

CH2MHILL

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Department of Water Resources
Southern Region

CH2M HILL
700 Clearwater Lane
Boise, ID
83712-7708
P.O. Box 8748
Boise, ID
83707-2748
Tel 208.345.5310
Fax 208.345.5315

September 3, 2004

Mr. James E. Stanton
Sr. Water Resources Agent
Department of Water Resources
1341 Fillmore Street, Suite 200
Twin Falls, ID 83301-3380

Dear Mr. Stanton:

Subject: Application for Transfer 71-446, High Mountain Ranches LLC

In the interest of time, we are forwarding directly to you our supporting calculations for the subject transfer. These calculations are specific to the determination of direct and immediate hydraulic connection for the new supply well to the Salmon River.

Attached please find the following:

- Technical Memorandum: Depletion Justification for Water Right Transfer Application 71-446, Prepared by Chuck Feast, P.G., Senior CH2M HILL Hydrogeologist. Attachments include:
 - Figure 1—Location Map
 - Figure 2—Well Driller's Report
 - Figure 3—Time/Duration curve developed from initial well drawdown test and determination of aquifer Transmissivity range
 - Figure 4—Evaluation of Stream Depletion from a Well with supporting methodology and references
- Copy of letter dated August 12, 2004, from IDWR to Holland & Hart

Mr. James E. Stanton

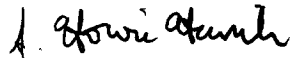
Page 2

September 3, 2004

Please review this information and call me if you have any questions. We are conveying the same information to those listed below.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read "S. Howie Henrikson".

S. Howie Henrikson, P.E.
Project Manager

c: Mr. J. Frederick Mack/Holland & Hart
 Mr. Jim Bennetts/ Attorney-at-Law
 Mr. Brian Hamilton/USBR/Salmon – via E-mail
 Mr. Matt Hightree/IDFG/Salmon – via E-mail
 Mr. Mike Lavey/CH2MHILL – via E-mail
 Mr. Chuck Feast/CH2MHILL – via E-mail

TECHNICAL MEMORANDUM

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Department of Water Resources
Southern Region

PREPARED FOR: Mike Lavey/CH2M HILL
S. Howie Henrikson, P.E./CH2M HILL

PREPARED BY: Chuck Feast, P.G./CH2M HILL

RE: Depletion Justification for Water Right Transfer Application 71-446

DATE: September 3, 2004

This memorandum provides the method, sources of data, and calculated percent "depletion" of the Salmon River for the proposed change in point of diversion and source for the Sink Creek Diversion Site (see Figure 1). The proposed change is from a surface water diversion to a shallow alluvial well approximately 82 feet from the river's edge and existing diversion. When requesting a change in source from surface water to groundwater, the Idaho Department of Water Resources (IDWR) criteria states that the proposed point of diversion must cause a minimum of 50 percent depletion in the original source in one day before the approval is granted by IDWR. The approach and methodology used in this analysis was discussed with Mr. Shane Bendixsen/IDWR and a similar procedure was followed¹.

In 2003, a test well was installed at the proposed point of diversion, 82 feet from the Salmon River. Figure 2 provides the Well Driller's Report for the test well. As shown by the log (Figure 2), the geology at the site consists of coarse alluvial material ranging from minor amounts of clay to clean sand and large gravel deposited by the Salmon River. Underlying the alluvial deposits is granite of the Idaho Batholith. On October 19, 2003, a 6-hour pumping test was conducted on the test well. Figure 3 presents the time-drawdown graph and resulting transmissivity values for the well determined from this test.

Figure 4 provides the analysis of the river depletion for this site using the method outlined by IDWR and using the site-specific geology of the test site and values from the pumping test. The calculated depletion percentage is directly proportional to the distance from the well to the river. The calculated percentages were based on the distance from the well to the centerline of the river—an estimated distance of about 182 feet (one-half of the total river width of 200 feet plus 82 feet). Using this distance, the analysis shows an 82 to 87 percent "depletion"; or, 82 to 87 percent of the water discharged from the well will come from the Salmon River within a 24-hour period (1 day). If the distance from the well to the edge of the river (82 feet) is used, the calculated "depletion" rises to about 90 percent.

In summary, the well is demonstrated to meet the criteria of "direct and immediate hydraulic connection" as outlined in IDWR Transfer Processing No. 24 Memorandum.

¹ Glover, R.E. and Balmer, G. G. "River Depletion Resulting from Pumping a Well near a River." Transactions of the American Geophysical Union. Vol 35, No. 3. Pp 468-470. June 1954.

FORWARD WHITE COPY TO WATER RESOURCES

FIGURE 3

Time - Drawdown
Salmon River Site Test
New Test Well
Q = 450 gpm
Test date: 10/29/03

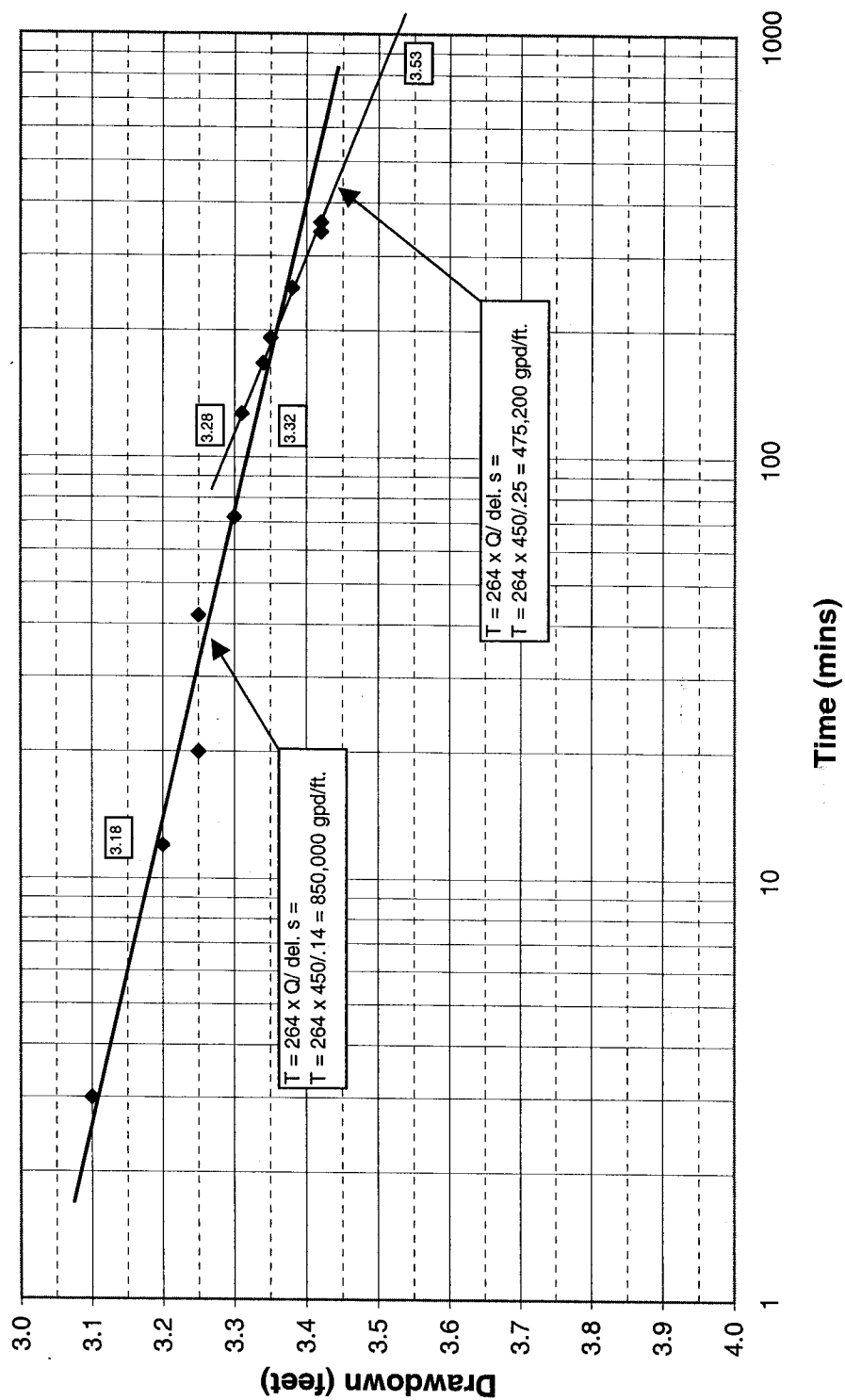


FIGURE 4

Evaluation of Stream Depletion from a Well
Sink Creek Water Rights Transfer

Method:

Calculated Stream Depletion from Balmer and Glover (1954) method as presented in the Groundwater Manual, 1977, U.S Bureau of Recreation, page 159-160.

Variables:

	T1	T2
T = Transmissivity (gpd/ft)	850000	475200
T = Transmissivity (ft ² /day)	113636	63529
S = Specific yield (unitless)	0.2	0.2
t = Time (days)	1	1
x = Distance from well to center of river (feet)	182	182
q = Flow that comes from the stream		
Q = Discharge of the well		

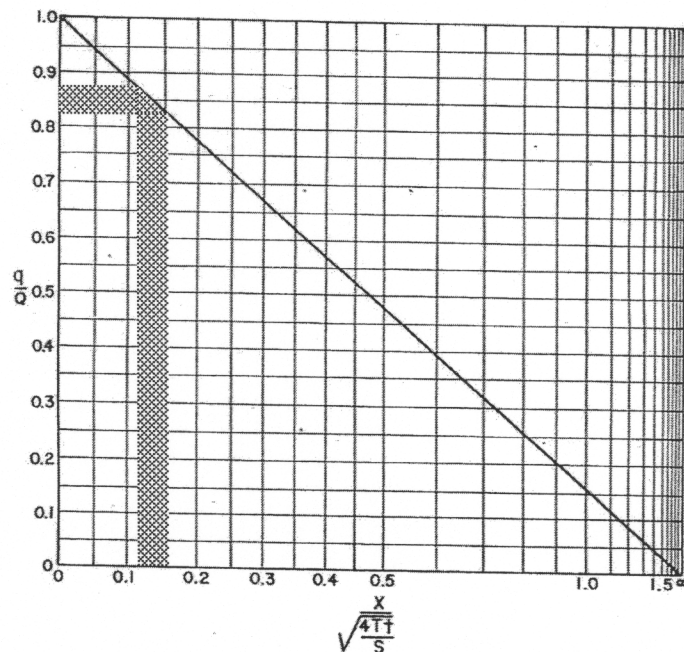
Sources of data:

Transmissivities from October 29, 2003 pumping test, test results attached
Specific yield, text book value for coarse gravels, multiple sources
Time, 24 hours required time limit
Distance from well to centerline of river
(Well 82.5 feet from River, River approx 200 feet wide)

Percent "Depletion" from Salmon River		
	$x/(4TtS)^{.5}$	q/Q
T1	0.12	87%
T2	0.16	82%

160

GROUND WATER MANUAL

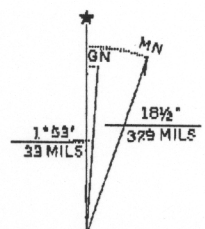
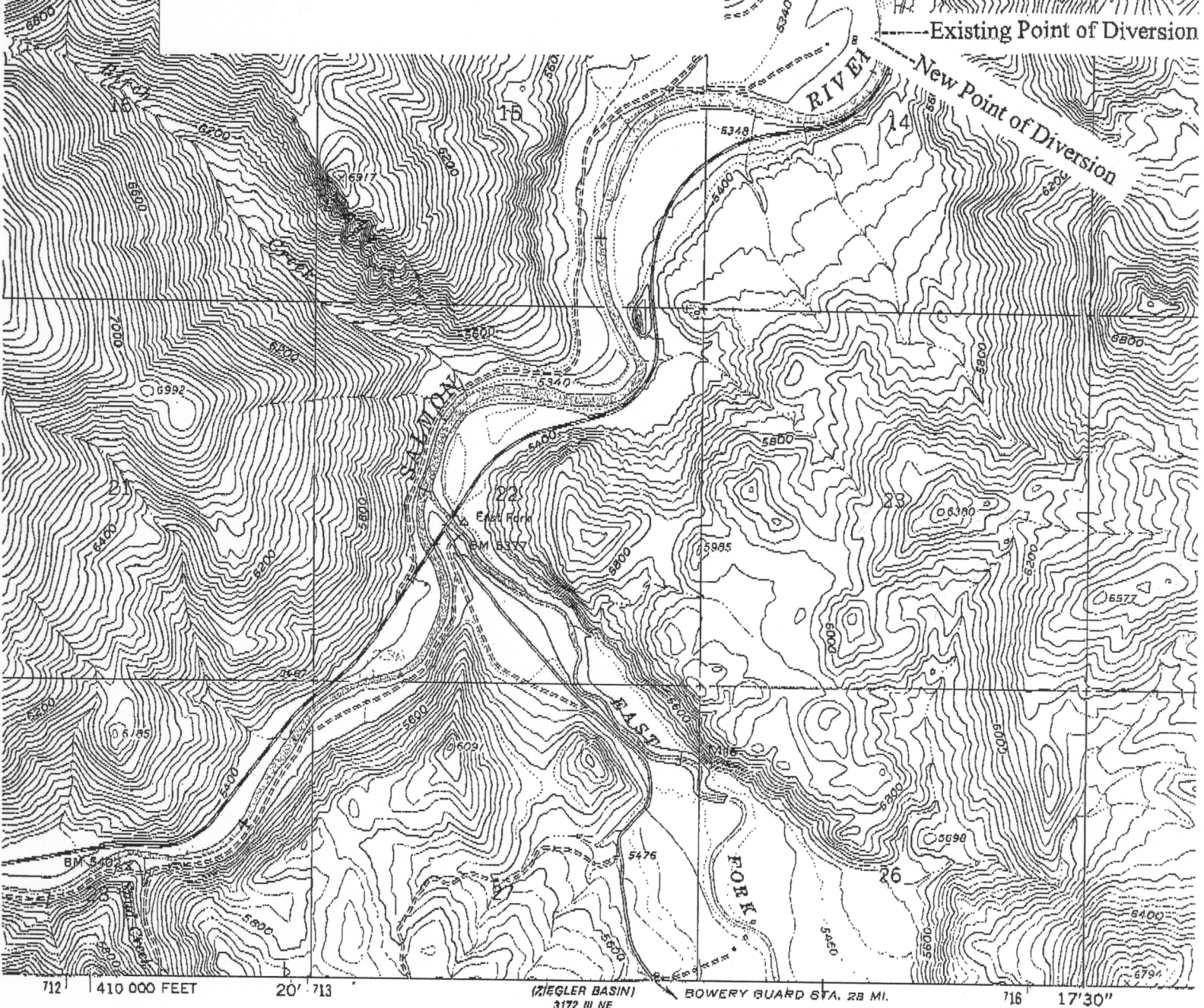


- q = Flow that comes from the stream
- Q = Discharge of the well
- x = Distance from the well to the stream or the computed distance to a recharge boundary
- T = Transmissivity
- t = Time from beginning of pumping
- S = Specific yield

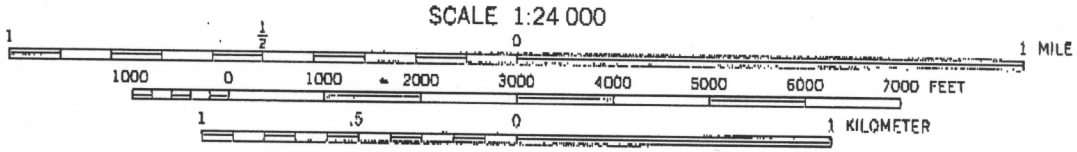
FIGURE 5-25.—Analysis of streamflow depletion by a well. 103-D-1451.

Glover, R.E and Balmer, G.G., "River Depletion Resulting from Pumping a Well near a River," Transactions of the American Geophysical Union, vol. 35, No.3, pp 468-470, June 1954.

Township 11 N Range 18E Section 14.



UTM GRID AND 1963 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



SCALE 1:24 000
 1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
 1 .5 0 1 KILOMETER
 CONTOUR INTERVAL 40 FEET
 DOTTED LINES REPRESENT 20-FOOT CONTOURS
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

FIGURE 1

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
 FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
 A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST