LIFT AT 13 FT. THE
 PIPE LINE FROM THE PUMP FOLLOWS DOWN THE
 RIVER TO THE CENTER PUMP WHERE IT GOES
 UPHILL. THEREFORE, THIS PUMP SHOULD
 HAVE APPROXIMATELY THE SAME PRESSURE
 AS THE CENTER PUMP OR 75 PSI.

GROUNDWATER THEORETICAL ANALYSIS

3 Hp West
Center Pump.

FILE: 65-13588

DATE: 7-23-1999

BY: DAN Nelson

THEORETICAL RATE OF FLOW: $Q = \frac{(8.8 \times (\text{HP}) \times (\text{EFF.}))}{\text{TDH}}$

Q = CFS

HP = Total Brake Horsepower of pumping plant (including booster)

Eff. = Pumping plant efficiency (assume 70% or 0.70)

TDH = Total dynamic head = [(LIFT) + (PSI X 2.31)]

LIFT = Depth to water in FEET from land surface to pumping water level

PSI = Pumping pressure measured in PSI near pump (if open discharge assume [0])

$$Q = \frac{(8.8) \times (3 \text{ hp}) \times (0.70)}{[(0) + (75 \text{ psi} \times 2.31)]} = \frac{18.48}{173.25} = 0.11 \text{ CFS}$$

48 gpm.

LIFT FROM:

Measurement ()

Owner ()

Area estimate (X)

Well Logs ()

Booster (Y) (N)

PSI FROM:

Measurement ()

Owner ()

Estimate (X)

Owner Gage ()

NOTES ON PUMP:

Motor Make, Serial or ID

Pump Make, Serial or ID, rating

REMARKS: This is a submersible pump, therefore there is no actual lift. The pressure against the pump was determined by a topo map that shows a lift of 160ft or 70psi. an additional 5psi was added to move the water through the pipe and for open discharge. This calculation matched the pump curve supplied by this pump.

MODEL SP 8

NOM. FLOW RATE
40 GPM
FLOW RANGE
22 to 56 GPM
PUMP OUTLET
2" NPT



SP 8 Selection Charts

RATINGS ARE IN GALLONS PER HOUR (GPH)

SP 8-5 (1½ HP)

SP 8-7 (2 HP)

DEPTH TO WATER LEVEL (in Feet)	PSI						PSI						Shut-off (PSI)
	0	20	30	40	50	60	0	20	30	40	50	60	
20													53
40													44
60													35
80	3120	1380											27
100	2640						3240	2520	1740	480			18
120	1800						3000	1860	720				9
140							2640	900					25
160							2100						17

Friction losses in discharge pipe and fittings are not included in tables.

SP 8-9 (3 HP)

SP 8-12 (5 HP)

DEPTH TO WATER LEVEL (in Feet)	PSI						PSI						Shut-off (PSI)
	0	20	30	40	50	60	0	20	30	40	50	60	
20													102
40													93
60													85
80													76
100													67
120	3360	2880	2520	1920	1080		3300	3120	2940	2640	2340		59
140	3120	2580	2040	1200									50
160	2940	2100	1320	240			3360	3000	2760	2520	2100	1500	41
180	2640	1440	420				3180	2820	2520	2160	1620	900	33
200	2280	540					3060	2580	2220	1680	420	180	24
220	1680						2880	2280	1800	1080	300		16
240							2640	1860	1200	420			
260							2400	1320	540				35
280							1980	600					27
300							1500						18

Friction losses in discharge pipe and fittings are not included in tables.

$$2940 / 60 = 49 \text{ gpm} = 0.11 \text{ cfs.}$$

$$2100 / 60 = 35 \text{ gpm} = 0.08 \text{ cfs}$$

GROUNDWATER THEORETICAL ANALYSIS

west
~~East~~ HOT WATER
 Pump station
 2-15 HP pumps

FILE: 65-13588

DATE: 7-23-1999

BY: DAN NELSON

THEORETICAL RATE OF FLOW: $Q = \frac{(8.8 \times (\text{HP}) \times (\text{EFF.}))}{\text{TDH}}$

Q = CFS

HP = Total Brake Horsepower of pumping plant (including booster)

Eff. = Pumping plant efficiency (assume 70% or 0.70)

TDH = Total dynamic head = [(LIFT) + (PSI X 2.31)]

LIFT = Depth to water in FEET from land surface to pumping water level

PSI = Pumping pressure measured in PSI near pump (if open discharge assume [0])

$$Q = \frac{(8.8) \times (15\text{hp} + 15\text{hp}) \times (0.70) = 184.80}{[(13) + (57 \times 2.31)] = 144.67} = \frac{1.28 \text{ CFS}}{573 \text{ gpm.}}$$

LIFT FROM:

PSI FROM:

NOTES ON PUMP:

Measurement (✓)

Measurement ()

Motor Make, Serial or ID

Owner ()

Owner ()

Pump Make, Serial or ID, rating

Area estimate (✓)

Estimate (✓)

Well Logs ()

Owner Gage ()

Booster (Y) (N)

REMARKS: This station has 2-15HP pumps that pump into a single main line. Both pumps are operated at the same time. There was a 13FT lift and pressure was determined by a topo map that shows a lift of 120 FT or 52psi. An additional 5psi was added for friction loss and open discharge.

GROUNDWATER THEORETICAL ANALYSIS

1 Hp pump
in
West Pump
Station

FILE: 65-13588

DATE: 7-23-1999

BY: DAN NELSON

THEORETICAL RATE OF FLOW: $Q = \frac{(8.8 \times (\text{HP}) \times (\text{EFF.}))}{\text{TDH}}$

Q = CFS

HP = Total Brake Horsepower of pumping plant (including booster)

Eff. = Pumping plant efficiency (assume 70% or 0.70)

TDH = Total dynamic head = [(LIFT) + (PSI X 2.31)]

LIFT = Depth to water in FEET from land surface to pumping water level

PSI = Pumping pressure measured in PSI near pump (if open discharge assume [0])

$(8.8) \times (\underline{1 \text{ hp}}) \times (0.70) = 6.16$
Q = _____ = 0.05 CFS.

$[(\underline{0}) + (\underline{57} \times 2.31)] = 131.67$

LIFT FROM:

PSI FROM:

NOTES ON PUMP:

Measurement ()

Measurement ()

Motor Make, Serial or ID

Owner ()

Owner ()

Area estimate (✓)

Estimate (✓)

Pump Make, Serial or ID, rating

Well Logs ()

Owner Gage ()

Booster (Y) (N)

REMARKS: This is a submersible pump
so there is no actual lift. The pressure
was determined by a topo map that shows a
lift of 120 ft or 52 psi. An additional 5 psi
was added for friction loss and open
discharge.

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Dan Nelson
Exam Date: 01/20/06
File No: John Swander
Computations for: Heating in spring and fall months

REQUIRED DATA:

Area of livable floor space, ft² (A) 166445
2 story? (N=1, Y=2) 1
House efficiency factor (c) * 1.11
Inside design temperature (Ti) 70
Average outside temperature (To) ** 59
Source temperature, degrees F (S) 138
Heating/cooling days per season (D) 181
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (Ti - To)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 2,032,293 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $Ts = 0.3 \times [S - Ti]$

Ts = 20.4 degrees F

FLOW RATE REQUIRED (at given source temperature)

Formula: $Q = E / (500 \times Ts) \times 448.8$

Q = 0.44 cfs

DIVERTED VOLUME OVER SEASON

Formula: $Vdiv = Q \times D \times H / 24 \times 1.9835$

Vdiv = 159.4 AFA

* c values are as follows:

- 0.28 Best energy efficiency - extra insulation, caulked and weatherstripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weatherstripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
- 1.11 Poor energy efficiency - minimal insulation, no weatherproofing or storm windows (older homes, shops or greenhouses)

** Suggested average outside temperatures:

WINTER

4 deg F Boise
6 deg F Grand View
-8 deg F Cascade

SUMMER

80 deg F Boise
90 deg F Grand View
70 deg F Cascade

SCANNED
AUG 8 2007

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Dan Nelson
Exam Date: 01/20/96
File No: John Swander
Computations for: Heating in winter months

REQUIRED DATA:

Area of livable floor space, ft2 (A) 166445
2 story? (N=1, Y=2) 1
House efficiency factor (e) * 1.11
Inside design temperature (Ti) 70
Average outside temperature (To) ** 24
Source temperature, degrees F (S) 138
Heating/cooling days per season (D) 92
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (Ti - To)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 8,498,682 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $Ts = 0.3 \times [S - Ti]$

Ts = 20.4 degrees F

* c values are as follows:

- 0.28 Best energy efficiency - extra insulation, caulked and weatherstripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weatherstripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
- 1.11 Poor energy efficiency - minimal insulation, no weatherproofing or storm windows (older homes, shops or greenhouses)

** Suggested average outside temperatures:

WINTER
4 deg F Boise
6 deg F Grand View
-8 deg F Cascade

SUMMER
80 deg F Boise
90 deg F Grand View
70 deg F Cascade

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Dan Nelson
Exam Date: 01/20/06
File No: John Swander
Computations for: Heating in summer months

REQUIRED DATA:

Area of livable floor space, ft² (A) 166445
2 story? (N=1, Y=2) 1
House efficiency factor (e) * 1.11
Inside design temperature (Ti) 70
Average outside temperature (To) ** 70
Source temperature, degrees F (S) 138
Heating/cooling days per season (D) 92
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (Ti - To)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 0 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $T_s = 0.3 \times [S - Ti]$

Ts = 20.4 degrees F

FLOW RATE REQUIRED (at given source temperature)

Formula: $Q = E / (500 \times Ts) \times 448.8$

Q = 0.00 cfs

DIVERTED VOLUME OVER SEASON

Formula: $V_{div} = Q \times D \times H / 24 \times 1.9835$

Vdiv = 0.0 AFA

* e values are as follows:

- 0.28 Best energy efficiency - extra insulation, caulked and weathersripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weathersripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
- 1.11 Poor energy efficiency - minimal insulation, no weatherproofing or storm windows (older homes, shops or greenhouses)

** Suggested average outside temperatures:

WINTER
4 deg F Boise
6 deg F Grand View
-8 deg F Cascade

SUMMER
80 deg F Boise
90 deg F Grand View
70 deg F Cascade



Wards Greenhouses

Location Garden Valley

Type of Crop Potted Plants

Area 3.5 Acres

Temperature 138°F 59°C

Flow 853 gpm 3233 L/min

Capacity 15.1 X 10⁶ Btu/hr 4.4 MWt

Annual Energy 33.0 X 10⁹ Btu/yr 9.7 GWh/yr

Load Factor: 0.25

Delta T: 35°F

Date:

Contact Person:

Orpha Ward

1760 Banks Lowman Rd.

Garden Valley, ID 83622

(208) 462-3846



[Icon Listing](#) [Idaho Listing](#) [Idaho Map](#) [US Map](#) [Main Page](#) [All Greenhouses](#)

For correspondence, please include proper e-mail address within the text to:

geoheat@oit.edu

Geo-Heat Center

3201 Campus Drive

Klamath Falls, OR 97601

Phone: (541) 885-1750

Fax: (541) 885-1754

geoheat@oit.edu

This page was last updated on January 19, 2005 by the Geo-Heat Center

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<http://geoheat.oit.edu/directuse/all/dug0136.htm>

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Sponsored by

Garden Valley Neighborhood Profile**Location:** Garden Valley, ID 83622[Search for Homes in this Area](#) | [View a Map](#) | [Glossary](#)**Demographics**

	Garden Valley, ID 83622	Nation
Population of Garden Valley	1993	11535
Median Age	40.7 years	37.47 ye
Median Household Income	\$42560	\$42350.
Percentage of Single Households	32.9%	41.53%
Percentage of Married Households	67.1%	58.46%
Percentage Families (households with children)	21.1%	24.32%
Average Household Size	2.53 people	2.57 pec
Percentage College or Better	20.5%	20.14%
Percentage White Collar	32.7%	47.14%

Cost of Living

	Garden Valley, ID 83622	Nation
Cost of Living Index	96.7	99.52
Average Yearly Utility Cost	3122	3196.27
Average Household Total Consumer Expenditures	\$40856 per year	\$41075.
Average Household Education Expenditures	\$343 per year	\$450.93
Average Household Entertainment Expenditures	\$2127 per year	\$2207.0
Average Household Transportation Expenditures	\$1477 per year	\$1563.8
Average Household Retail Expenditures	\$18197 per year	\$18600.
Average Household Non-Retail Expenditures	\$22659 per year	\$22474.

Quality of Life

	Garden Valley, ID 83622	Nation
Average Winter High Temperature	34.3 degrees	41.29 de
Average Winter Low Temperature	14.4 degrees	22.88 de
Average Summer High Temperature	86.6 degrees	86.56 de
Average Summer Low Temperature	54 degrees	62.35 de

Ward's Greenhouse Inc.
Garden Valley, ID
Covered area 1999

CURRENT
GREEN
HOUSE
SETUP

A1		1972 sq. ft.
A2		2197
A3		2197
B1		5967
B2		4647
B3		4433
B4		3115
B5		2842
B6		2891
B7		2842
B8		2940
B9		2940
B10		3060
C/D		54,912
E		25,344
F1	24 x 130	3,120
F2	24 x 130	3,120
F3	28 x 130	3,640
G-6 small Cold Frames		7,350
G-6 large " "	30 x 49	8,820
H-4 houses	30 x 98	11,760
B/C alley way	24 x 264	<u>6,336</u>
		166,445

PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 7/23/1999

FILE NUMBER 65-13588

**THE PHOTOS ON THIS PAGE
SHOW THE WEST PUMP
STATION.**



The top photo shows inside the pump house. Inside the pump house you can see the two 15 Hp turbine pumps that deliver the hot water. The pipeline for the 1Hp pump connects to the mainline that runs along the wall. The mainline goes up the hill from this point. You can see the old gas fired pump in the corner, but it is not connected to the mainline or intake pipe.



This middle photo shows the 20 Hp in-line pump. This pump diverts water directly from the river, and only diverts cold water.



This bottom photo shows the pipeline from the 1Hp pump. The water was high enough and the slopes treacherous enough that it was not safe at the time of the exam to get a photo of the actual pump location. However, you can see the mainline coming from around the corner, and the electric panel in the well house.

PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 7/23/1999

FILE NUMBER 65-13588

**THE PHOTOS ON THIS PAGE
SHOW THE EAST PUMP
STATION.**



The top photo shows inside the pump house. Inside the pump house you can see the two 15 Hp turbine pumps that deliver the hot water. The mainline from his pump house goes over to the location of the 3 Hp pump where it then goes up the hill.



This bottom photo shows the pipeline from the 3 Hp pump. The water was high enough and the slopes treacherous enough that it was not safe at the time of the exam to get a photo of the actual pump location. However, you can see the mainline coming from the pump to the point where it joins with the mainline from the East Pump House and then head up the hill. The electric panel is located on top of the hill.

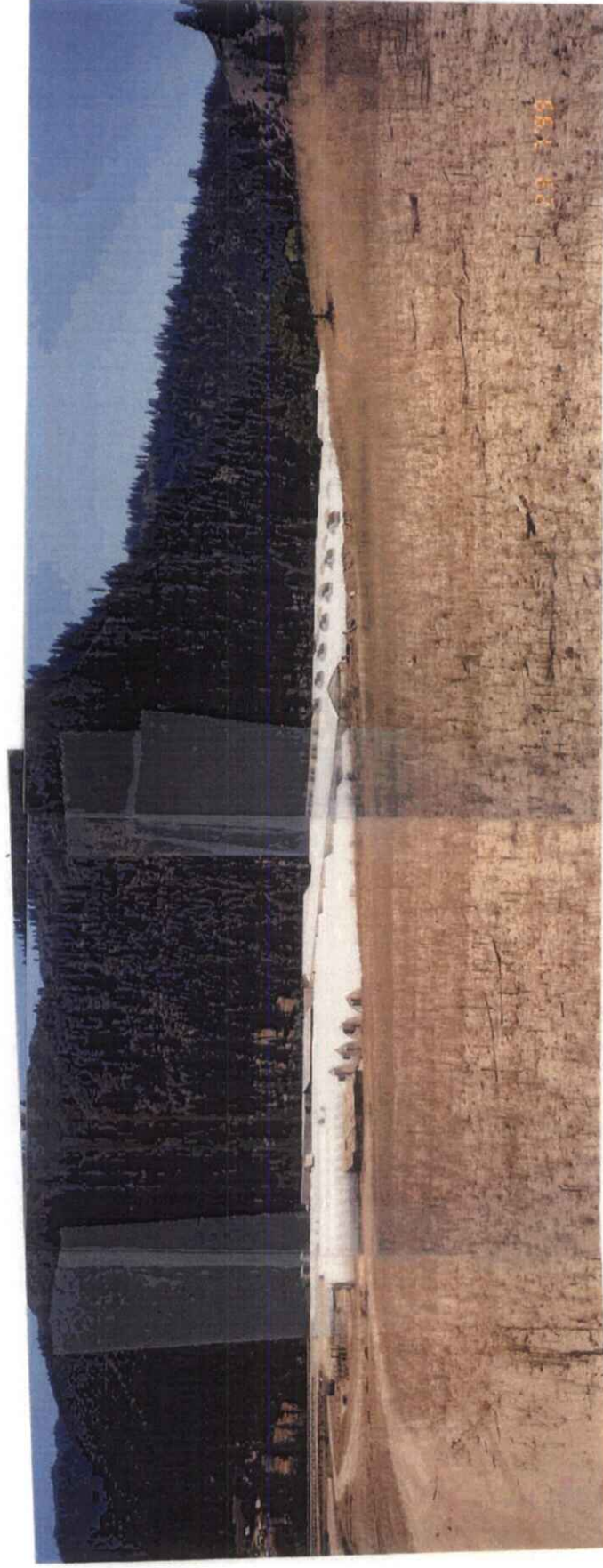
Mainline
goes up the
hill here.

Location of
3 Hp pump

PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 7/23/1999

FILE NUMBER 65-13588

This photo shows the greenhouse facility.



FIELD NOTES

PERMIT NUMBER 65-13588

PLEASE NOTE: These documents are for backup purposes only and are not apart of actual Beneficial Use Field Report.

IMPORTANT MESSAGE

FOR Dan

DATE 5/27

TIME 9:30

A.M.
P.M.

WHILE YOU WERE OUT

M Doug Ward

OF Ward's Greenhouse

PHONE NO. 462-3846

TELEPHONED

☒

PLEASE CALL

CALLED TO SEE YOU

☐

WILL CALL AGAIN

WANTS TO SEE YOU

☐

URGENT

RETURNED YOUR CALL ☐

MESSAGE wanted you to
know that the temp. of
the hot water when it
enters the greenhouse is
SIGNED 125°. If you have

✓HighMark

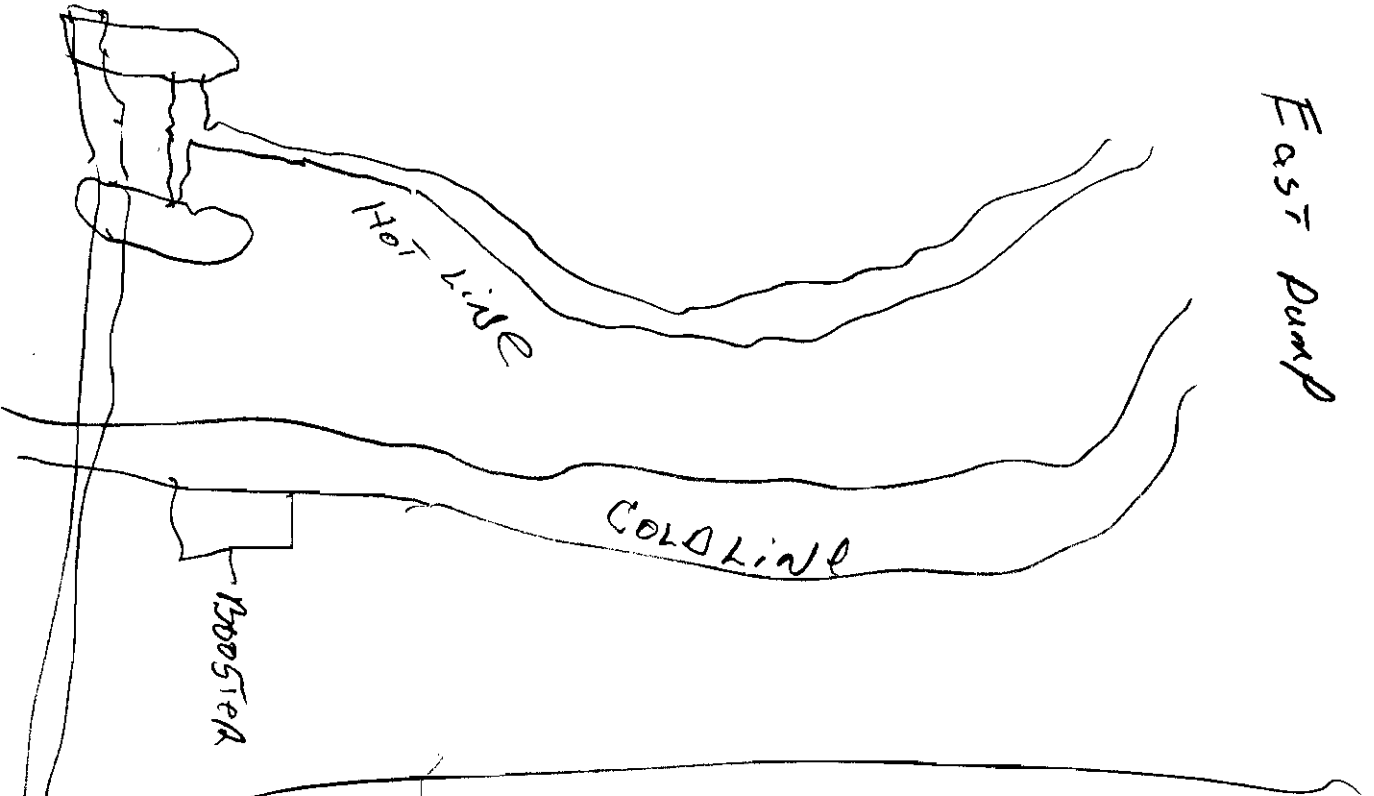
P3-AN2334



Paper contains 50% recycled fibers,
of which 20% is post-consumer waste

Questions please call him.
lg

East Pump



Dog T.

Center.

Hot Springs

East Center



EAST
CENTER

1 H D Road

East
Pump

West
Center

East ONLY RUN 1 at a TIME.

UPPER HOT SPRINGS
East Pump (Pump #1)
15 HP US ELECTRIC

ID # Z12 Z27 BROOK

230 VOLT
89.5 EFF
Model #
F 407A
1765 RPM

WEST Pump Pump #2

ID # Z12 Z27 BROOK
15 HP US ELECTRIC

230 VOLT
89.5
Model #
F 407A
1765 RPM

Runs about 90 psi

13 FT LIFT

ADDED HOT SPRINGS

AND HAVE ADDED GREEN HOUSES.

COLD well used TO irrigate
and maintain cooler

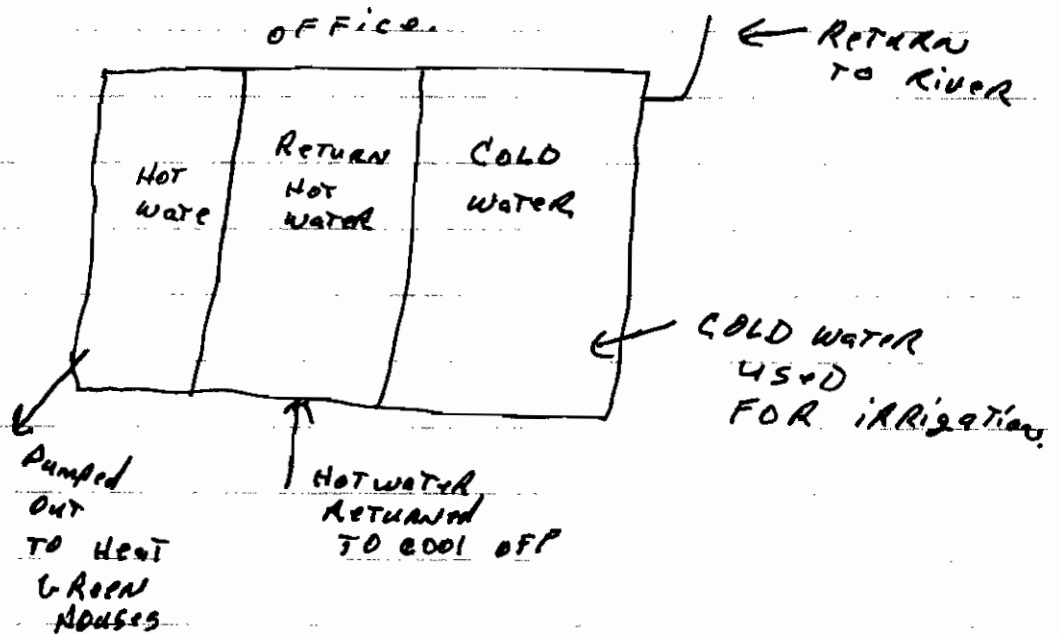
TEMPs ~~ON~~ HOT WATER

USED TO HEAT

GREEN HOUSE. AND

THEN PUT INTO

TANK FOR IRRIGATION



East ONLY RUN 1 at a Time

UPPER HOT SPRINGS
East Pump (Pump #1)
15 HP US ELECTRIC

ID# 212 227 8R060F

230 VOLT
89.5 EFF
MODEL #
F 407A
1765 RPM

WEST Pump Pump #2

ID# 212 227 8R060F
15 HP US ELECTRIC

230 VOLT
89.5
MODEL #
F 407A
1765 RPM

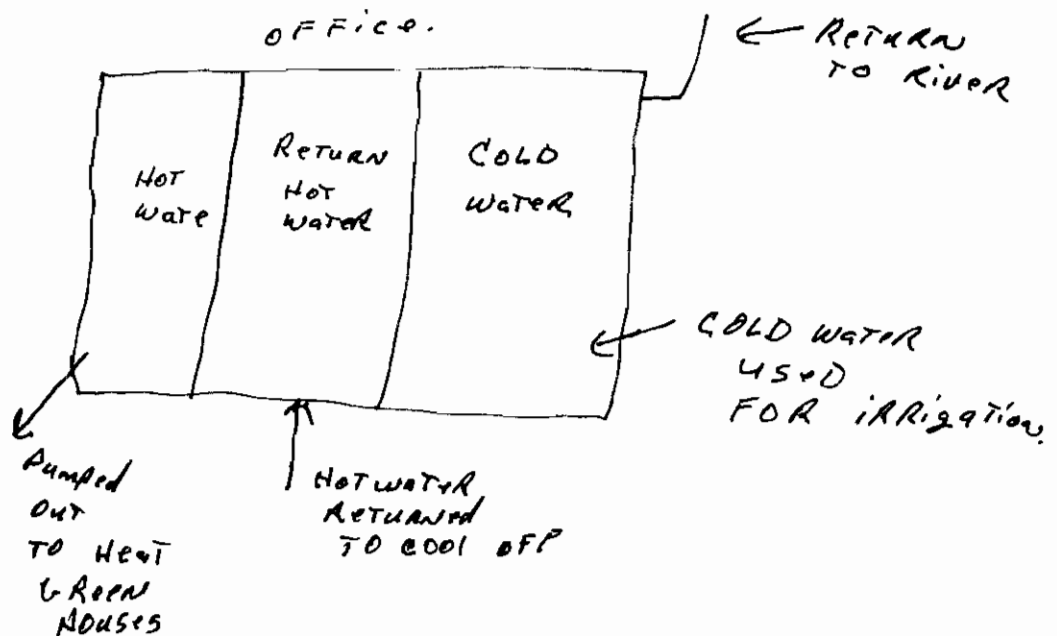
Runs about 90 psi

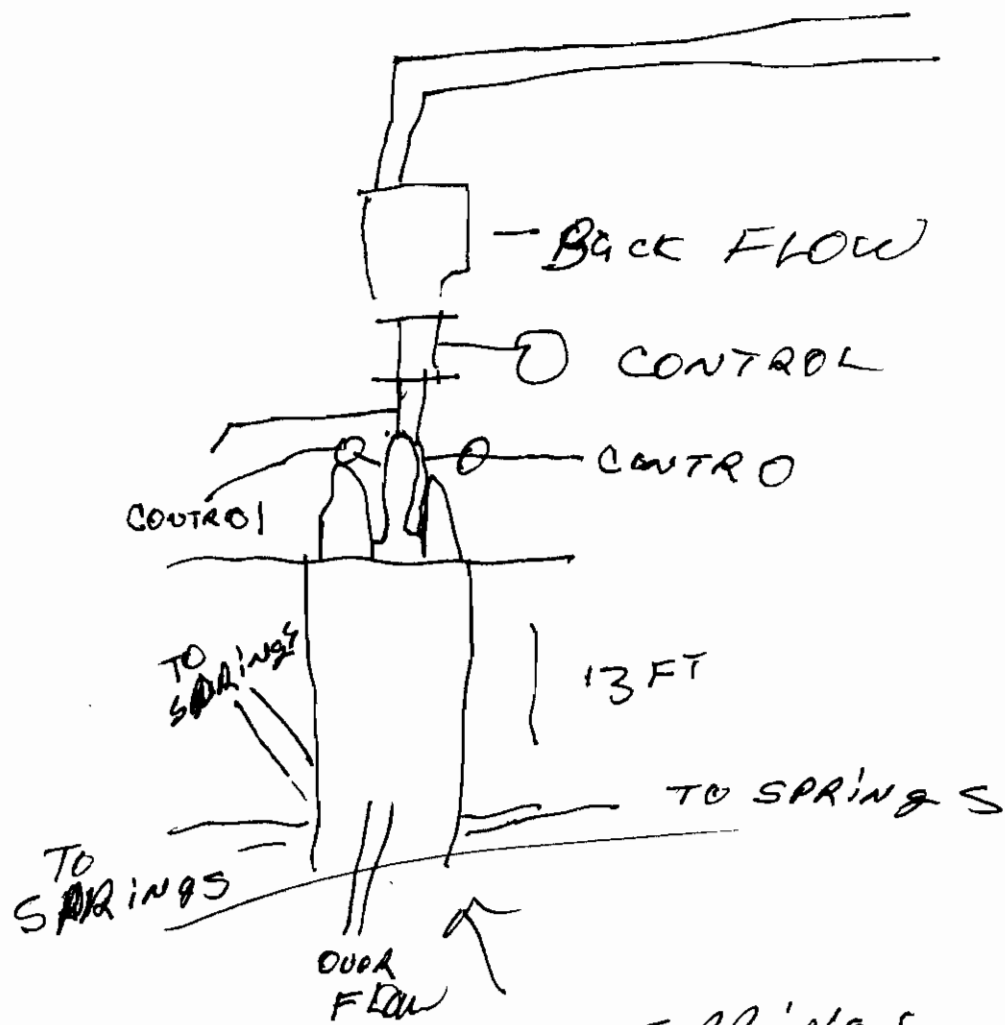
13 FT LIFT

ADDED HOT SPRINGS

AND HAVE ADDED GREEN HOUSES.

COLD well used TO IRRIGATE
and maintain cooler
TEMPS ~~AND~~ HOT WATER
USED TO HEAT
GREEN HOUSE. AND
THEN PUT INTO
TANK FOR IRRIGATION





3 SPRINGS
ENTER
HER

CENTER PUMP
STATION

CENTER PUMP

SUBMERSIBLE

3 HP

Model 2823028110

230 VOLT

3450 RPM

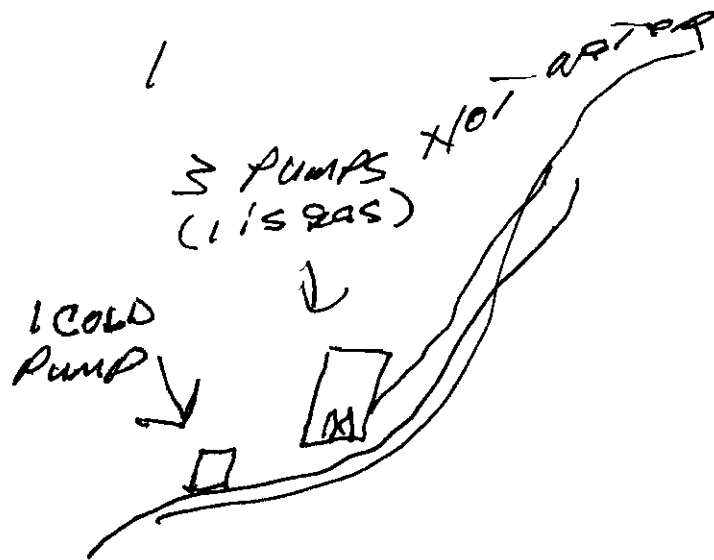
1.15

13 FT LIPS

West Pump Station

WEST PUMPS STATION
HOT & COLD WATER

HO



West Pump (LGS)
UNKNOWN

CENTER Pump (ELEC)
MOTOR same as EAST pump

EAST Pump (ELECT.)
MOTOR 15 HP 3480 RPM
230V
Model 4UE21 5TTDW7022 AA

Pump IMP- 8.31 SN 6240697
MOTOR B22 PLS

- Determine P/D
- Gather year to date of totalizing records to determine needed volume - see permit remarks
- Show Dave system diagrams from 65-07903 + 65-07904 to determine if operation has expanded or changed so that it can be licensed under this permit
- See if polygon mean possible

GENERAL INFO

CONV DATE: 10/27/97

NAME: Dave Ward

PHONE #: 462-3846

PERMIT #: 65-13344A

LOCATION OF WELL: —

CASING SIZE: —

HP: 20 → 8" pipe (5' exposed)

DYNAMIC:

STATIC:

DEPTH:

PSI:

ACRES IRRIGATED:

SPRINKLER INFO:

TYPE:

SIZE:

LENGTH:

OPERATING:

STOCK: —

DOMESTICS: —

OTHER USES: commercial

OTHER RTS USED:

DIRECTIONS:

EXAM DATE:

~~130°~~
springs
120°-130° pipe
80° return approx
2 lines

1 FROM upper
spring and 1 FROM lower

Need
GPS
poly son

Have
NOT
EXPOSED
Trees

New HOT HOUSES

7 - 100 x 96
1 - 96 x 264

6 - 49 x 30
6 - 49 x 24

LOST inside
3 - 105-30
mud

QUOTATION WORKSHEET

SALE ☒ RENTAL ☐

RENTAL

Oct 1 1997

RENTAL/SALES ORDER #



OWNER Woods Greenhouse CUST #

Bob Nampa RFR

5 I - a

53

STATE.ZIP

6755-698-806 2512-281-008 #12

[illegible]

THIS IS NOT AN INVOICE

IS NOT AN INVOICE

ORIGINAL

Performance Curves

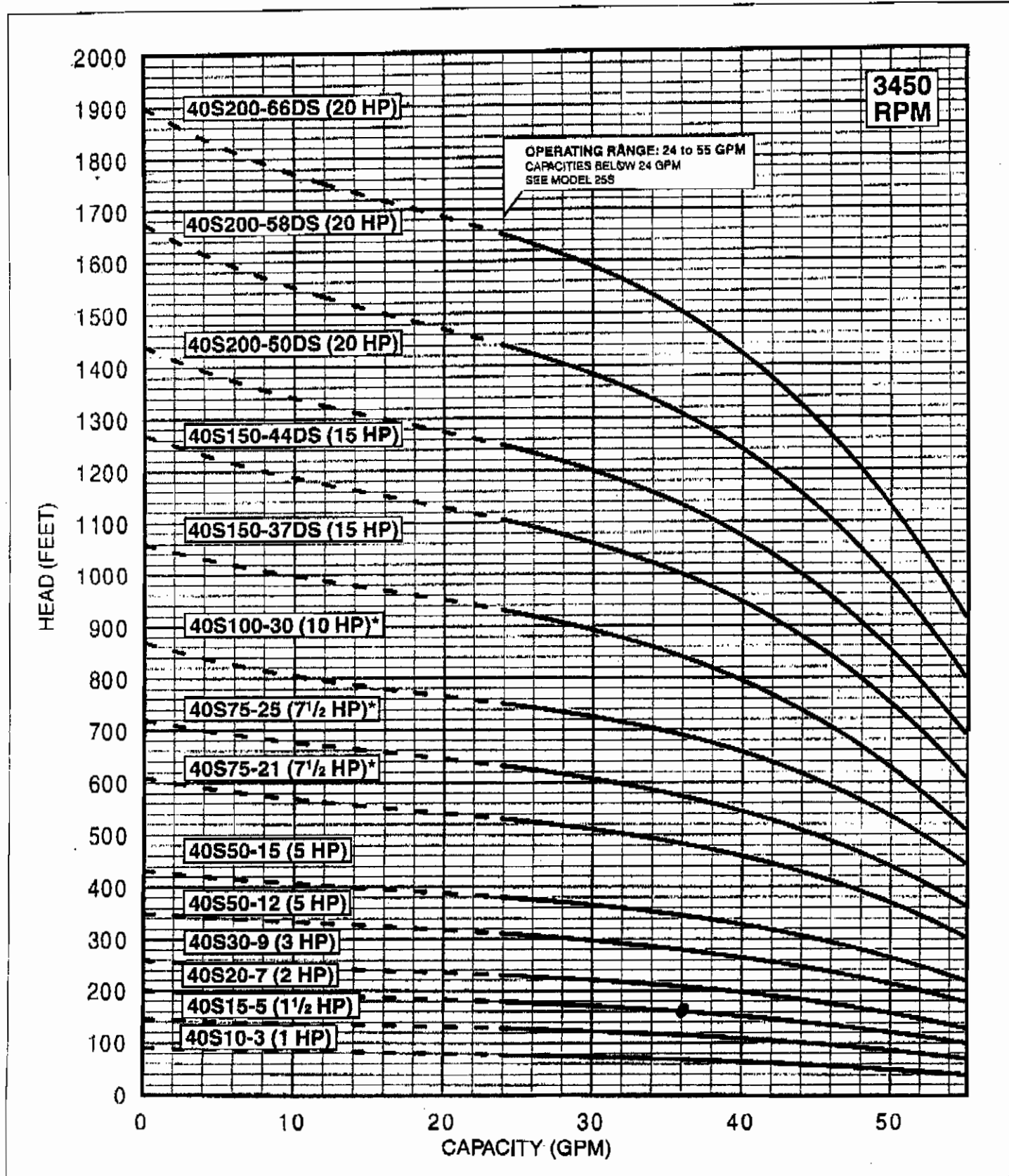
40 GPM

Model 40S

FLOW RANGE: 24 - 55 GPM

OUTLET SIZE: 2 " NPT

NOMINAL DIA. 4"



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

4" MOTOR STANDARD, 1-10 HP/3450 RPM.

6" MOTOR STANDARD, 15-20 HP/3450 RPM.

* Also available with 6" motor.

Performance conforms to ISO 2548 Annex B
@ 5 ft. min. submergence.

MODEL SP 8

NOM. FLOW RATE
40 GPM
FLOW RANGE
22 to 56 GPM
PUMP OUTLET
2" NPT



SP 8 Selection Charts

RATINGS ARE IN GALLONS PER HOUR (GPH)

SP 8-5 (1½ HP)

SP 8-7 (2 HP)

DEPTH TO WATER LEVEL (in Feet)	PSI						Shut-off (PSI)	PSI						Shut-off (PSI)
	0	20	30	40	50	60		0	20	30	40	50	60	
20		3360	2940	2220	660		53				3120	2760	2160	77
40		3000	2340	900			44			3120	2820	2280	1320	69
60		2160	1200				35		3180	2880	2340	1440		60
80	3120	1380					27		2880	2460	1620	300		51
100	2640						18	3240	2520	1740	480			43
120	1800						9	3000	1860	720				34
140								2640	900					25
160								2100						17

Friction losses in discharge pipe and fittings are not included in tables

SP 8-9 (3 HP)

SP 8-12 (5 HP)

DEPTH TO WATER LEVEL (in Feet)	PSI						Shut-off (PSI)	PSI						Shut-off (PSI)
	0	20	30	40	50	60		0	20	30	40	50	60	
20					3180	2940	102						3360	139
40				3240	3000	2700	93						3180	131
60			3240	3000	2760	2280	85					3240	3060	122
80		3300	3060	2760	2400	1740	76				3240	3060	2880	113
100		3060	2820	2460	1800	900	67			3300	3120	2880	2640	105
120	3360	2880	2520	1920	1080		59		3300	3120	2940	2640	2340	96
140	3120	2580	2040	1200			50		3120	2940	2760	2460	2040	87
160	2940	2100	1320	240			41	3360	3000	2760	2520	2100	1500	79
180	2640	1440	420				33	3180	2820	2520	2160	1620	900	70
200	2280	540					24	3060	2580	2220	1680	420	180	61
220	1680						16	2880	2280	1800	1080	300		53
240								2640	1860	1200	420			44
260								2400	1320	540				35
280								1980	600					27
300								1500						18

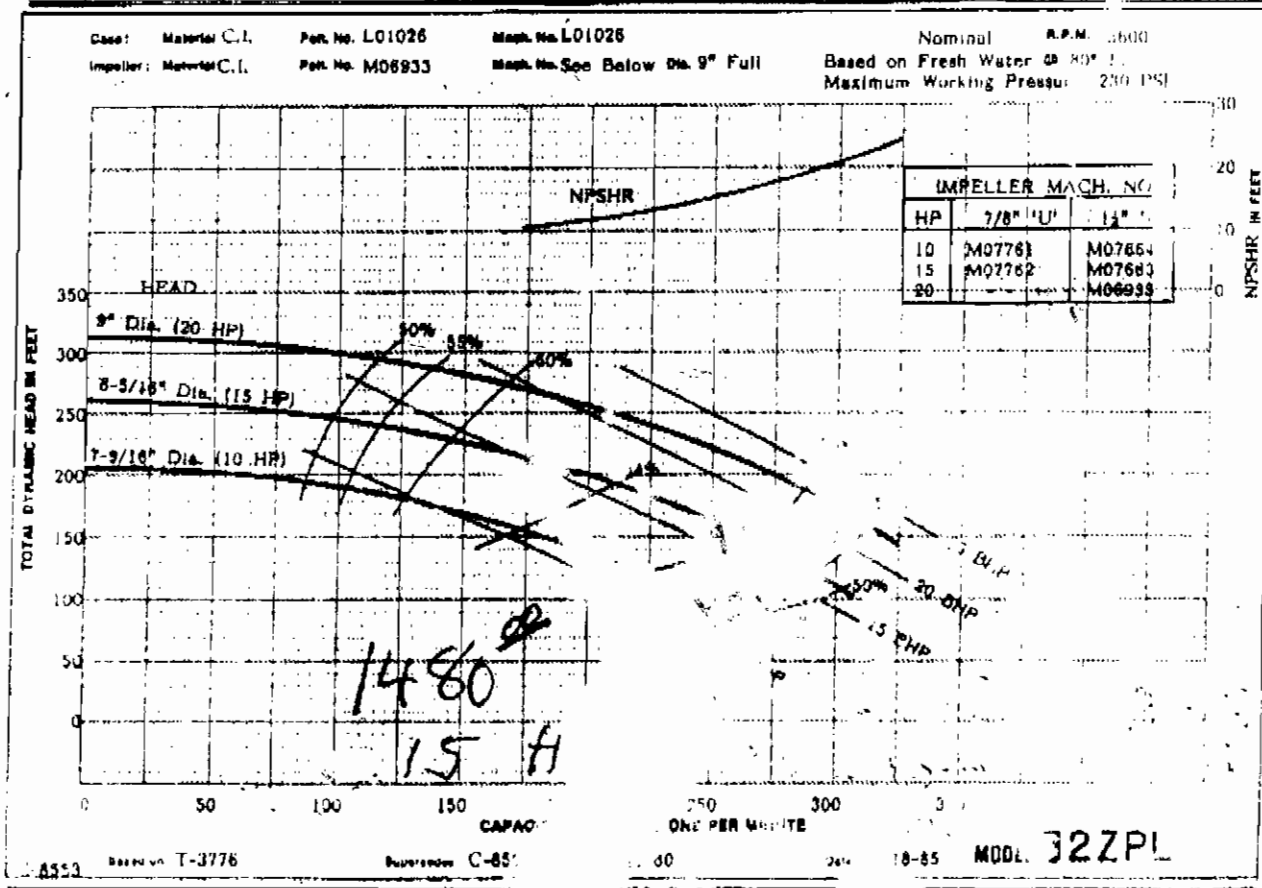
Friction losses in discharge pipe and fittings are not included in tables.



BERKELEY PUMPS

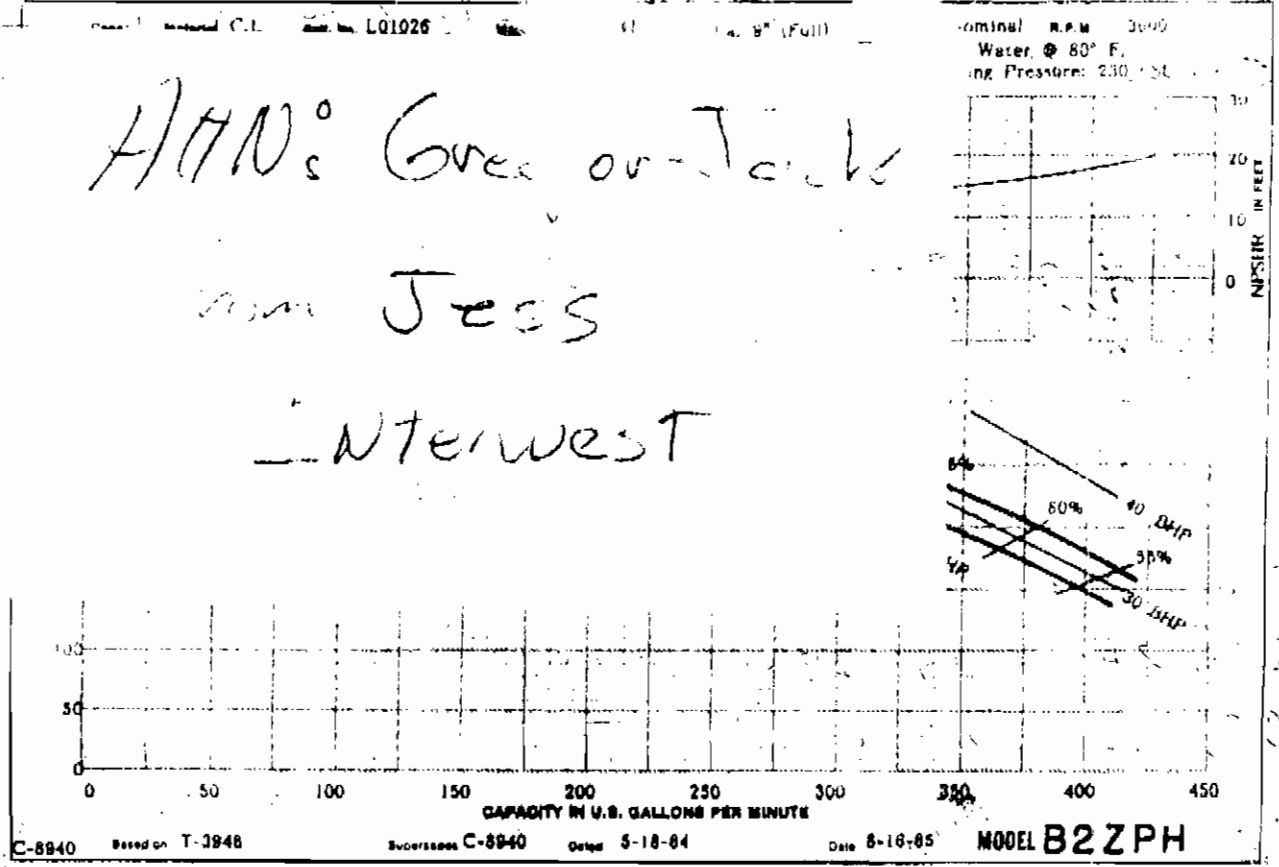
TYPE "B" RATING CURVES
MOTOR DRIVE

CURVE	4075
DATE	1-2-86
PAGE	1.01
SUPERSEDES	
4075 Curves	



Wesi
HOT
WATER
PUMP
LOW
PUMP
STAT.

ATTN: Green or-Jack
from Jess
Interwest

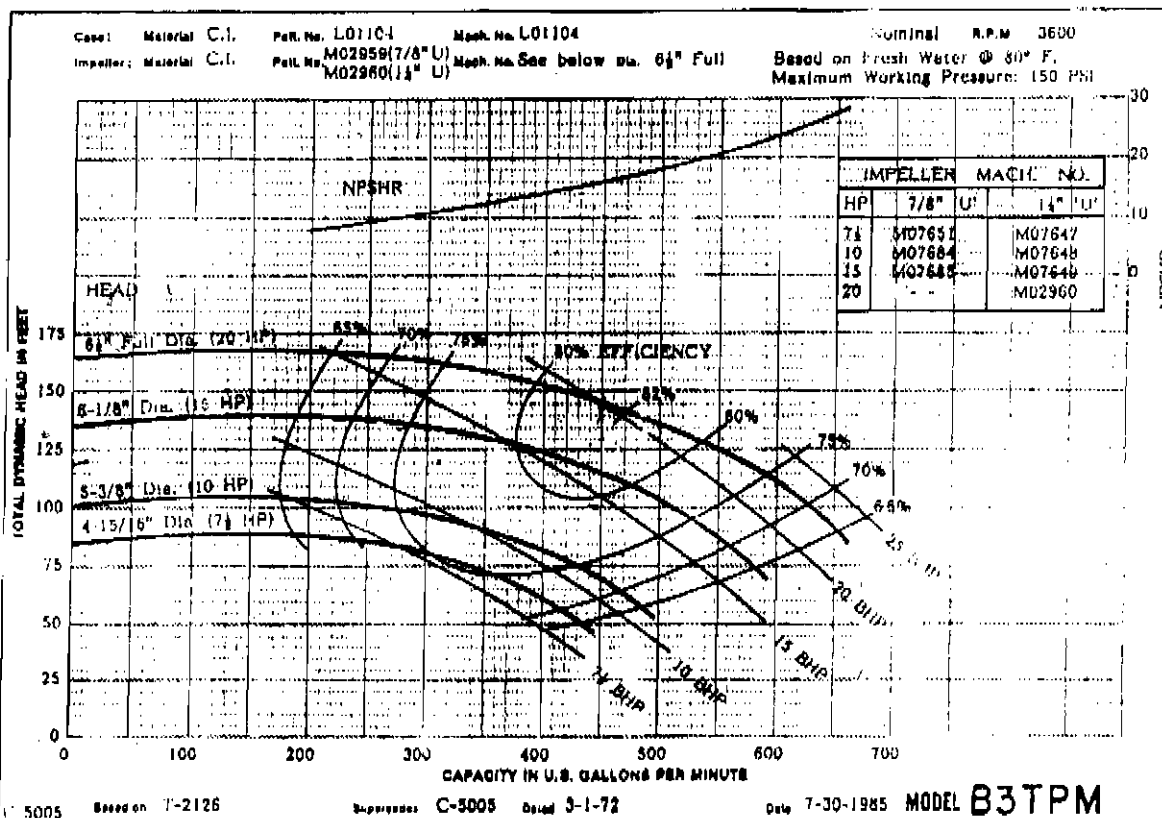


84654



BERKELEY PUMPS TYPE "B" RATING CURVES MOTOR DRIVE

CURVE	4075
DATE	1-2-88
PAGE	407
SUPERSEDED	
All previously issued	
4075 Curves	



River Pump

