

MEMORANDUM

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Department of Water Resources
Southern Region

February 5, 2004

Reviewed by: Garth Newton 

From: Shane Bendixsen

Subject: Transfer 70750, Raft River

Previously a memo dated December 18, 2003 was submitted for this same transfer. For ease in reading it has been incorporated into this memo. The original memo addressed the question of connection between the cold water and deep geothermal water. This supplement was prepared to address the question about the hydraulic connection between the river and shallow ground water.

It is my understanding the applicant wishes to transfer part of his ground water right approximately 4,000 feet to the northwest (see the Attached #1). Reason for the transfer is the current well produces water too hot for irrigation. The new well will hopefully produce water of a lower temperature and the mixing of the water from the two wells will be suitable agricultural use.

Ground water in the Raft River area is best described as shallow cold water system underlain by a deep geothermal aquifer. The shallow aquifer is usually encountered at depth from a few feet to over 100 feet. The deep geothermal system is usually encountered at greater depths.

Non-geothermal well water temperature is usually 55 to 60 degrees F. Temperature in the Raft River Geothermal aquifer can be greater than 150 degrees F. Water in the bottom of the existing well was 111 degrees F when drilled in 1950. This suggests some type of mixing between the cold and geothermal systems. The question is whether the mixing is just temperature or geothermal water leaking upwards.

The Raft River Geothermal area was developed in the late 1970's, but it was determined to be not economic and has since not been active. The development did produce several studies that do provide an understanding of the system. Spencer and others (1979), describe the deep geothermal water as leaking upward into the cooler regional system. This was based on water quality data from the shallower irrigation wells in the area. The total dissolved solids averaged approximately 650 mg/l. The deep geothermal system has TDS ranging from 1600 to 6330 mg/l. Surface water in the basin usually has a TDS less than 150 mg/l (Walker and others, 1970). The surface water recharges the cooler regional

aquifer. Obviously the deep geothermal waters are leaking upwards into the cooler regional system.

As a further check of more recent water quality data from the regional system is shown on Attachment #1. The TDS ranges from 787 to 919 mg/l.

The flow from the geothermal waters upward into the regional system is probably saturated, but data are not available to confirm this. Therefore pumping from one system will probably affect the other.

How much water is leaking into the regional system is not known. It would take some type of a numeric model to determine this and even then the accuracy would be questionable.

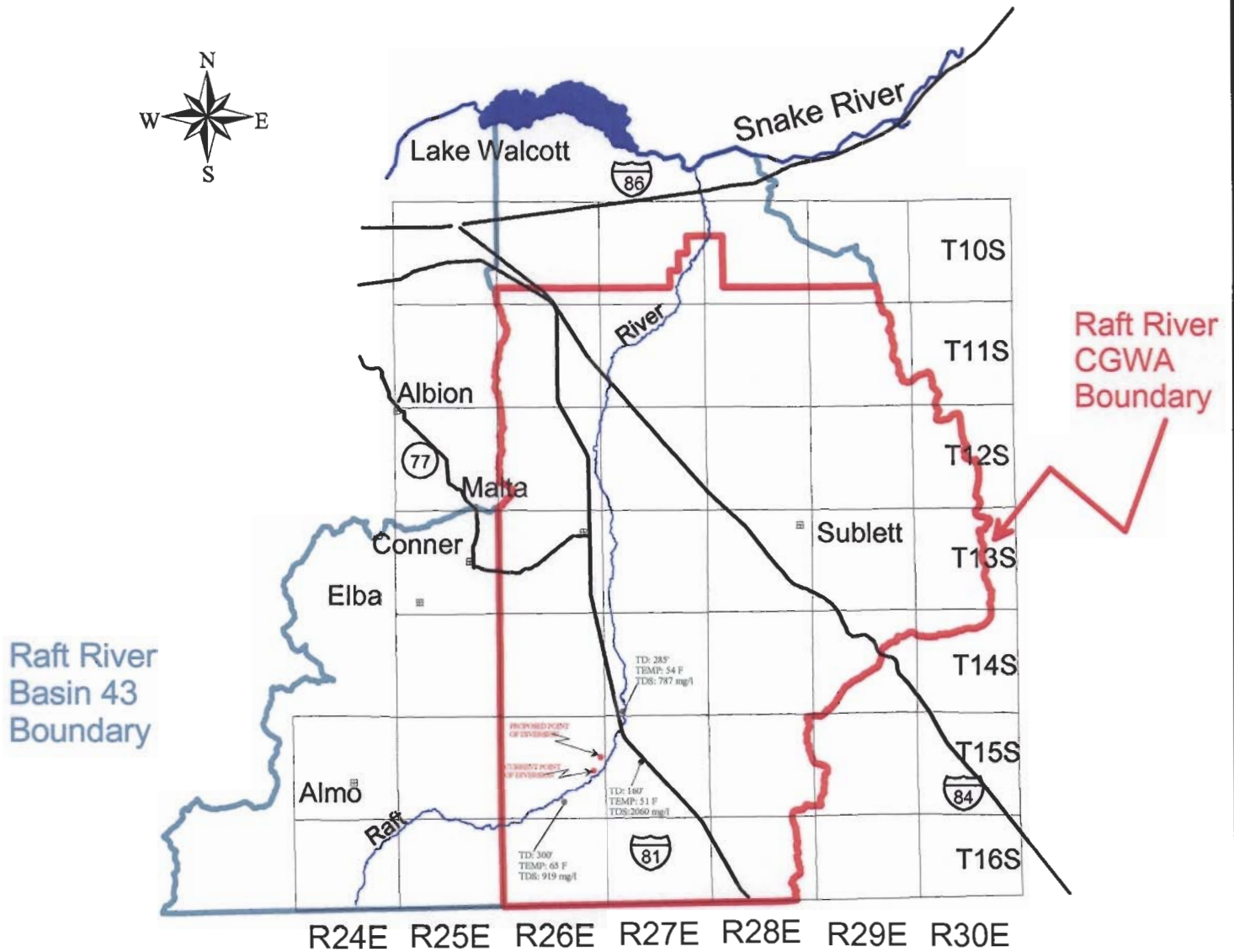
Attachment #2 presents a surface \ ground water profile for the area of interest. Presented are Raft River and the water table in spring 1980 and 2001. The data does suggest that in this area the water table and the river are not hydraulically connected. Therefore pumping from one will not affect the other.

REFERENCES

Spencer, G. S., Russell, B.F, and Sullivan, J.F, Potential use of Geothermal Resources in the Snake River Basin: An Environmental Overview, Prepared by EG&G Idaho, Inc. for the Department of Energy, September, 1979.

Walker, E.H. and others, The Raft River Basin, Idaho-Utah, as of 1966 – a Reappraisal of Water Resources and Effects of Ground Water Development: Idaho Department of Water Resources Water Information Bulletin 19, 1970.

RAFT RIVER CRITICAL GROUND WATER AREA



• WATER QUALITY STATION
TDS: TOTAL DISSOLVED SOLIDS
TD: TOTAL DEPTH

LOOKING NORTHWEST

LEGEND

- RAFT RIVER
- WATER TABLE SPRING 1980
- WATER TABLE SPRING 2001

ELEVATION (ft)

RIVER MILES

Scale: R24E, R25E, R26E, R27E, R28E, R29E, R30E

Marker: + River Mile



LEGEND
 RAFT RIVER
 WATER TABLE SPRING 1980
 WATER TABLE SPRING 2001