

BROCKWAY
ENGINEERING
P.L.L.C.

Hydraulics

Hydrology

Water Resources

July 9, 2003

Mr. Allen Merritt
Idaho Department of Water Resources
1341 Fillmore Street, Suite 200
Twin Falls, ID 83301

RECEIVED
JUL 09 2003
Department of Water Resources
Southern Region

Subject: ESRP Aquifer Impact Analysis - Busman Water Right Transfer

Dear Allen:

Enclosed is the revised transfer spreadsheet and mitigation plan for the Busman transfer. The proposal is to dry up 21.1 acres of the Beckley water rights for mitigation both for the reduction in transferable volume due to consumptive irrigation requirement and for hydrologic mitigation in the ESRPA.

We agreed in your office on July 8, 2003, that the discharge rate assignable to the mitigation acres would be proportional to the acreage dried up and the combined water right discharge rate of 3.77 cfs. This revised analysis shows that, with the 21.1 acres of Beckley land dried up and a reduced pumping schedule at the Busman dairy, the impact is within the +/- 5% on the Milner-King Hill reach of the Snake River. Note that the 2003 assumed pumping at the dairy is significantly reduced since pumping cannot occur for the entire 2003 irrigation season.

I am also enclosing a CD with the U of I Transfer Spreadsheet which I have been using. The input and output have been modified to make it easier to evaluate changes in pumping and mitigation scenarios. No changes have been made in response functions or calculation procedures.

Thank you for your efforts on this and pending transfers. Call me if you have additional questions and let me know if any additional information is required.

Sincerely,

Charles E. Brockway P.E., Ph.D.

Enclosure: Mitigation Analysis - Busman Dairy Transfer
CD w/ U of I Spreadsheet

cc: Del Kohtz

CHARLES E.
BROCKWAY,
Ph.D., P.E.

CHARLES G.
BROCKWAY,
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Table 1 Proposed Pumping Schedule

Mitigation Plan

TRANSFER NO 1
 Applicant: Bussman/Larsen
 Transfer # 68993

FROM: Larsen

TO: Bussman

Model Node
 9 22
 10 13

Acres dried up to transfer 20 acres Larsen
 Allowed vol.transfer 2.69 af/a
 Volume Transferred: 53.8 af/year
 17.9 af/trimester
 Desired pumping 60.0 af/year
 20.0 af/trimester

TRANSFER NO 2 **NONE** FROM:
 Applicant: 0
 Transfer # TO: 0 0 0

Acres dried up to transfer 0 acres
 Allowed vol.transfer 4 af/a
 Volume Transferred: 0.0 af/year
 0.0 af/trimester

MITIGATION ACRES (if any)
 Additional acres dried up 21.1 acres FROM: Beckley
 Allowed transfer 2.84 af/a
 Volume (Mitigation) 60.0 af/year
 20.0 af/trimester

Model Node
 14 16

ANNUAL PUMPING

								Transfer #1		Transfer #2	
Begin	Years End	Number	%Acres	Mitigation Acres Actual Af/yr	Ac Dried Up	Bussman Pumping af/year	Percent of Max	Percent Reduction	Pumping af/year	Percent of Trans	Percent Reduction
2003		1	1.00	60.0	21.1	27.0	0.45	0.55	0.0	0	
2004		1	1.00	60.0	21.1	48.0	0.80	0.20	0.0	0	
2005		1	1.00	60.0	21.1	48.0	0.80	0.20	0.0	0	
2006		1	1.00	60.0	21.1	48.0	0.80	0.20	0.0	0	
2007		1	1.00	60.0	21.1	55.2	0.92	0.08	0.0	0	1.00
2008	2012	5	1.00	60.0	21.1	58.8	0.98	0.02	0.0	0	1.00
2013	2017	5	0.60	36.0	12.7	58.8	0.98	0.02	0.0	0	1.00
2018	2022	5	0.60	36.0	12.7	60.0	1.00	0.00	0.0	0	1.00
2023	2031	9	0.55	33.0	11.6	60.0	1.00	0.00	0.0	0	1.00
2032	2042	11	0.50	30.0	10.6	60.0	1.00	0.00	0.0	0	1.00
2043	2052	10	0.50	30.0	10.6	60.0	1.00	0.00	0.0	0	1.00
2053	2072	20	0.50	30.0	10.6	60.0	1.00	0.00	0.0	0	1.00
2073 >>>>			0.50	30.0	10.6	60.0	1.00	0.00	0.0	0	1.00

Mitigation for impacts to reaches of the Snake River will be achieved by drying up acres at the Beckley farm and reduced pumping at the proposed place of use according to the above table..

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GROUND-WATER RIGHTS TRANSFER SPREADSHEET

UNIVERSITY OF IDAHO - IDAHO WATER RESOURCES RESEARCH INSTITUTE

IDAHO DEPARTMENT OF WATER RESOURCES

Cells this color are set up for user entries

ENTER STARTING DATE FOR SIMULATION. THEN PUSH "UPDATE DATES" BUTTON

YEAR 1967
SEASON Spring

Transfer # 1:
68993
Bussman/Larsen
Mitigation
Beckley

ENTER CELL LOCATION
ROW 10
COLUMN 13

Bussman
'TO' CELL
Larsen
'FROM1' CELL

Beckley
'FROM2' CELL

'FROM3' CELL

Larsen FROM 1 36-26761 pumped '67-69
Larsen FROM1 36-07044 pumped '69-99
Larsen FROM1 36-7158 pumped '71-99
Beckley FROM2 36-77331 pumped '74-03

Spring
Summer
Fall

Percent pumped
0.35
0.46
0.19
1.00

PUMPING SCHEDULE

TO: Bussman
FROM: Larsen
Max Vol Transferred Vol
AF/TRI 20.00
AF/YR 60.00

Year	%Pumped
2003	0.45
2004	0.80
2005	0.80
2006	0.80
2007	0.92
2008 to 2012	0.98
2013 to 2017	0.98
2018 to 2022	1.00
2023 to 2031	1.00
2032 to 2042	1.00
2043 to 2052	1.00
2053 to 2072	1.00
2073 >>>>	1.00

MITIGATION

FROM: Beckley
Max Vol
AF/TRI 20.0
AF/YR 60.0
Mitigation ac. Unused
2003 0.00
2004 0.00
2005 0.00
2006 0.00
2007 0.00
2008 to 2012 0.00
2013 to 2017 0.40
2018 to 2022 0.40
2023 to 2031 0.45
2032 to 2042 0.50
2043 to 2052 0.50
2053 to 2072 0.50
2073 >>>> 0.50

TRIMESTER OF ACTIVITY	TO WELL Projected Use AF/TRIMESTER	FROM1 WELL		FROM2 WELL		FROM3 WELL	
		With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER	With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER	With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER
SPR 1967	0.00	6.28	6.28	0.00	0.00	0.00	0.00
SUM 1967	0.00	6.28	6.28	0.00	0.00	0.00	0.00
WIN 1967	0.00	6.28	6.28	0.00	0.00	0.00	0.00
SPR 1968	0.00	6.28	6.28	0.00	0.00	0.00	0.00
SUM 1968	0.00	6.28	6.28	0.00	0.00	0.00	0.00
WIN 1968	0.00	6.28	6.28	0.00	0.00	0.00	0.00
SPR 1969	0.00	14.53	14.53	0.00	0.00	0.00	0.00
SUM 1969	0.00	14.53	14.53	0.00	0.00	0.00	0.00
WIN 1969	0.00	14.53	14.53	0.00	0.00	0.00	0.00
SPR 1970	0.00	14.53	14.53	0.00	0.00	0.00	0.00
SUM 1970	0.00	14.53	14.53	0.00	0.00	0.00	0.00
WIN 1970	0.00	14.53	14.53	0.00	0.00	0.00	0.00
SPR 1971	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SUM 1971	0.00	17.93	17.93	0.00	0.00	0.00	0.00
WIN 1971	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SPR 1972	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SUM 1972	0.00	17.93	17.93	0.00	0.00	0.00	0.00
WIN 1972	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SPR 1973	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SUM 1973	0.00	17.93	17.93	0.00	0.00	0.00	0.00
WIN 1973	0.00	17.93	17.93	0.00	0.00	0.00	0.00
SPR 1974	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1974	0.00	17.93	17.93	20.00	20.00	0.00	0.00
WIN 1974	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SPR 1975	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1975	0.00	17.93	17.93	20.00	20.00	0.00	0.00
WIN 1975	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SPR 1976	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1976	0.00	17.93	17.93	20.00	20.00	0.00	0.00
WIN 1976	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SPR 1977	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1977	0.00	17.93	17.93	20.00	20.00	0.00	0.00
WIN 1977	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SPR 1978	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1978	0.00	17.93	17.93	20.00	20.00	0.00	0.00
WIN 1978	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SPR 1979	0.00	17.93	17.93	20.00	20.00	0.00	0.00
SUM 1979	0.00	17.93	17.93	20.00	20.00	0.00	0.00

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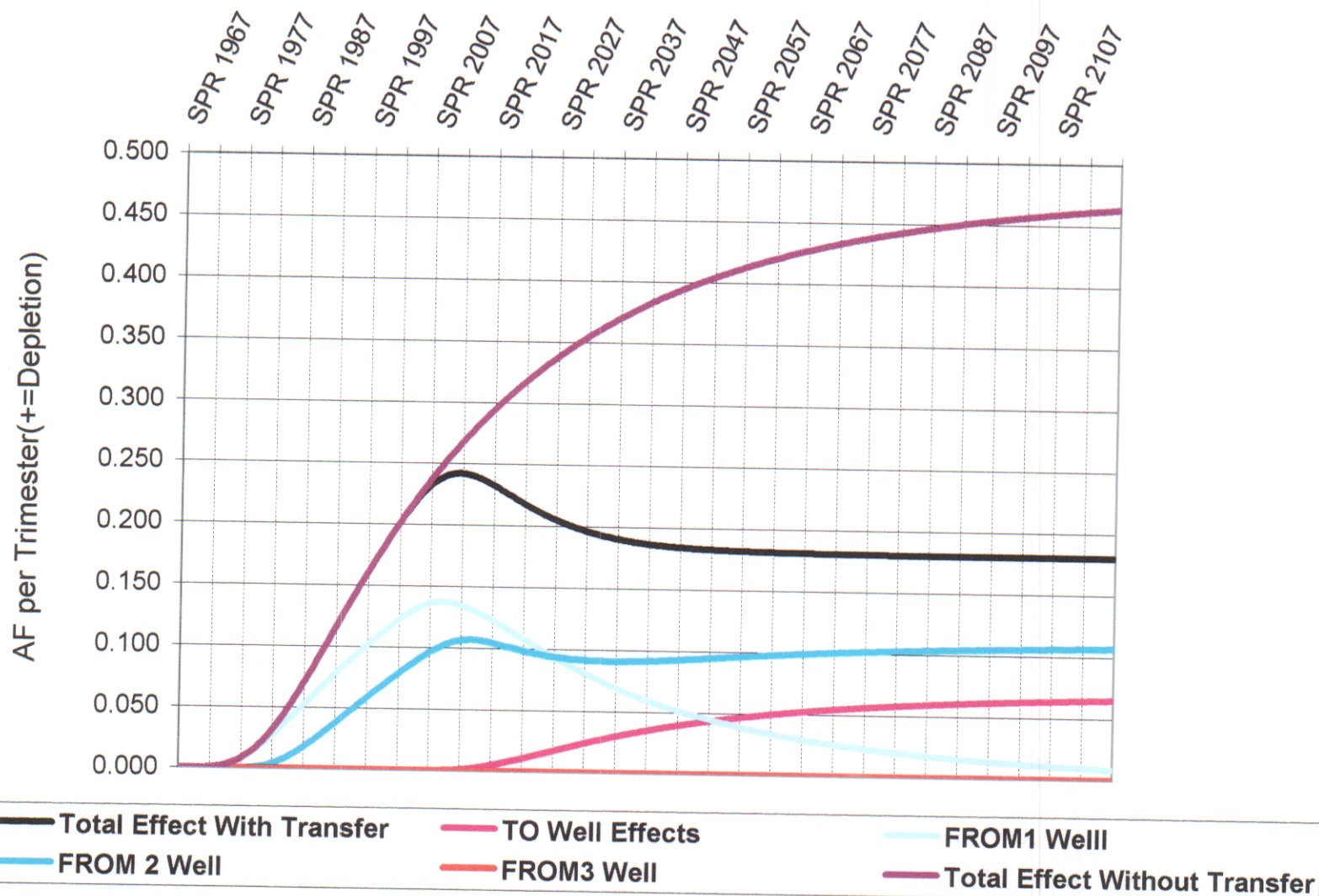
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Hydrologic Response--Heise/Ashton to Lewisville

Transfer No: 68993

Applicant: Bussman/Larsen



JUL 21 2003

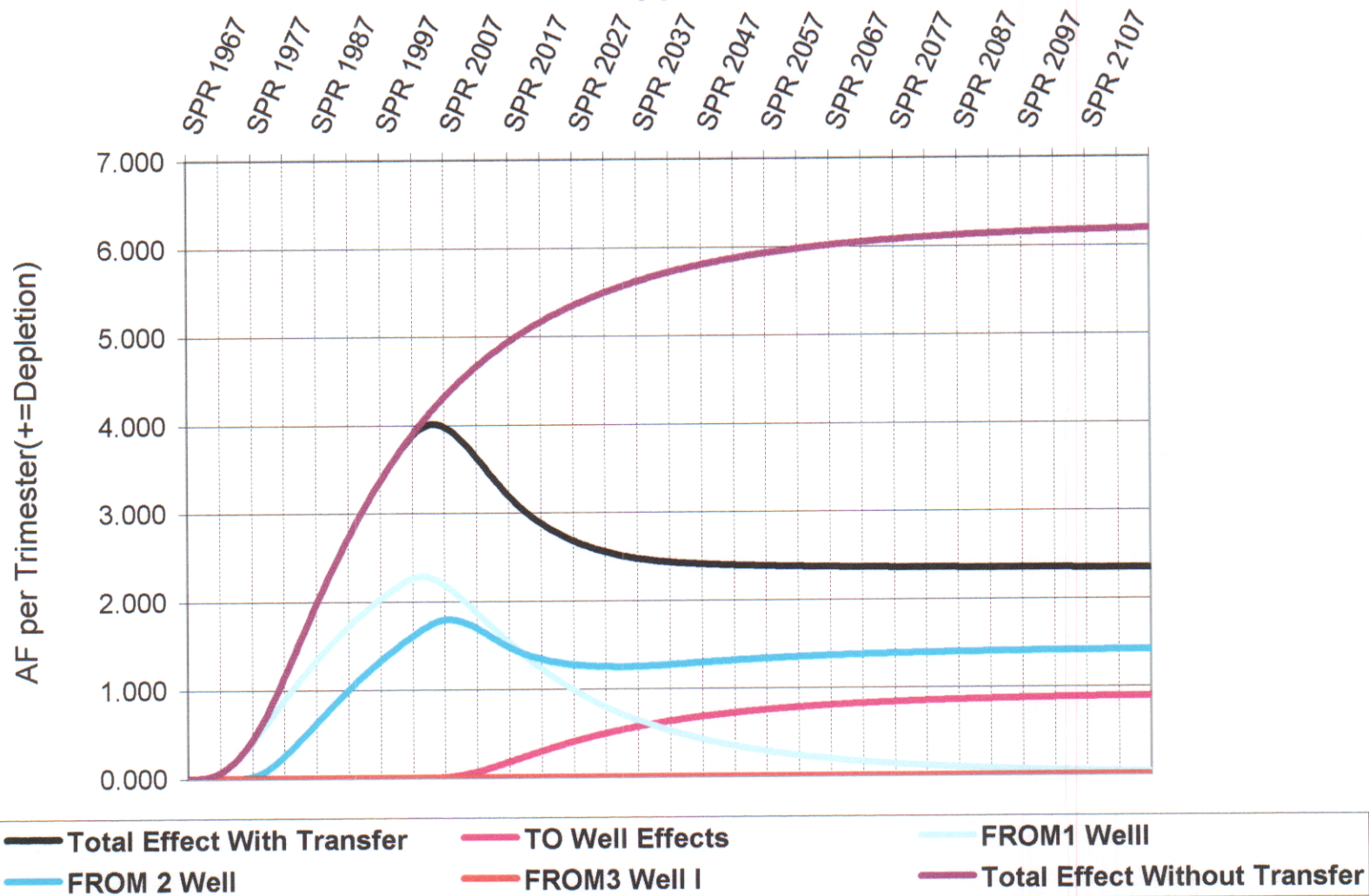
SCANNED

Hydrologic Response--Near Shelley to Neeley Reach

Transfer No: 68993

Applicant:

Bussman/Larsen



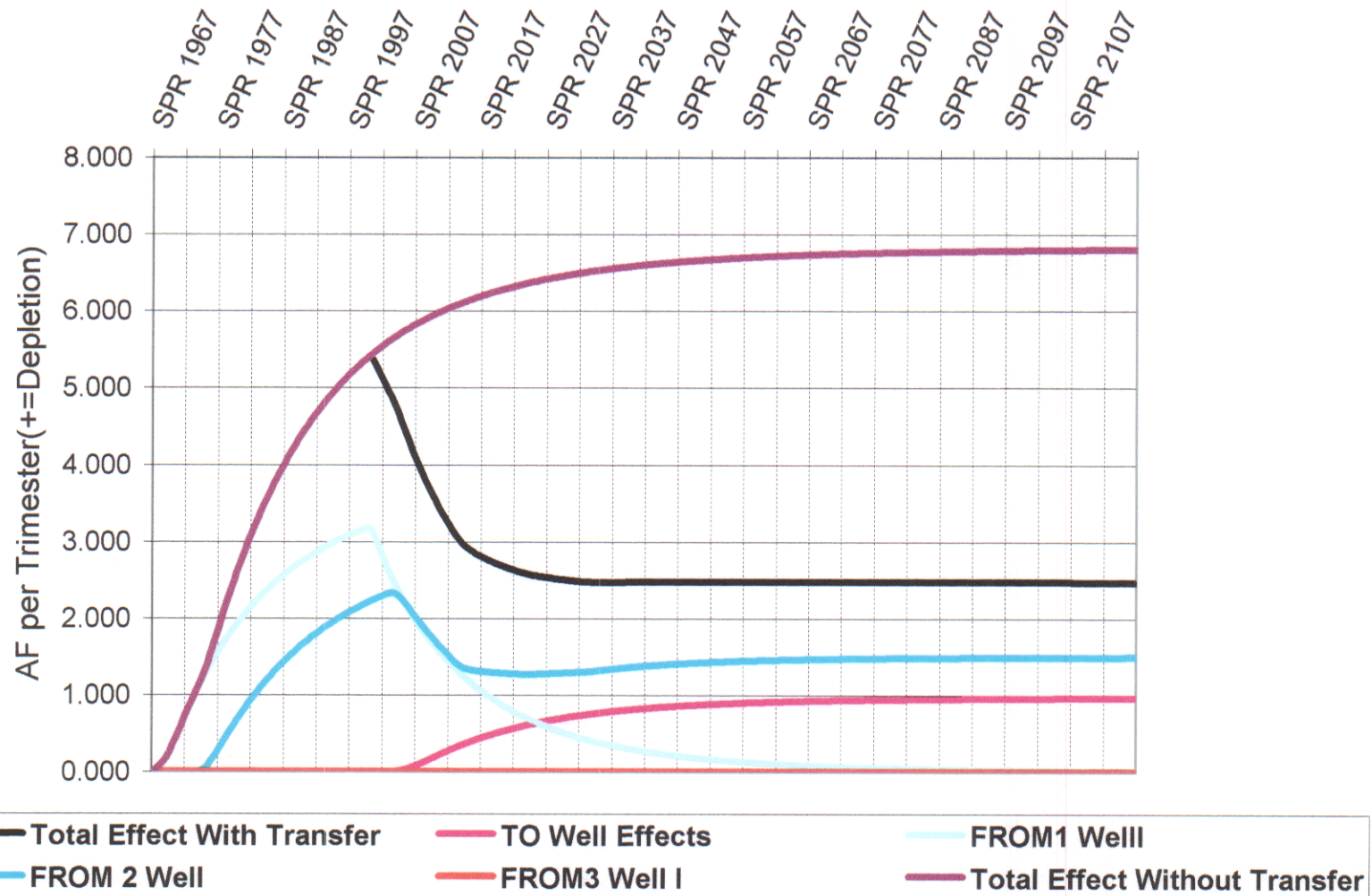
Hydrologic Response--Neeley to Minidoka

Transfer No:

68993

Applicant:

Bussman/Larsen



JUL 21 2003

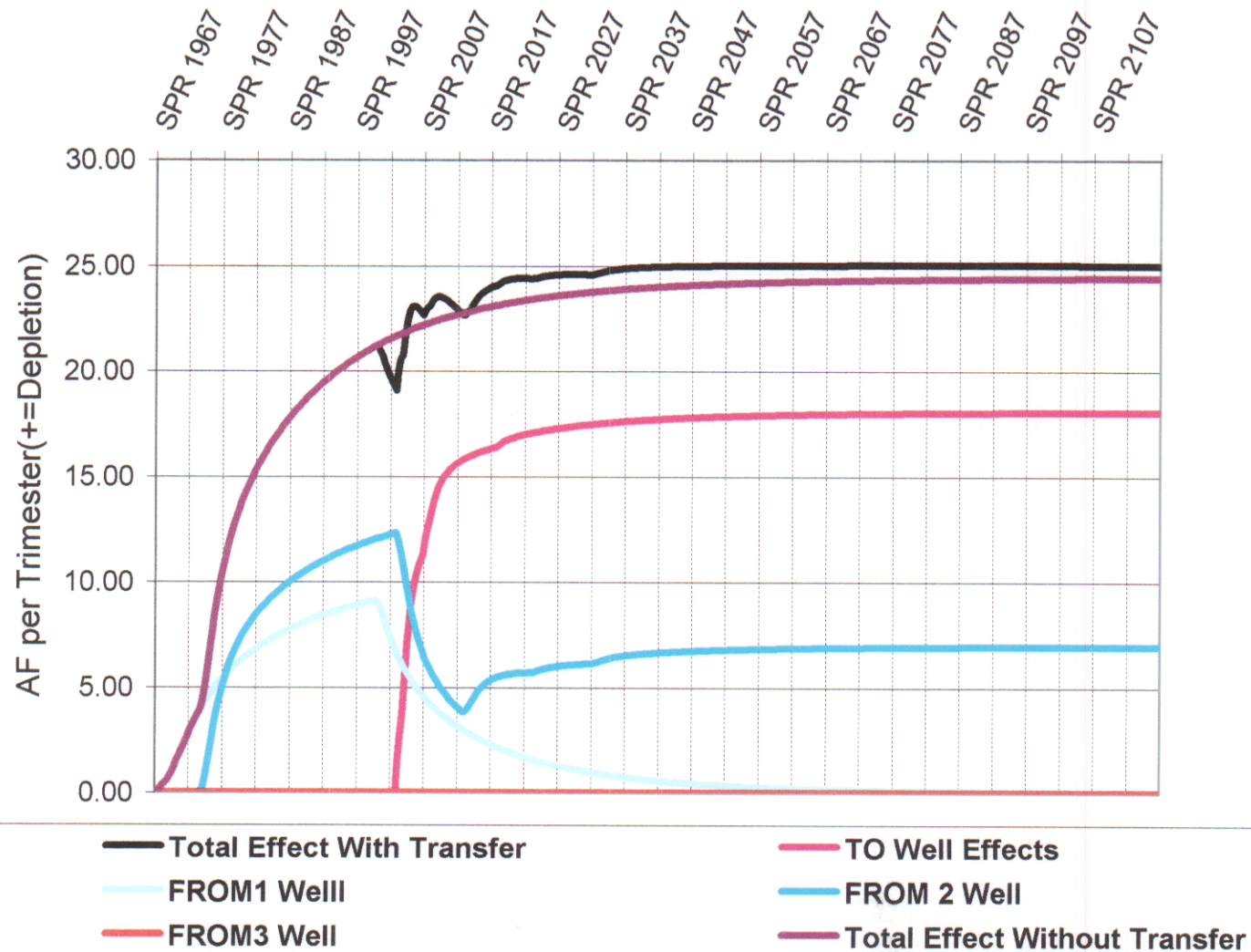
SCANNED

SCANNED
JUL 21 2003

Hydrologic Response-- Milner to King Hill Reach

Transfer No.:68993

Applicant: Bussman/Larsen

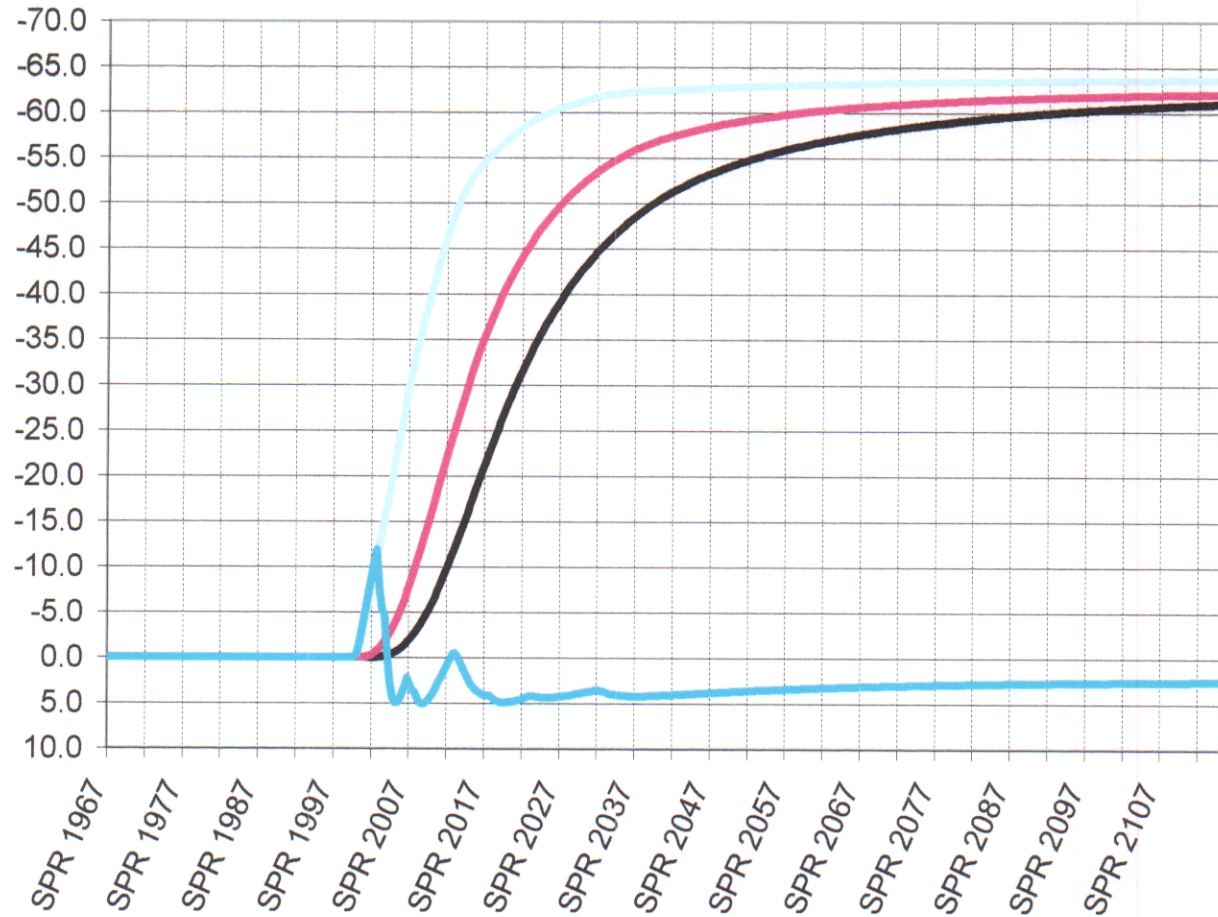


Net Percent Transfer Impact

Transfer No: 68993

Applicant: Bussman/Larsen

Percent Impact of Transfer



Heise/Ashton to Lewisville Near Shelley to Neeley Neeley to Minidoka Milner to King Hill

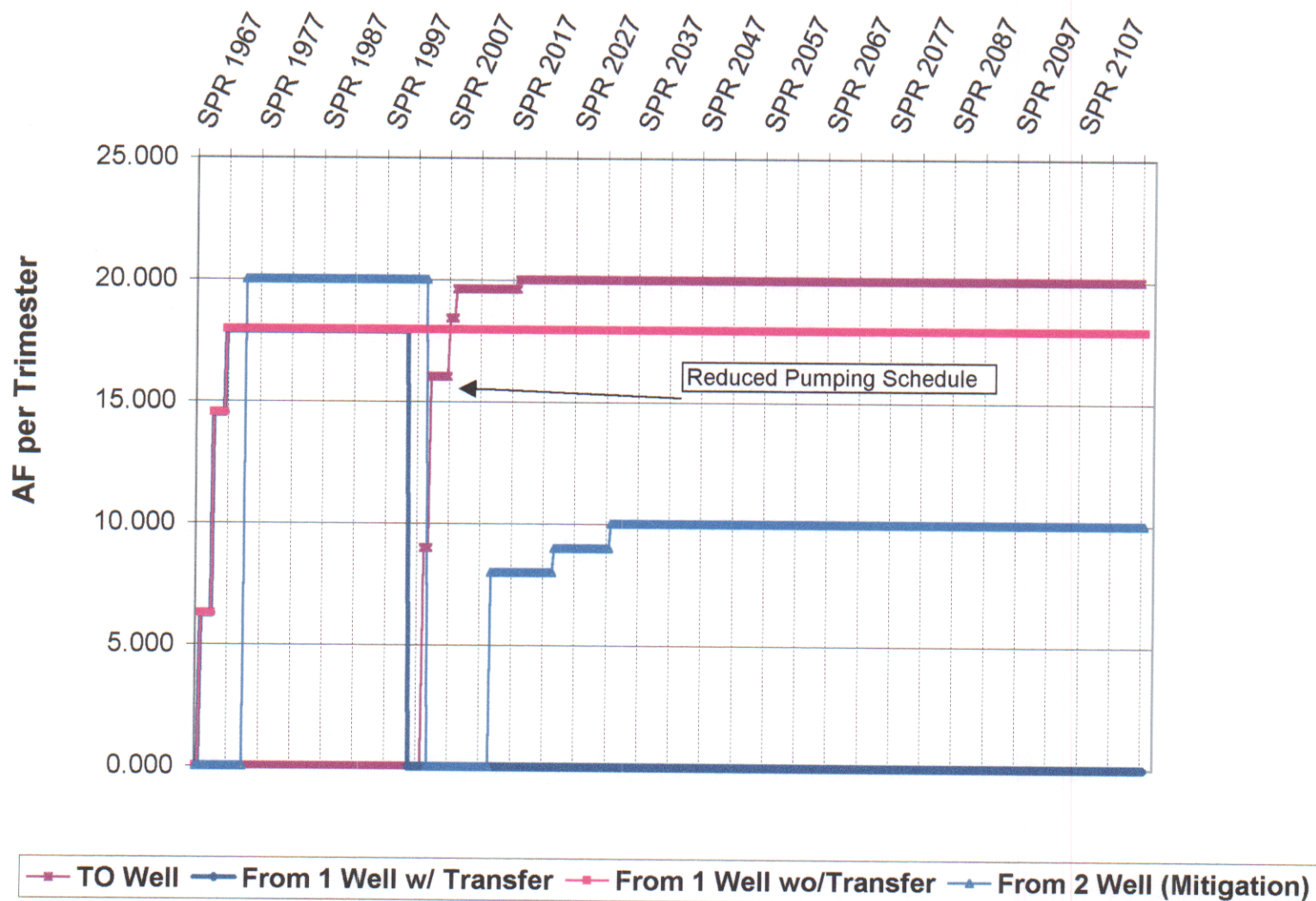
JUL 21 2003

SCANNED

Pumping and Mitigation Schedule

Transfer No:68993

Applicant: Bussman/Larsen



JUL 21 2003

SCANNED

Mitigation Plan and Analysis

Transfer Number 68993

Applicant: John Busman, Busman Dairy

Prepared for the Applicant
by Charles E. Brockway
Brockway Engineering, P.L.L.C.

April 29, 2003

Description of transfer

This application for a water right transfer proposes to transfer 0.228 cfs and 60 acre feet per annum, of ground water right(s) currently utilized for irrigation in Section(s) 19 and 30, T8S R22E in Minidoka County to the Busman dairy in Section 7, T8S R16E in Jerome County. The Applicant is requesting the Department to transfer the entire quantity of water, but subject to the ongoing mitigation requirements outlined below as well as any other conditions imposed.

Director's Transfer Guidance

This transfer application has been prepared in accordance with the new Guidance Memorandum prepared by the Department. This guidance memorandum specifies additional requirements for documentation with respect to proof of beneficial use and non-forfeiture. All documentation required under this memoranda has been submitted to the Department.

The Administrator's Memorandum now requires a determination of historical consumptive use on irrigated land for all transfers contemplating a change in nature of use, for example, irrigation to commercial/stockwater for dairies. A determination has been made by IDWR of the historical consumptive use on the irrigated lands under water rights 36-07044, 36-02676, and 36-07158 applicable to this transfer. Based on the evaluation by Allen Merritt of the Southern Regional Office of IDWR, using FSA crop records and published consumptive use by Allen and Brockway (1983), the consumptive use on the 372 irrigated acres covered under these water rights is 2.69 af/yr. The allowable transfer volume for dairy use is equal to the average historical

consumptive use for irrigation times the number of acres proposed to be dried up under the transfer. Therefore, for this transfer, the allowed transfer volume for the 20 acres proposed to be dried up is 53.8 af/yr.

The Applicant also acknowledges that the approval of the transfer will be conditioned in accordance with various requirements spelled out in that guidance.

Impacts on Snake River and springs

The location of current water use ("FROM well") and proposed water use ("TO well") are both within the Eastern Snake Plain aquifer area. (The TO well is actually more than one well in this instance, but is referred to in this analysis as the TO well for purposes of simplicity.)

Pumping at either site will impact the discharge of springs, tributaries and underground sources reaching the various reaches of the Snake River. When a point of diversion is moved within the aquifer, impacts on each of the reaches will differ, potentially affecting other water uses.

Consequently, the applicant has undertaken a hydrologic analysis comparing the pre-transfer and post-transfer impacts of the diversion. This analysis was a dynamic one, taking into account the time delay of changes in pumping on the various reaches. The purpose of the analysis is to help craft a mitigation plan which will avoid adverse impacts on other water uses.

The analysis was performed by C.E. Brockway P.E., Brockway Engineering P.L.L.C. Brockway Engineering utilized the Groundwater Rights Transfer Spreadsheet for impacts within the Eastern Snake Plain aquifer prepared by the University of Idaho using the ESRPA Ground Water Flow Model. This spreadsheet and associated response functions simulates the effect of the proposed transfer on each of the four (4) reaches of the Snake River: Ashton to Lewisville, Near Shelley to Neeley, Neeley to Minidoka, and Milner to King Hill.

In this case, Transfer spreadsheet predicts negative impacts (that is, an increase in depletion effect compared to pre-application conditions) on the Milner to King Hill reach. Each of the remaining three reaches would experience a positive effect (that is, an reduction in depletion effect compared to pre-transfer conditions). This is consistent with the basic premise of the model, which assumes that a negative effect in any given river reach will be offset by an equal and opposite effect in one or more of the remaining reaches.

Given these results, this mitigation plan addresses only the negative impacts in the Milner-King Hill reach. No mitigation is required for any of the remaining reaches.

The spreadsheet predicts the transient impacts (that is, impacts over time) on selected reaches corresponding to pumping or recharge within specific nodes or cells within the ground water model area.

The cells corresponding to the TO well and the FROM well are selected and the volume pumped historically at the FROM well is determined from the appropriate allowed volumes from the water rights applicable to the acres to be dried up accounting for any CRP or Water Bank rental that may have occurred from these rights. The proposed future pumping volume at the TO well is entered.

The spreadsheet currently has a 150 year calculating period. It estimates impacts based on trimester (4 month) input in acre feet for the 150 year period (or 450 trimesters). The period begins on the date pumping of the first pre-transfer well was initiated. This is a sufficient time horizon for this proposed transfer.

Historic or proposed future pumping for four (4) individual wells including the TO well can be input into the spreadsheet thereby allowing the simulation of impacts from one or more individual transfer proposals and/or drying up of additional acres for mitigation of impacts. This procedure was utilized to simulate the additional positive impact of drying up additional acres at the Beckley farm to mitigate for the proposed transfer from the Larsen farm to the Busman dairy.

The allowed transfer volume per acre and the allowed volume for mitigation per acre were based on the historical consumptive use at each site. The consumptive irrigation requirement at the Larsen farm was determined by Allen Merritt of the Southern Region IDWR and the consumptive use on the Beckley farm was determined from cropping history which showed that alfalfa has been grown several years in the past on the acres proposed for mitigation. The Allen and Brockway (1983) consumptive use for alfalfa was therefore utilized to determine the allowable transfer volume for the dried up acres on the Beckley farm.

Summary of Methodology

1. For this transfer, the single cells in the ESRPA model representing the FROM point of diversion (Larsen farm, cell 9,22) and the TO point of

diversion (Busman dairy, cell 10,13) were determined. The cell location for the mitigation acres (Beckley farm , cell 14,16)

2. Historical pumping volumes for the FROM well water rights were determined based on the priorities of each rights (see Data Entry sheet attached). These rights ceased pumping after 1999. The 'Without transfer' scenario assumed that the full transferred volume continued to be pumped for the period of the simulation and the 'with transfer' scenario assumed that the historically pumped transfer volume began in 2003 with 'reduced volume pumping' for mitigation for each year or period of years as shown on the attached Mitigation Plan spreadsheet. The annual pumping volume was assumed to be distributed equally over the three trimesters for each year.

Historical pumping for the mitigation acres dried up at the Beckley farm was assumed to commence in 1974 which is the priority date of the water right and pumped continuously through 2002 at which time this pumping ceased under the 'with transfer' scenario. The base pumping (without transfer scenario) for the Beckley acres was assumed to continue for the period of the simulation.

3. The base depletion curve for the 'without transfer' is calculated by the program for each trimester for the period of simulation.

4. The depletion at each Snake River reach caused by the combination of pumping at the TO well, the residual depletion from the FROM well and the net effect of drying up the mitigation acres was determined by the spreadsheet program. This is termed the depletion 'with transfer'.

5. Pumping at the TO node and the number of acres dried up for mitigation and the resulting simulated volume of pumping at the mitigation site (Beckley) was adjusted over the period of the simulation in single years or groups of years so that the 'with transfer' depletion curve (net effects curve) for the Milner-King Hill reach was within $\pm 5\%$ of the base curve or 'without transfer' curve for the period after the commencement of pumping from the TO well. This reduced pumping volume below the transferred volume and the reduced pumping due to drying up acres for mitigation constitutes the "hydrologic mitigation" for this transfer. The reduced pumping volumes were determined by trial and error until a reasonable 'fit' to the base curve (without transfer) to within $\pm 5\%$ was accomplished for the simulation period.

6. The graphs for each of the 4 Snake River reaches show the comparison over time of the "net effect" on reach gains of the proposed transfer with the reduced pumping for mitigation. Also, the 'net percent transfer impact' for each reach is shown graphically.

7. The reduced pumping volume per year at the TO well and the acres dried up for mitigation was calculated for each year or group of years after commencement of pumping under the proposed transfer and is shown on the attached 'Mitigation Plan, Table I'

Proposed mitigation

The applicant will reduce pumping under the transferred water rights at the new points of diversion (Busman dairy) and dry up acres at the mitigation site (Beckley) in a quantity sufficient to assure that no additional impact to the Milner to King Hill reach is experienced. The quantity of reduced pumping and number of acres required to be dried up will change from time to time according to a schedule set out below. This reflects the dynamic nature of the relationship between the aquifer and the river.

The annual pumping volume proposed for mitigation and number of acres to be dried up is shown on the Mitigation Plan, Table I attached.

The 'Stipulations Regarding Mitigation' attached reflect this mitigation plan.

Stipulations Regarding Mitigation

Transfer Number 68993

John Busman-Busman Dairy

April 29, 2003

1. Mitigation

The Applicant has agreed to reduce pumping of those water rights under this water right transfer and to dry up additional previously irrigated acreage at the Beckley farm, and in a quantity sufficient to assure that no additional impact to the Milner to King Hill reach or any other reach is experienced. The quantity of reduced pumping and/or additional dry-up has been calculated and agreed to by the Parties. The reduced pumping schedule mitigates for the impact of the full annual volume applied for in the transfer application. The quantity of reduced pumping for each year and/or additional dryup is set out in the table(s) appended hereto. These mitigation requirements will be incorporated by the Department into the transfer approval and set out as permanent conditions on the affected water rights.

2. Monitoring of mitigation requirements

Discharge from the new well(s) will be monitored by the Applicant, in accordance with the Director's new water right transfer guidance or other applicable requirements as determined by the Director. The quantity of pumped volumes will be reported annually to IDWR .

3. Positive impacts on other reaches

The Department does not currently have a mechanism in place to recognize the positive impacts that a transfer may have on other river reaches within the Eastern Snake Plain Aquifer.

The Applicant and the Protestant have agreed that no "reach credits" will be recognized in conjunction with the approval of this transfer at this time. The Parties have agreed, however, that if such "reach credits" are recognized in the future by the Department or other appropriate entity, the

Applicant retains the right to apply for such credits based on this transfer. Likewise, the Protestant retains the right to oppose their recognition. If and when such credits are subsequently recognized, they will accumulate only from that point in time forward.

4. No reopening of mitigation calculation

The Applicant and the Protestant have agreed that the quantification of the mitigation obligation (as set out in the attached table(s)) will be permanent. The quantity of mitigation will not be subject to re-opening, re-examination, or re-calculation, except by mutual agreement and approval by the Department. This restriction applies even in the event that new data, new modeling or other information becomes available.

5. Substitute mitigation

As specified above, the mitigation will be provided in the form of reduced pumping and/or additional dry-up. No other method of achieving the mitigation may be substituted by the Applicant, except upon approval of the Department of an application for modification of the mitigation requirement as provided for by law. Moreover, the Protestant shall be given notice of such application.

In any event, the Protestant will not be required to accept any substitute form of mitigation that is less effective than the original mitigation. Specifically, any substitute mitigation must be "in kind" (meaning that it must provide a substitute supply of water—rather than some other kind of compensation—to make up for the depletions caused by the transfer), "in time" (meaning that the make-up water must be provided so as to reach the impacted area at the appropriate time to respond to the depletion caused by the transfer), and "in place" (meaning that the replacement must provide water to same area as the depletions are experienced). Finally, the substitute mitigation must provide water to the depleted impacted areas with the same degree of certainty and reliability as the original mitigation.

6. Consumptive use

The parties recognize that this transfer is premised upon the assumption of 100 percent consumptive use of water by the dairy. Consequently, the Applicant will be free to improve the efficiency of water

use in the future or make other changes under those rights that reduce or eliminate any return flows, without providing further mitigation.

John Busman
Busman Dairy

Bonnie B. Beckley

R. K. Beckley