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DETERMINATION OF THE MINIMUM TARGET SATURATED THICKNESS NEEDED FOR DROUGHT PROTECTION IN A CRITICAL CELL

by

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and

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INTRODUCTION

The Grand Prairie region of Arkansas is underlain by a Quaternary aquifer which is utilized primarily for the irrigation of rice and soybeans. Irrigators have been concerned with wells going dry and with decreased well capacities. In this report the term "drawdown" refers to the distance between an arbitrarily assigned datum at or above the ground surface, and the elevation of the groundwater table. The cumulative drawdown (day to day decrease in the groundwater table elevation) resulting from withdrawal of groundwater from interacting wells has caused yields in some wells to be less than design discharge. Drawdown is a function of the groundwater withdrawal rate and various aquifer characteristics including saturated thickness. The saturated thickness is the difference between the bottom of the aquifer and the groundwater table. If preventing loss of well design capacity during the irrigation season is to be achieved, adequate saturated thickness must be maintained at all well locations.

Computation of the cumulative drawdown in any well within a network of neighboring wells by the Theis formula (Theis, 1935) becomes complicated as the number of wells increases. "Pumping" is used in this report to mean withdrawal of groundwater from an aquifer. The degree of recovery during non-pumping periods is also difficult to calculate. AQUISIM (Verdin, et al, 1981) is a dynamic aquifer computer simulation model which considerably simplifies the computation of cumulative drawdowns. Most groundwater table elevation measurements in this region are made in the spring. The determination of the spring saturated thickness necessary for maintenance of adequate well capacities throughout the irrigation season is, therefore, an important management tool. This paper describes a method for determining the minimum spring saturated thickness needed to assure groundwater availability in a particular cell. Desirable (target) spring saturated thicknesses for average and dry climatologic conditions are presented. These values can subsequently be used to determine target groundwater levels needed for drought protection.

1. Selection of the critical cell

The Grand Prairie region was divided into cells 3 miles x 3 miles square as shown in Figure 1 (Peralta, et al, 1984). The elevation of the bottom of the Quaternary aquifer was determined for the center of each cell based on elevations reported by Engler, et al (1945) and used by Griffis (1972) and Peralta, et al (1984). The spring 1982 groundwater table elevation for the center of each cell was determined from U. S. Geological Survey data by Peralta, et al (1984). The non-artesian saturated thickness is the distance between the bottom of the aquifer and the groundwater table. The cell with the smallest saturated thickness in the spring of 1982 was selected for examination in this study. This cell, referred to as the critical cell, is located approximately 7.5 miles south of Stuttgart, Arkansas at coordinates I=13, J=9 (Figure 1). The spring 1982 saturated thickness in this cell was approximately 12 feet.

2. Explanation of universal kriging

Universal kriging is an estimation procedure used for automatic contouring of point observations (Olea, 1975). It is based on the theory of regionalized variables. A regionalized variable is any numerical function with a spatial distribution which varies from one place to another with apparent continuity, but the changes of which

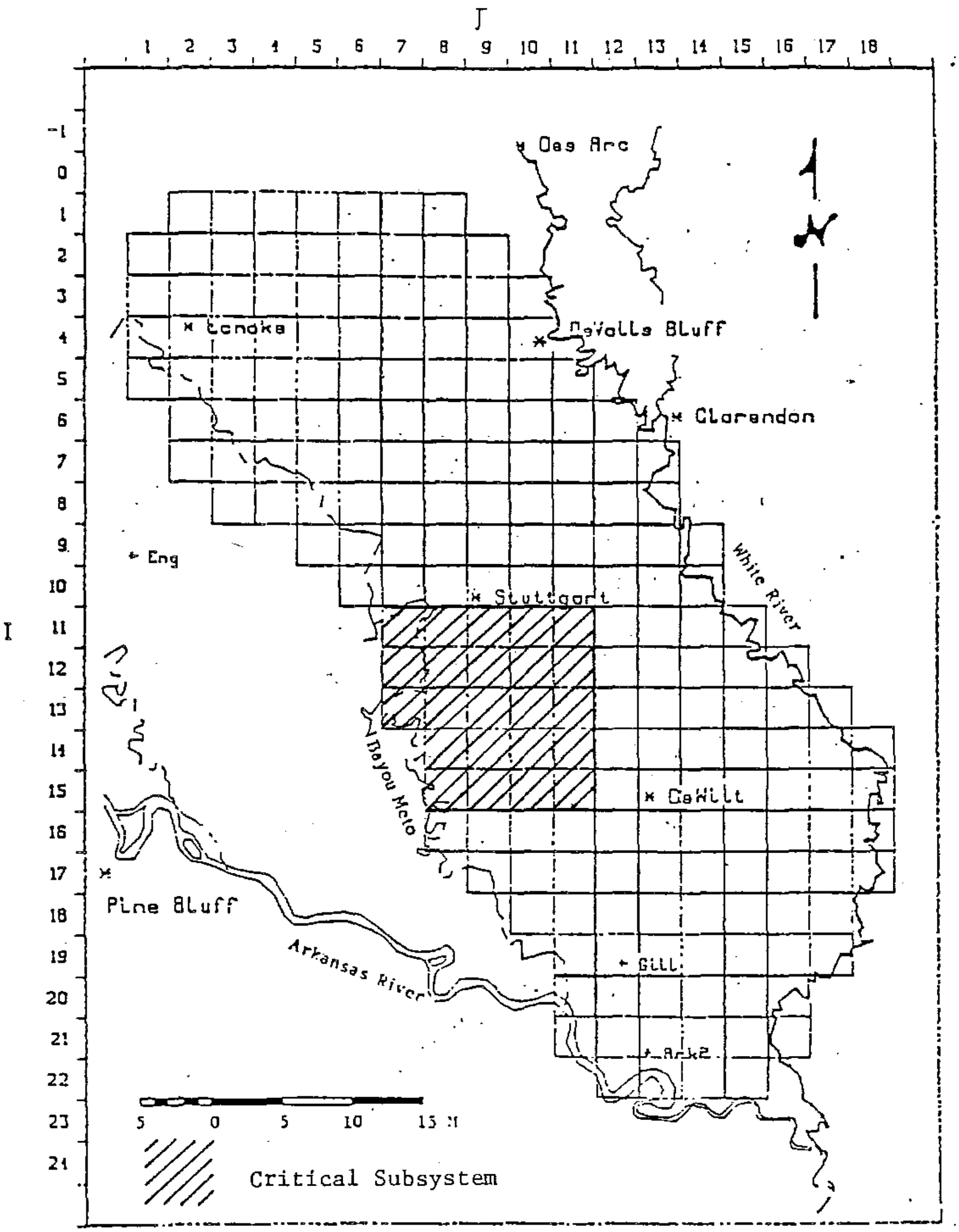


Figure 1 : The Grand Prairie Study Area

cannot be represented by any workable function (Olea, 1975). The variation in the spatial distribution is known as the trend. The aquifer bottom and the water table are trending surfaces, generally represented by point observations, which may be contoured by universal kriging. This method has the advantages of being more reliable and unbiased than other estimation methods (Olea, 1975). Additionally, this method yields the variance of the estimation for every kriged point.

3. Explanation of AQUISIM

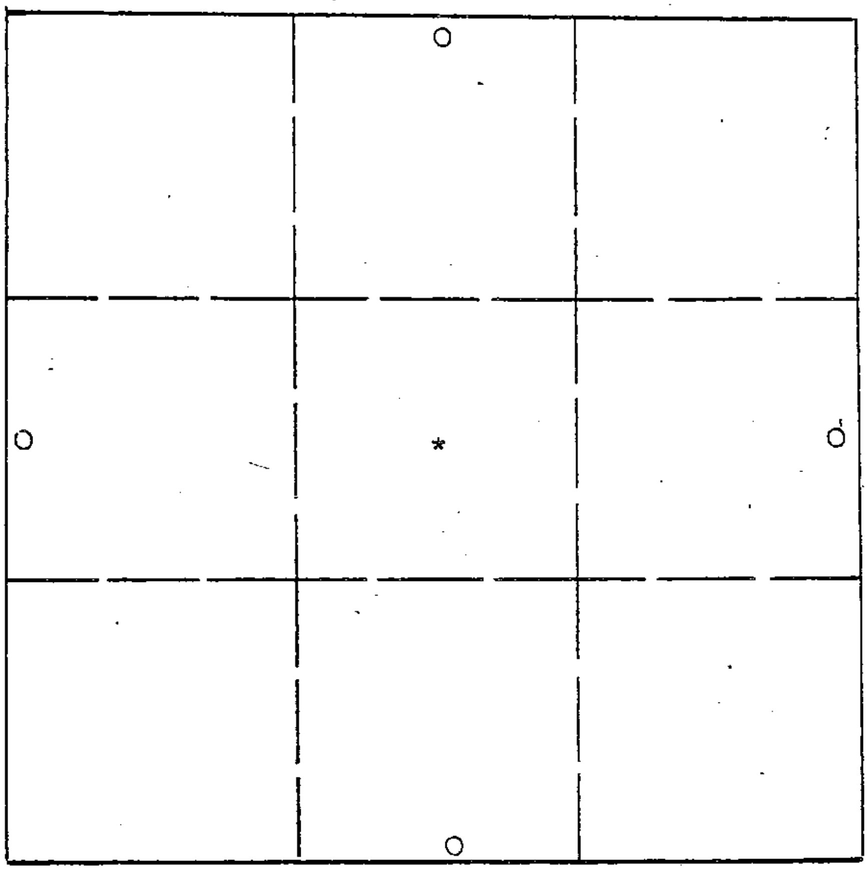
AQUISIM performs dynamic simulation in two dimensions of the responses to various stresses in an unconfined (non-artesian) aquifer. It consists of two computer programs, GENERAT and SIMULAT. The model is based on the use of discrete kernel theory. Discrete kernels which represent the unit response to a unit excitation (stress) are generated first by GENERAT. The discrete kernels describe the effect, based on the Theis equation, of a unit of pumping at a particular well on the groundwater level at other points. The number of units of groundwater withdrawal (excitation) at each pumping location is input in SIMULAT. The response at chosen observation locations to those excitations is also determined by SIMULAT. The model computes an average area response to an area excitation, an average area response to a point excitation, and a point response to a point excitation. The areas are square cells of selectable size. The point excitations are withdrawals due to pumping at wells. The point responses are drawdowns in observation wells. The AQUISIM groundwater simulation model has been validated for use in the Grand Prairie (Peralta, et al, 1984) using 3 mile x 3 mile cells. Values of hydraulic conductivity (270 ft/day) and effective porosity (0.3) chosen for this study are those used in validation of the model (Engler, 1945; Griffis, 1972; Peralta, et al, 1984).

4. Selection of the critical subsystem

To reduce the size and complexity of the simulation, it was decided that a subsystem of cells should be defined consisting of those cells in which pumping had an effect on the critical cell. Examination of the grid shown in Figure 1 reveals that each cell has eight adjacent cells. The critical cell and the eight cells adjacent to it - a 3 x 3 array - was selected for simulation. AQUISIM requires a boundary of constant head cells, therefore, the critical subsystem modeled consists of a 5 x 5 array of cells. The critical subsystem for this study is near the edge of the Quaternary aquifer. Cells I=14, J=7 and I=15, J=7 are not part of the Quaternary aquifer model. They were, therefore, not included in the critical subsystem model, which consists of twenty-three cells (Figure 1).

5. Simulation to determine radius of effects of maximum theoretical pumping in the critical cell

The maximum effect on groundwater levels in the critical cell would result if all the acreage were cropped to rice. In the simulation described in this section, the entire critical cell was hypothetically provided with 750 GPM irrigation pumps, one for each 75 acres. (AQUISIM does not calculate the point drawdown at an observation point outside the cell containing the excitation well. Due to this limitation a single 9 mile x 9 mile cell containing the 3 x 3 array of the critical cell and its eight adjacent cells was used. Simulated observation points were centered along each of the boundaries (Figure 2).



solid cell = 9 mi. x 9 mi.
dashed line cells = 3 mi. x 3 mi.
O = observation point

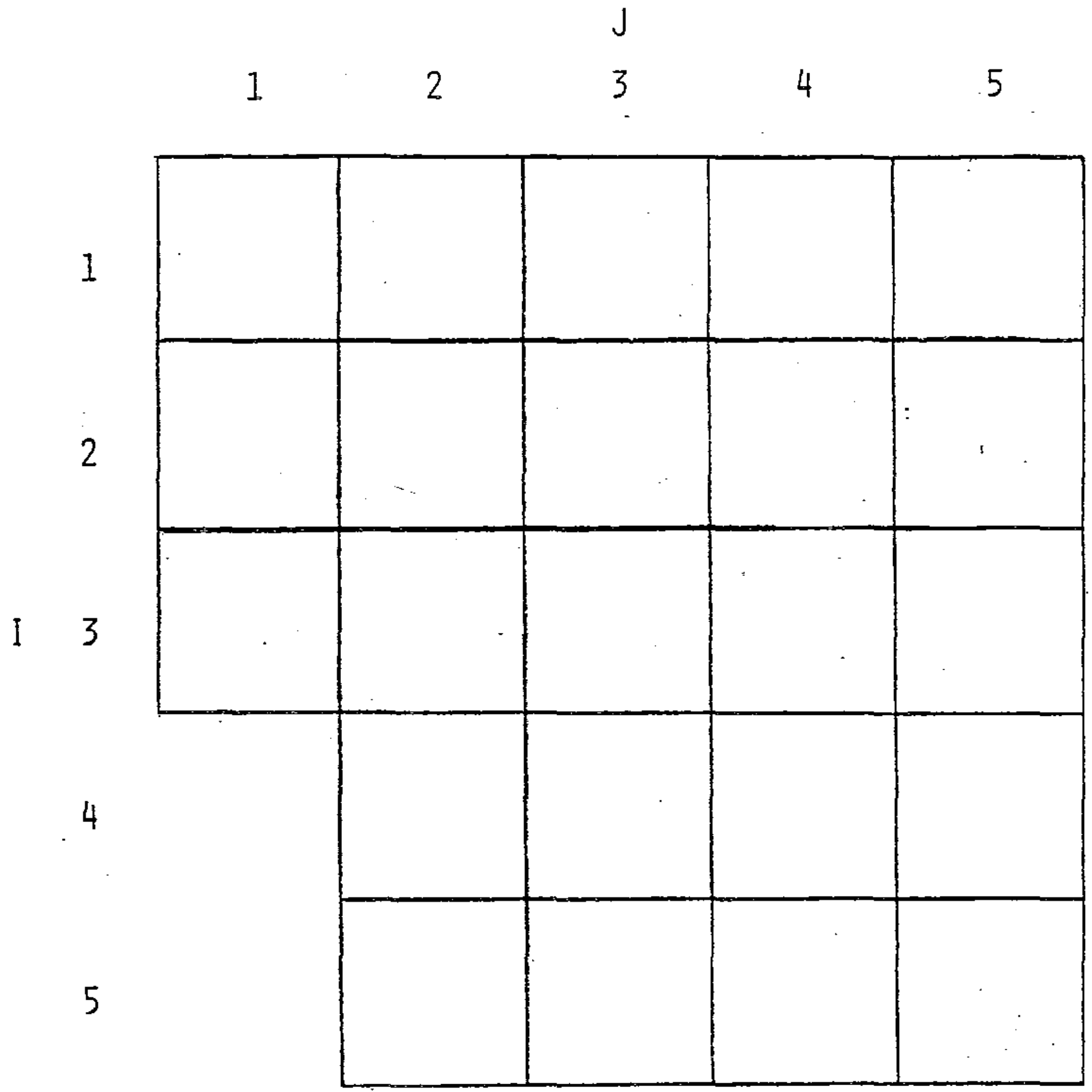
* 81 equally spaced 750 gpm wells (one well/75acres)

Figure 2: Location of Wells for Simulation to Determine Maximum Distance of Pumping Effects

A layer of constant head cells, required by AQUISIM, was placed around the 9 mile x 9 mile cell. The pumps were simulated to operate simultaneously on a rigorous four day on, two day off schedule for 92 days to simulate a droughty three month irrigation season (June-August) in the Grand Prairie region. (This is similar to the irrigation schedule needed during the dry 1980 growing season.) No decline of the water table resulted at the observation points during the simulation. The effects of pumping in one 3 mile x 3 mile cell, therefore, do not extend any further than the outer boundaries of the adjacent 3 mile x 3 mile cells. Conversely, only pumping in those cells adjacent to the critical cell has any effect on the critical cell. The 5 x 5 critical subsystem (Figure 3) defined in section 4 is therefore large enough to adequately simulate the effects on the critical cell of nearby groundwater withdrawals.

6. Simulation to determine the effects of pumping in the entire region on the critical cell

Pumping in surrounding cells has very little effect on water levels in the critical cell during a one year time span. This was verified by simulation of the entire Grand Prairie region (Figure 1). Monthly pumping values for a climatically average year were used in all except the critical cell. No pumping was simulated in the critical cell. Any change of the water table elevation in the critical cell for this simulation was, therefore, totally a result of pumping in the surrounding cells. Due to the gradient which exists in the vicinity of the critical cell, the simulated water table actually rose in the critical cell throughout the simulated irrigation season. In other words, recharge to the cell was greater than discharge from it. Therefore, drawdowns



each cell = 3 mi. x 3 mi.

Figure 3: The Critical Subsystem

in the critical cell can be properly simulated using the critical subsystem only. Simulation of the entire Grand Prairie is not needed to predict water level response in the critical cell for a single season.

7. Well locations and selection of simulated irrigation schedules

Information on all domestic and irrigation wells in the critical cell were obtained from a questionnaire distributed to well owners (Figure 4). All well owners pumping from the Quaternary aquifer responded. A summary of pertinent results from the questionnaire is found in Table 1. At the time of the questionnaire, no domestic wells were located in the critical cell. Seven irrigation wells which pump groundwater from the Quaternary aquifer under normal climatic conditions were identified. The location of each well is shown in Figure 5. In the simulations described later in the report it was assumed that all wells fully penetrated the aquifer.

TABLE 1: Well Owners Questionnaire Results

Well #	Yield (GPM)	Diameter (in.)	Acres Normally Irrigated	Acres Irrigated in Drought
1	600	8	*	65
2	900	8	*	95
3	900	24	*	160
4	700	24	80	80
5	500	8	50	50
6	350	10	30	30
7	400	12	40	40

* Used only as supplementary irrigation wells in normal seasons.

1. Please place the number from the top right hand corner of this page on the map at the approximate location of the well you are describing (if you have more than one well, please use a separate questionnaire for each).

2. What is the depth of the bottom of this well from the ground surface?

3. What is the yield of this well?

   ________ gallons per minute
   or ________ gallons per hour

4. What is the diameter of the well casing?

5. What is the purpose of this well (irrigation, domestic, etc.)?

6. If this is an irrigation well, during which months is it operated?

7. What crops and how many acres of each crop normally rely on this well for irrigation water?

8. <u>For each crop</u>, what is the approximate first date of irrigation and the approximate last date of irrigation?

9. During irrigation what is your normal pumping cycle?

   ________ hours on, ________ hours off
   or ________ days on, ________ days off

10. If surface water were not available from reservoirs during a drought season, what crops and how many acres of each crop would rely on this well for irrigation water?

11. What is the horsepower of the pump you use (horsepower shown on the pump's label)?

12. What is the source of energy for your pump?

   ________ electricity ________ diesel
   ________ propane ________ other

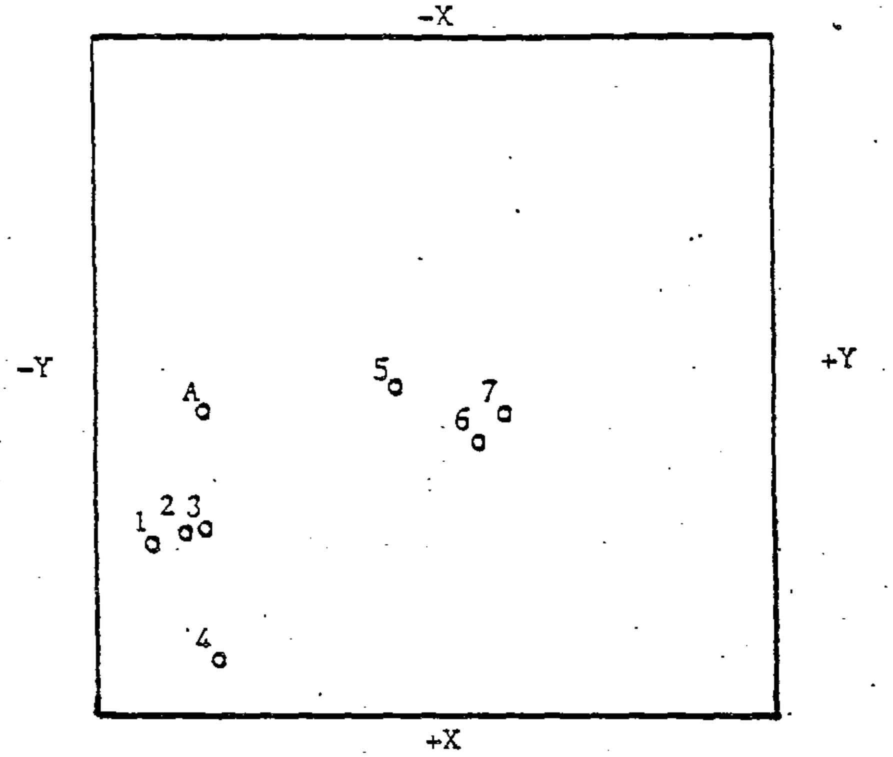
13. If your power source is electricity, what electric rate schedule do you operate under during the irrigation season:

   ________ ¢/Hp-month, and ________ ¢/kw-hr

   off season:
   ________ ¢/Hp-month, and ________ ¢/kw-hr

14. It may help us to contact you personally if any further assistance is needed. We ask you to provide your name, mailing address, and phone number if you choose to do so. Please feel free to return any comments to us that you may wish.

Figure 4 : Well Owners Questionnaire



	well location (ft)*		diameter (in)	capacity (gpm)
	x	y		
1	5238	-7826	8	600
2	5213	-6965	8	900
A	1320	-6600	24	700
3	5189	-6462	24	900
4	7871	-6453	24	700
5	880	-1173	8	500
6	2295	1326	10	350
7	2222	1735	12	400

* measured from the center of the cell

Figure 5 : Well Locations and Data

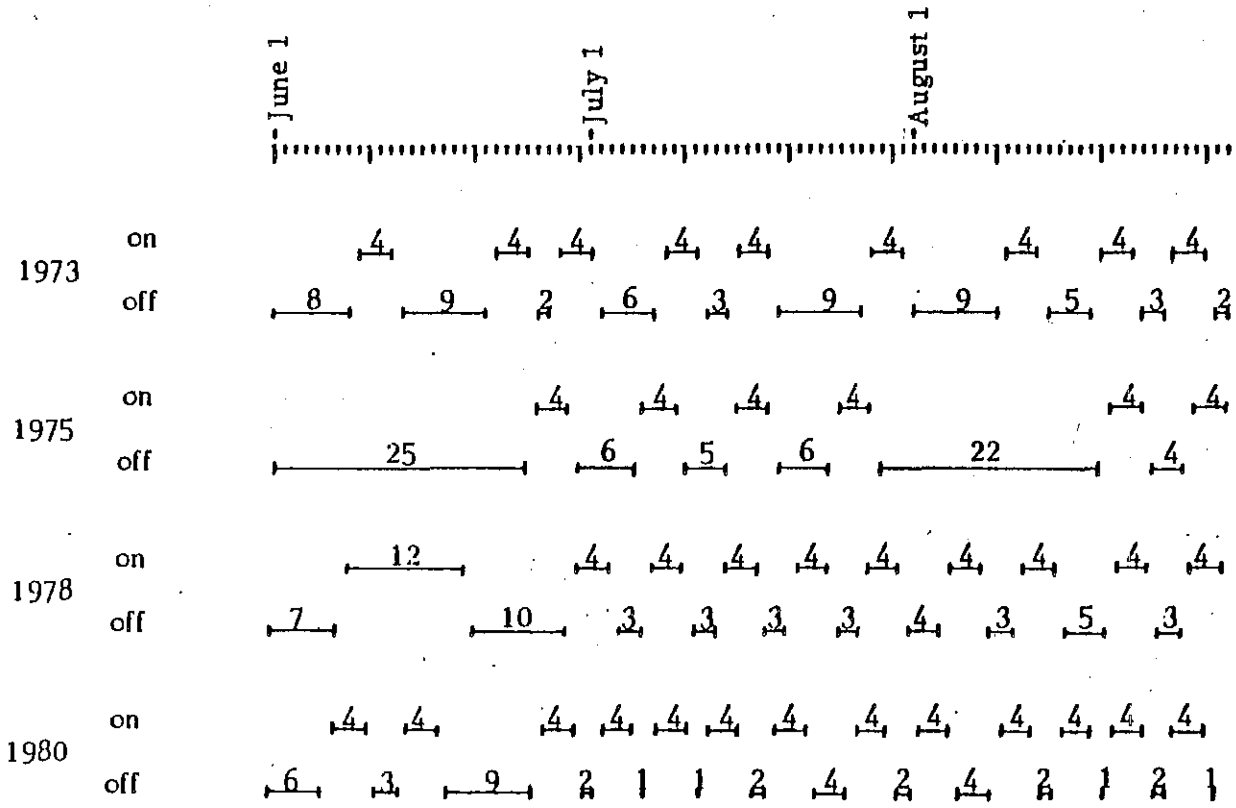
All irrigators were employing a rice-soybean crop rotation scheme. It is possible that all irrigable crop acreage may be cropped to rice simultaneously. Because this practice would require the greatest quantity of irrigation water, the groundwater pumping requirement for each well was determined using simulated daily rice irrigation schedules for the proper acreages (Figure 6). The model used to develop the daily rice irrigation schedules is described in Peralta and Dutram (1984).

Climatologic data for the years 1970-1979 and 1981 were assumed representative of "normal" (non-droughty) years. For those years, the average seasonal pumping requirement was 18.8 inches, which closely approximates the 1973 demand. The pumping requirement is based upon the assumption that some source other than groundwater (i.e. reservoirs) is used for initial flooding of the fields. The non-droughty seasonal pumping requirement ranged from a minimum of 12.5 inches in 1975 to a maximum of 25.6 inches in 1978. Data from 1980 was selected to represent conditions in a droughty season. Therefore, pumping schedules based on 1973, 1975, 1978 and 1980 climatic conditions were used in the groundwater simulations.

Irrigators reported that well supply capacity was adequate in "normal" (non-droughty) years for the reported irrigated acreage. During drought conditions (similar to 1980), however, an additional 700 GPM well is needed at location A (Figure 5) to provide sufficient capacity for the acreage which would require irrigation water.

8. Validation of AQUISIM for computation of point drawdowns

AQUISIM was validated for computation of point drawdowns by comparing its results with those obtained using the Theis equation. Due



Reference: Peralta and Dutram, 1984

Figure 6 : Simulated Daily Rice Irrigation Schedules for 1973, 1975, 1978, and 1980

to limitations of the Theis equation, a uniform transmissivity (4050 ft^2/day) and a horizontal water table were used in AQUISIM. The results of this comparison with three adjacent wells (wells 1, 2, and 3 of the critical cell), for four days of continuous and uniform pumping are found in Table 2. Column 5 of the table shows the Theis estimate of the total drawdown in well number 2 resulting from pumping in wells 1, 2, and 3. Column 6 shows the AQUISIM estimate for the same hypothetical operation.

TABLE 2: Drawdown in Well Number 2 Calculated Using the Theis Equation and AQUISIM for Four Days of Pumping, Assuming an Initially Horizontal Water Table, Uniform Transmissivity of 4050 $ft.^2$/day, and the Pumping Rates of Table 6.

CALCULATED DRAWDOWN (FT.)

	Theis equation				AQUISIM
as a result of pumping in Well #	1	2	3	1+2+3	1+2+3
Day					
1	0.0	42.7	5.5E-03	42.7	42.6
2	3.0E-04	45.0	0.1	45.1	45.1
3	4.3E-03	46.4	0.3	46.7	46.7
4	1.7E-02	47.4	0.6	48.0	47.9

9. Determination of aquifer bottom elevations in the critical subsystem

Region-wide kriging of the bottom of the aquifer assigns a single elevation value to the center of each cell. Because the bottom is an irregular surface, that single value cannot with complete accuracy represent the actual bottom topography. The bottom of the aquifer in the critical subsystem was, therefore, kriged using data obtained from

Arkansas Reports of Water Well Construction and from United States Geological Survey records for that area. Aquifer bottom values for 112 locations in the critical subsystem were obtained. The aquifer bottom elevation above sea level for the center of each cell in the critical subsystem and each well in the critical cell is given in Table 3.

10. Identification of the critical well

Of the well sites considered, the kriged elevation of the bottom of the aquifer is equally high at several wells (Table 3). The 1982 water table elevations in the center of each cell of the critical subsystem and in each well in the critical cell are shown in Table 4. Assuming the slope of the water table in the critical subsystem will remain fairly constant over time, the saturated thickness will be thinnest under well seven.

Well seven was designated the "critical well". This is the well which, in a management scenario, will most likely be monitored to estimate the saturated thickness in the critical cell if no other observation wells are drilled. The sum of the initial saturated thickness and the aquifer bottom elevation of each well site was used as the initial water table elevation in the simulations. The kriged elevation of the aquifer bottom in the center of the critical cell is six feet higher than the kriged elevation of the aquifer bottom at the critical well (Table 3). The elevation of the sloping water table at well seven and at the center of the critical cell is approximately the same. Thus, the minimum saturated thickness needed in the center of the cell is six feet less than that needed at well seven.

TABLE 3: Elevations Above Sea Level of the Aquifer Bottom (ft)

cells

I	J	1	2	3	4	5
	1	63	90	70	80	70
	2	85	100	87	65	62
I	3	95	96	106	75	67
	4		70	60	67	67
	5		45	80	80	50

wells

1	2	3	4	5	6	7	A
89	90	90	83	100	100	100	100

TABLE 4: 1982 Water Table Elevations Above Sea Level in the Center of Each Cell of the Critical Subsystem and in Each Well in the Critical Cell (ft)

cells

		J = 1	2	3	4	5
	1	144	127	112	107	108
	2	147	131	114	104	102
I	3	154	137	117	102	97
	4		148	123	103	96
	5		158	136	111	102

wells

1	2	3	4	5	6	7	A
129	129	128	129	121	118	117	126

11. The hydraulic gradient of the critical subsystem

The hydraulic gradient of the critical subsystem shown in Table 4 was the same for the beginning of each simulation. To accomplish this, elevation relationships (Table 5) of the spring 1982 groundwater table at all wells in the critical cell and at the centers of all cells in the critical subsystem were determined from Table 4 in the following manner. The cell with the highest 1982 water table elevation at its center, cell I=5, J=2, was assigned a value of zero. The difference between the 1982 water table elevation at the center of each cell and the water table elevation in cell I=5, J=2 is the elevation relationship for each cell. Similarly, the difference between the 1982 water table elevation at each well in the critical cell and the water table elevation in cell I=5, J=2 is the elevation relationship for each well.

In sections 11-14, drawdown refers to the distance between a horizontal datum, 300 feet above sea level, and the groundwater table elevation. As input, AQUISIM requires the initial drawdown in each cell and at each observation point. The cell with the highest water table elevation has the smallest initial drawdown. The drawdown in the other cells and at each observation point is greater by the amount of the elevation relationship value. Therefore, the elevation relationships are positive values.

12. Determination of inputs for the simulation model

An initial saturated thickness under the critical well (well 7) was arbitrarily selected and added to the aquifer bottom elevation at that location. This value was subtracted from 300 feet to establish the initial (spring) drawdown in the critical well. From the elevation relationships in Table 5 it can be seen that the initial drawdown in the critical well (well 7) is 41 feet greater (the elevation is 41 feet smaller) than the initial drawdown in cell I=5, J=2. The initial drawdown in all other cells and wells is determined by adding their elevation relationship value to the initial drawdown value in Cell I=5, J=2.

Subtracting the aquifer bottom elevation from the elevation datum (300 ft) yields the maximum possible physically feasible drawdown value for each cell and well. The initial saturated thickness beneath each cell and well is determined by subtracting its initial drawdown value from its maximum possible drawdown value. Multiplying the saturated thickness beneath each cell by the hydraulic conductivity (270 ft/day) produces the transmissivity value for each cell.

TABLE 5: Elevation Relationships at the Center of Each Cell in the Critical Subsystem and at Each Well in the Critical Cell for the Spring 1982 Groundwater Table (ft)

cells

		J 1	2	3	4	5
I	1	14	31	46	51	50
	2	11	27	44	54	56
	3	4	21	41	56	61
	4		10	35	55	62
	5		0	22	47	56

wells

1	2	3	4	5	6	7	A
29	29	30	29	37	40	41	32

Simulations which estimated the annual pumping values for each cell were performed for each year from 1972 through 1982 by Peralta, et al (1984). The percent of pumping attributable to each month was determined by Peralta and Dutram (1984). From that data, monthly pumping values for each cell adjacent to the critical cell were determined. Those monthly values were divided by the number of days per month to yield an average daily pumping value for each cell adjacent to the critical cell (Table 6). The I,J cell coordinates in Table 6 correspond to those in Figure 3. The daily pumping values in the adjacent cells were entered as distributed excitations, i.e. withdrawals taken uniformly from the entire area of the cell. The sum of the responses in the critical cell to point excitations in the critical cell and to distributed excitations in the adjacent cells represents the total response to all pumping which affects the critical cell. In the simulation, irrigation wells in the critical cell were pumped according to the requirements of the daily rice irrigation schedule for the appropriate year. Well A was pumped only for the drought simulation (1980). In order to simulate the maximum drawdowns possible, all wells were pumped simultaneously in the simulation. All simulated pumping wells (excitation points) were also simulated observation points since the drawdowns in the wells resulting from pumping were desired. The simulation was run from April 1, the approximate date of spring water table measurements in the region, through August 31, the end of the irrigation season.

13. Selection of the maximum acceptable drawdown constraint

In the simulations the maximum acceptable seasonal drawdown in a

TABLE 6: Daily Groundwater Pumping Values for Each Pumping Cell in the Critical Subsystem and for Each Well in the Critical Cell (cu.ft./day)

			cells J 2	3	4
June 1973		2	0.8440E+06	0.8363E+06	0.7970E+06
	I	3	0.7183E+06	*	0.7107E+06
		4	**	0.7460E+06	0.8363E+06
July 1973		2	0.5900E+06	0.5845E+06	0.5571E+06
	I	3	0.5023E+06	*	0.4968E+06
		4	**	0.5213E+06	0.5845E+06
August 1973		2	0.7219E+06	0.7152E+06	0.6816E+06
	I	3	0.6142E+06	*	0.6077E+06
		4	**	0.6377E+06	0.7152E+06
June 1975		2	0.6767E+06	0.6700E+06	0.6390E+06
	I	3	0.5757E+06	*	0.5697E+06
		4	**	0.5977E+06	0.6700E+06
July 1975		2	0.4729E+06	0.4684E+06	0.4465E+06
	I	3	0.4023E+06	*	0.3981E+06
		4	**	0.4177E+06	0.4684E+06
August 1975		2	0.5787E+06	0.5729E+06	0.5465E+06
	I	3	0.4923E+06	*	0.4871E+06
		4	**	0.5110E+06	0.5729E+06
June 1978		2	0.1287E+07	0.1274E+07	0.1215E+07
	I	3	0.1095E+07	*	0.1083E+07
		4	**	0.1137E+07	0.1274E+07
July 1978		2	0.8990E+06	0.8906E+06	0.8490E+06
	I	3	0.7652E+06	*	0.7571E+06
		4	**	0.7948E+06	0.8906E+06
August 1978		2	0.1100E+07	0.1090E+07	0.1039E+07
	I	3	0.9365E+06	*	0.9265E+06
		4	**	0.9726E+06	0.1090E+07
June 1980		2	0.1588E+07	0.1573E+07	0.1499E+07
	I	3	0.1351E+07	*	0.1336E+07
		4	**	0.1403E+07	0.1573E+07
July 1980		2	0.1110E+07	0.1099E+07	0.1048E+07
	I	3	0.9445E+06	*	0.9342E+06
		4	**	0.9806E+06	0.1099E+07
August 1980		2	0.1358E+07	0.1345E+07	0.1282E+07
	I	3	0.1155E+07	*	0.1143E+07
		4	**	0.1200E+07	0.1345E+07

*critical cell **constant head cell

wells

1	2	3	4	5	6	7	A
1.15E+05	1.73E+05	1.73E+05	1.35E+05	9.62E+04	6.74E+04	7.70E+04	1.35E+05

well was that value which would leave one-third of that well's initial saturated thickness remaining. This was done for the following reasons. For the sake of efficiency, the maximum seasonal drawdown in a pumping well should not exceed approximately two-thirds of the initial design saturated thickness (Johnson, 1966; McWhorter and Sunada, 1977). Since the range of the estimate of the bottom elevation in the center of the critical cell is ± 13 feet at the 95% confidence interval, allowing seasonal drawdowns of only two-thirds the initial saturated thickness provides a margin of error to compensate for uncertain knowledge of the bottom elevation.

Two-thirds of the initial saturated thickness in each well was added to the initial drawdown in each well to calculate the maximum acceptable drawdown in each well. If a simulation resulted in a drawdown greater than the maximum acceptable drawdown in any well, a new simulation was performed. For the subsequent simulation, initial water table elevations were uniformly increased (to maintain the 1982 hydraulic gradient of the critical subsystem). Revised initial drawdowns, saturated thicknesses, transmissivities, and maximum acceptable drawdowns were computed. This procedure was repeated until the simulated maximum drawdown was less than the maximum acceptable drawdown for all wells.

14. Results of the simulations

The resulting drawdowns of the final simulation using 1973 climatological data are found in Appendix 1. These drawdowns represent the difference in elevation between the datum elevation and the elevation of the water table. For time period 1 (day 1), the initial drawdown at the critical well (number seven) is 185 feet. This corresponds to an April 1 water table elevation of 115 feet and a saturated thickness of 15 feet. The maximum acceptable drawdown in this well is 195 feet, i.e. the initial drawdown (185 feet) plus two-thirds the initial saturated thickness (10 feet). In the simulation, no groundwater pumping occurred through day 69, by which time the water table had risen slightly. Simulated pumping commenced on day 70 and continued for four days during which time the drawdown increased to 193.88 feet. Upon cessation of pumping, the water table in the vicinity of the well began recovery which continued until the next period of irrigation pumping. This pumping and recovery cycle continued until the end of the simulation period on day 153 (August 31).

The greatest simulated drawdown at well seven amounted to 195.14 feet and occurred on day 151. The difference between this value, to the nearest foot, and the initial drawdown of 185 feet is 10 feet. Since 10 feet is two-thirds of the initial saturated thickness of 15 feet, a 15 foot initial saturated thickness at well seven is adequate to maintain sufficient well capacity during climatological conditions such as those occurring in 1973. All other wells were evaluated in the same way.

Since well seven has been designated the critical well, the desirable spring saturated thickness at well seven is shown in Table 7. The minimum desirable saturated thickness necessary in the center of the critical cell is also found in Table 7. Table 7 also shows values of 15 ft, 16 ft, and 19 ft for climatic conditions of 1975, 1978, and 1980 respectively. Simulated drawdowns for the 1980 irrigation season are found in Appendix 2. For all years, the ratio of final/initial saturated thickness was greater than 1/3 for all wells (Table 8).

TABLE 7: Necessary Initial Saturated Thickness

	Saturated Thickness (ft)	
	Well Seven	Center of Critical Cell
Minimum (1975)	15	9
Mean (1973)	15	9
Maximum (1978)	16	10
Drought (1980)	19	13

The saturated thicknesses determined by this study are smaller than those which would be necessary under conditions of a more level water table gradient. The water table gradient across the critical cell is approximately 1:1100 (20 feet in 4.2 miles) when measured along a southwest to northeast course. The gradient effectively causes increased flow into the cone of depression of a pumping well. This results in less drawdown than would result in an area with a horizontal water table.

It should be emphasized that the reported results are dependent on assumed pumping capacities, information on existing wells, and kriged estimates of aquifer bottom elevations. The range of the estimate of the bottom elevation in the center of the critical cell is ± 13 feet at the 95% confidence interval. The aquifer bottom elevation estimates are the best that can be made without additional borings. In addition, changes in irrigated acreage and pumping rates, or addition and deletion of wells in the critical cell would produce different results.

TABLE 8: Ratio Of Final To Initial Saturated Thickness

	Well #	Final Saturated Thickness	Initial Saturated Thickness	Ratio, Final/Initial Saturated Thickness
1973	1	16	38	0.42
	2	12	36	0.33
	3	14	36	0.39
	4	29	44	0.66
	5	7	19	0.37
	6	7	16	0.44
	7	5	15	0.33
1975	1	16	38	0.42
	2	14	37	0.38
	3	16	36	0.44
	4	30	44	0.68
	5	7	19	0.37
	6	7	16	0.44
	7	5	15	0.33
1978	1	17	39	0.44
	2	13	38	0.34
	3	15	37	0.41
	4	30	45	0.67
	5	8	20	0.40
	6	8	17	0.47
	7	6	16	0.38
1980	1	22	42	0.52
	2	14	41	0.34
	3	18	40	0.45
	4	33	48	0.69
	5	12	23	0.52
	6	11	20	0.55
	7	9	19	0.47
	A	14	28	0.50

SUMMARY

The concept of reasonable use is a major facet of Arkansas groundwater law. One perception of reasonable use of groundwater is that use which permits interacting wells to maintain their design discharge capacity throughout the year. Assuring that capability requires insuring that an adequate saturated thickness exists throughout the year. In Arkansas, most water table elevation measurements are made in the spring, prior to the irrigation season. For agricultural areas, the most practical way of assuring that an adequate saturated thickness exists throughout the year, is to assure that there is a satisfactory spring saturated thickness.

This report presents a method for determining the springtime saturated thickness that must exist in a particular cell in order to insure adequate groundwater availability even during a droughty irrigation season. This is a powerful management tool which can be utilized in the design of target groundwater levels for drought protection. (A discussion of the target level approach to groundwater management in Arkansas is presented by Peralta and Peralta, 1984).

A dynamic computer model was used to simulate water table response to Quaternary groundwater withdrawals in existing wells within a particular 3 mile by 3 mile portion of the Grand Prairie. Simulations were performed to determine the minimum desirable spring saturated thickness (i.e., target saturated thickness) for non-droughty and droughty irrigation seasons. The target saturated thickness for the center of the examined cell is 9-10 feet for non-droughty seasons and 13 feet for a droughty season. These values are based on the assumptions: that no new wells will be drilled in the Quaternary aquifer in that cell, that the acreages currently being irri-

gated by groundwater will continue to be irrigated, and that existing wells are fully penetrating.

Based on water elevations reported by the USGS, the saturated thickness which existed in the center of this cell in the spring of 1982 is estimated to be 12 feet. These elevations are calculated using the ground surface elevation at an observation well. The ground elevation is estimated from topographic maps that have a 5 feet contour interval. For this reason alone a water table elevation estimate may be as much as 5 feet in error.

It is predicted (Peralta et al, 1984) that the saturated thickness in this cell will decline as much as 5 feet by 1992, if current groundwater withdrawal rates continue. The continuing availability of adequate Quaternary groundwater in this cell is dependent on future water needs, and groundwater usage, and on future rules or laws for water management.

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APPENDIX 1: Resulting Drawdowns of the Final Simulation Using 1973 Climatological Data

Daily Well Drawdowns (April 1 - August 31, 1973)

	well number 1	2	3	4	5	6	7
TIME = 1	0.17300E 03	0.17300E 03	0.17400E 03	0.17300E 03	0.18100E 03	0.18400E 03	0.18500E 03
TIME = 2	0.17300E 03	0.17300E 03	0.17400E 03	0.17300E 03	0.18100E 03	0.18400E 03	0.18500E 03
TIME = 3	0.17300E 03	0.17300E 03	0.17400E 03	0.17300E 03	0.18100E 03	0.18400E 03	0.18500E 03
TIME = 4	0.17300E 03	0.17300E 03	0.17400E 03	0.17300E 03	0.18100E 03	0.18400E 03	0.18500E 03
TIME = 5	0.17299E 03	0.17299E 03	0.17399E 03	0.17299E 03	0.18099E 03	0.18399E 03	0.18499E 03
TIME = 6	0.17299E 03	0.17299E 03	0.17399E 03	0.17299E 03	0.18099E 03	0.18399E 03	0.18499E 03
TIME = 7	0.17299E 03	0.17299E 03	0.17399E 03	0.17299E 03	0.18099E 03	0.18399E 03	0.18499E 03
TIME = 8	0.17299E 03	0.17299E 03	0.17399E 03	0.17299E 03	0.18099E 03	0.18399E 03	0.18499E 03
TIME = 9	0.17299E 03	0.17299E 03	0.17399E 03	0.17299E 03	0.18099E 03	0.18399E 03	0.18499E 03
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TIME = 13	0.17298E 03	0.17298E 03	0.17398E 03	0.17298E 03	0.18098E 03	0.18398E 03	0.18498E 03
TIME = 14	0.17298E 03	0.17298E 03	0.17398E 03	0.17298E 03	0.18098E 03	0.18398E 03	0.18498E 03
TIME = 15	0.17298E 03	0.17298E 03	0.17398E 03	0.17298E 03	0.18098E 03	0.18398E 03	0.18498E 03
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TIME = 99	0.18606E 03	0.19399E 03	0.19179E 03	0.18585E 03	0.19172E 03	0.19180E 03	0.19355E 03
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+          Ø.1744ØE Ø3 Ø.17686E Ø3 Ø.17756E Ø3 Ø.1745ØE Ø3 Ø.18188E Ø3 Ø.18527E Ø3 Ø.18626E Ø3
  TIME =115
+          Ø.17426E Ø3 Ø.17659E Ø3 Ø.17732E Ø3 Ø.1744ØE Ø3 Ø.1818ØE Ø3 Ø.18516E Ø3 Ø.18615E Ø3
  TIME =116
+          Ø.17415E Ø3 Ø.17637E Ø3 Ø.17712E Ø3 Ø.17432E Ø3 Ø.18174E Ø3 Ø.185Ø8E Ø3 Ø.186Ø6E Ø3
  TIME =117
+          Ø.174Ø6E Ø3 Ø.17617E Ø3 Ø.17695E Ø3 Ø.17426E Ø3 Ø.18167E Ø3 Ø.185ØØE Ø3 Ø.18599E Ø3
  TIME =118
+          Ø.17399E Ø3 Ø.176Ø1E Ø3 Ø.1768ØE Ø3 Ø.1742ØE Ø3 Ø.18164E Ø3 Ø.18494E Ø3 Ø.18592E Ø3
  TIME =119
+          Ø.186Ø7E Ø3 Ø.19424E Ø3 Ø.192Ø7E Ø3 Ø.186Ø9E Ø3 Ø.19177E Ø3 Ø.19186E Ø3 Ø.1936ØE Ø3
  TIME =12Ø
+          Ø.19375E Ø3 Ø.19536E Ø3 Ø.19318E Ø3 Ø.1867ØE Ø3 Ø.19225E Ø3 Ø.19237E Ø3 Ø.19413E Ø3
  TIME =121
+          Ø.19428E Ø3 Ø.19611E Ø3 Ø.1939ØE Ø3 Ø.18718E Ø3 Ø.19253E Ø3 Ø.19269E Ø3 Ø.19447E Ø3
  TIME =122
+          Ø.19462E Ø3 Ø.1967ØE Ø3 Ø.19444E Ø3 Ø.18745E Ø3 Ø.19272E Ø3 Ø.19293E Ø3 Ø.19471E Ø3
  TIME =123
+          Ø.18271E Ø3 Ø.17879E Ø3 Ø.17948E Ø3 Ø.17573E Ø3 Ø.1827ØE Ø3 Ø.18614E Ø3 Ø.18717E Ø3
  TIME =124
+          Ø.17517E Ø3 Ø.17795E Ø3 Ø.17862E Ø3 Ø.17517E Ø3 Ø.1823ØE Ø3 Ø.18575E Ø3 Ø.18675E Ø3
  TIME =125
+          Ø.17474E Ø3 Ø.17743E Ø3 Ø.17811E Ø3 Ø.17489E Ø3 Ø.182Ø9E Ø3 Ø.18551E Ø3 Ø.1865ØE Ø3
  TIME =126
+          Ø.1745ØE Ø3 Ø.177Ø5E Ø3 Ø.17776E Ø3 Ø.17471E Ø3 Ø.18196E Ø3 Ø.18535E Ø3 Ø.18633E Ø3
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+ TIME =127	Ø.17433E Ø3	Ø.17675E Ø3	Ø.17749E Ø3	Ø.17458E Ø3	Ø.18187E Ø3	Ø.18523E Ø3	Ø.18621E Ø3
+ TIME =128	Ø.17421E Ø3	Ø.17651E Ø3	Ø.17727E Ø3	Ø.17449E Ø3	Ø.18179E Ø3	Ø.18513E Ø3	Ø.18611E Ø3
+ TIME =129	Ø.17411E Ø3	Ø.17631E Ø3	Ø.17709E Ø3	Ø.17441E Ø3	Ø.18174E Ø3	Ø.18505E Ø3	Ø.18603E Ø3
+ TIME =13Ø	Ø.17403E Ø3	Ø.17614E Ø3	Ø.17694E Ø3	Ø.17436E Ø3	Ø.18169E Ø3	Ø.18499E Ø3	Ø.18597E Ø3
+ TIME =131	Ø.17397E Ø3	Ø.17599E Ø3	Ø.17681E Ø3	Ø.17431E Ø3	Ø.18165E Ø3	Ø.18493E Ø3	Ø.18591E Ø3
+ TIME =132	Ø.186Ø6E Ø3	Ø.19424E Ø3	Ø.192Ø9E Ø3	Ø.1862ØE Ø3	Ø.19178E Ø3	Ø.19186E Ø3	Ø.19359E Ø3
+ TIME =133	Ø.19374E Ø3	Ø.19537E Ø3	Ø.19321E Ø3	Ø.18689E Ø3	Ø.19227E Ø3	Ø.19237E Ø3	Ø.19413E Ø3
+ TIME =134	Ø.19428E Ø3	Ø.19614E Ø3	Ø.19394E Ø3	Ø.18729E Ø3	Ø.19255E Ø3	Ø.1927ØE Ø3	Ø.19447E Ø3
+ TIME =135	Ø.19462E Ø3	Ø.19673E Ø3	Ø.19449E Ø3	Ø.18756E Ø3	Ø.19274E Ø3	Ø.19294E Ø3	Ø.19471E Ø3
+ TIME =136	Ø.18271E Ø3	Ø.17883E Ø3	Ø.17953E Ø3	Ø.17584E Ø3	Ø.18272E Ø3	Ø.18615E Ø3	Ø.18718E Ø3
+ TIME =137	Ø.17518E Ø3	Ø.178ØØE Ø3	Ø.17868E Ø3	Ø.17528E Ø3	Ø.18232E Ø3	Ø.18576E Ø3	Ø.18676E Ø3
+ TIME =138	Ø.17476E Ø3	Ø.17749E Ø3	Ø.17818E Ø3	Ø.175ØØE Ø3	Ø.18212E Ø3	Ø.18553E Ø3	Ø.18652E Ø3
+ TIME =139	Ø.17451E Ø3	Ø.17711E Ø3	Ø.17783E Ø3	Ø.17482E Ø3	Ø.18199E Ø3	Ø.18537E Ø3	Ø.18635E Ø3
+ TIME =14Ø	Ø.17435E Ø3	Ø.17682E Ø3	Ø.17756E Ø3	Ø.1747ØE Ø3	Ø.18189E Ø3	Ø.18525E Ø3	Ø.18623E Ø3
+ TIME =141	Ø.18638E Ø3	Ø.19497E Ø3	Ø.19275E Ø3	Ø.18653E Ø3	Ø.19199E Ø3	Ø.19213E Ø3	Ø.19386E Ø3
+ TIME =142	Ø.194Ø1E Ø3	Ø.196Ø2E Ø3	Ø.1938ØE Ø3	Ø.18719E Ø3	Ø.19245E Ø3	Ø.1926ØE Ø3	Ø.19437E Ø3
+ TIME =143	Ø.19452E Ø3	Ø.19672E Ø3	Ø.19448E Ø3	Ø.18755E Ø3	Ø.19271E Ø3	Ø.19291E Ø3	Ø.19468E Ø3

TIME =144	Ø.19483E Ø3	Ø.19727E Ø3	Ø.19498E Ø3	Ø.18781E Ø3	Ø.17288E Ø3	Ø.19313E Ø3	Ø.19490E Ø3
TIME =145	Ø.18290E Ø3	Ø.17933E Ø3	Ø.17999E Ø3	Ø.17607E Ø3	Ø.18285E Ø3	Ø.18633E Ø3	Ø.18735E Ø3
TIME =146	Ø.17535E Ø3	Ø.17846E Ø3	Ø.17911E Ø3	Ø.17550E Ø3	Ø.18244E Ø3	Ø.18592E Ø3	Ø.18692E Ø3
TIME =147	Ø.17492E Ø3	Ø.17792E Ø3	Ø.17858E Ø3	Ø.17520E Ø3	Ø.18223E Ø3	Ø.18568E Ø3	Ø.18666E Ø3
TIME =148	Ø.18681E Ø3	Ø.19590E Ø3	Ø.19360E Ø3	Ø.18695E Ø3	Ø.19226E Ø3	Ø.19248E Ø3	Ø.19422E Ø3
TIME =149	Ø.19437E Ø3	Ø.19684E Ø3	Ø.19455E Ø3	Ø.18754E Ø3	Ø.19268E Ø3	Ø.19290E Ø3	Ø.19467E Ø3
TIME =15Ø	Ø.19482E Ø3	Ø.19746E Ø3	Ø.19514E Ø3	Ø.18787E Ø3	Ø.19290E Ø3	Ø.19317E Ø3	Ø.19494E Ø3
TIME =151	Ø.19509E Ø3	Ø.19793E Ø3	Ø.19559E Ø3	Ø.18809E Ø3	Ø.19306E Ø3	Ø.19336E Ø3	Ø.19514E Ø3
TIME =152	Ø.18314E Ø3	Ø.17994E Ø3	Ø.18055E Ø3	Ø.17633E Ø3	Ø.18301E Ø3	Ø.18654E Ø3	Ø.18756E Ø3
TIME =153	Ø.17556E Ø3	Ø.17903E Ø3	Ø.17963E Ø3	Ø.17574E Ø3	Ø.18259E Ø3	Ø.18612E Ø3	Ø.18711E Ø3

APPENDIX 2: Resulting Drawdowns of the Final Simulation Using 1980 Climatological Data

Daily Well Drawdowns (April 1 - August 31, 1980)

well number

	1	2	A	3	4	5	6	7
TIME = 1	0.16900E 03	0.16900E 03	0.17200E 03	0.17000E 03	0.16900E 03	0.17700E 03	0.18000E 03	0.18100E 03
TIME = 2	0.16900E 03	0.16900E 03	0.17200E 03	0.17000E 03	0.16900E 03	0.17700E 03	0.18000E 03	0.18100E 03
TIME = 3	0.16900E 03	0.16900E 03	0.17200E 03	0.17000E 03	0.16900E 03	0.17700E 03	0.18000E 03	0.18100E 03
TIME = 4	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 5	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 6	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 7	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	[illegible]
TIME = 8	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 9	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 10	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 11	0.16899E 03	0.16899E 03	0.17199E 03	0.16999E 03	0.16899E 03	0.17699E 03	0.17999E 03	0.18099E 03
TIME = 12	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03
TIME = 13	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03
TIME = 14	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03
TIME = 15	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03
TIME = 16	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03
TIME = 17	0.16898E 03	0.16898E 03	0.17198E 03	0.16998E 03	0.16898E 03	0.17698E 03	0.17998E 03	0.18098E 03

TIME = 18	Ø.16898E Ø3	Ø.16898E Ø3	Ø.17198E Ø3	Ø.16998E Ø3	Ø.16898E Ø3	Ø.17698E Ø3	Ø.17998E Ø3	Ø.18098E Ø3
TIME = 19	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 2Ø	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 21	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 22	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 23	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 24	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 25	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 26	Ø.16897E Ø3	Ø.16897E Ø3	Ø.17197E Ø3	Ø.16997E Ø3	Ø.16897E Ø3	Ø.17697E Ø3	Ø.17997E Ø3	Ø.18097E Ø3
TIME = 27	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 28	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 29	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 3Ø	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 31	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 32	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 33	Ø.16896E Ø3	Ø.16896E Ø3	Ø.17196E Ø3	Ø.16996E Ø3	Ø.16896E Ø3	Ø.17696E Ø3	Ø.17996E Ø3	Ø.18096E Ø3
TIME = 34	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 35	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 36	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3

TIME = 37	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 38	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 39	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 4Ø	Ø.16895E Ø3	Ø.16895E Ø3	Ø.17195E Ø3	Ø.16995E Ø3	Ø.16895E Ø3	Ø.17695E Ø3	Ø.17995E Ø3	Ø.18095E Ø3
TIME = 41	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 42	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 43	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 44	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 45	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	[illegible]
TIME = 46	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 47	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 48	Ø.16894E Ø3	Ø.16894E Ø3	Ø.17194E Ø3	Ø.16994E Ø3	Ø.16894E Ø3	Ø.17694E Ø3	Ø.17994E Ø3	Ø.18094E Ø3
TIME = 49	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 5Ø	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 51	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 52	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 53	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 54	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3

TIME = 55	Ø.16893E Ø3	Ø.16893E Ø3	Ø.17193E Ø3	Ø.16993E Ø3	Ø.16893E Ø3	Ø.17693E Ø3	Ø.17993E Ø3	Ø.18093E Ø3
TIME = 56	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 57	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 58	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 59	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 6Ø	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 61	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 62	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 63	Ø.16892E Ø3	Ø.16892E Ø3	Ø.17192E Ø3	Ø.16992E Ø3	Ø.16892E Ø3	Ø.17692E Ø3	Ø.17992E Ø3	Ø.18092E Ø3
TIME = 64	Ø.16891E Ø3	Ø.16891E Ø3	Ø.17191E Ø3	Ø.16991E Ø3	Ø.16891E Ø3	Ø.17691E Ø3	Ø.17991E Ø3	Ø.18091E Ø3
TIME = 65	Ø.16891E Ø3	Ø.16891E Ø3	Ø.17191E Ø3	Ø.16991E Ø3	Ø.16891E Ø3	Ø.17691E Ø3	Ø.17991E Ø3	Ø.18091E Ø3
TIME = 66	Ø.16891E Ø3	Ø.16891E Ø3	Ø.17191E Ø3	Ø.16991E Ø3	Ø.16891E Ø3	Ø.17691E Ø3	Ø.17991E Ø3	Ø.18091E Ø3
TIME = 67	Ø.16891E Ø3	Ø.16891E Ø3	Ø.17191E Ø3	Ø.16991E Ø3	Ø.16891E Ø3	Ø.17691E Ø3	Ø.17991E Ø3	Ø.18091E Ø3
TIME = 68	Ø.17998E Ø3	Ø.18569E Ø3	Ø.18280E Ø3	Ø.18399E Ø3	Ø.17980E Ø3	Ø.18617E Ø3	Ø.18628E Ø3	Ø.18797E Ø3
TIME = 69	Ø.18635E Ø3	Ø.19275E Ø3	Ø.18345E Ø3	Ø.18512E Ø3	Ø.18045E Ø3	Ø.18664E Ø3	Ø.18679E Ø3	Ø.18850E Ø3
TIME = 7Ø	Ø.18686E Ø3	Ø.19328E Ø3	Ø.18384E Ø3	Ø.18589E Ø3	Ø.18084E Ø3	Ø.18691E Ø3	Ø.18713E Ø3	Ø.1888[illegible]E Ø
TIME = 71	Ø.18720E Ø3	Ø.19363E Ø3	Ø.18411E Ø3	Ø.18647E Ø3	Ø.18111E Ø3	Ø.18710E Ø3	Ø.18738E Ø3	Ø.18911E Ø3
TIME = 72	Ø.17638E Ø3	Ø.17710E Ø3	Ø.17343E Ø3	Ø.17288E Ø3	Ø.17043E Ø3	Ø.17799E Ø3	Ø.18121E Ø3	Ø.18225E Ø3
TIME = 73	Ø.17020E Ø3	Ø.17025E Ø3	Ø.17295E Ø3	Ø.17215E Ø3	Ø.16995E Ø3	Ø.17765E Ø3	Ø.18086E Ø3	Ø.18180E Ø3

TIME = 74	Ø.16986E Ø3	Ø.16988E Ø3	Ø.17271E Ø3	Ø.17174E Ø3	Ø.16971E Ø3	Ø.17747E Ø3	Ø.18Ø67E Ø3	Ø.18168E Ø3
TIME = 75	Ø.18Ø74E Ø3	Ø.18646E Ø3	Ø.18345E Ø3	Ø.18555E Ø3	Ø.18Ø45E Ø3	Ø.18663E Ø3	Ø.18692E Ø3	Ø.18861E Ø3
TIME = 76	Ø.18699E Ø3	Ø.19339E Ø3	Ø.184ØØE Ø3	Ø.18649E Ø3	Ø.181Ø1E Ø3	Ø.187Ø3E Ø3	Ø.18734E Ø3	Ø.189Ø5E Ø3
TIME = 77	Ø.18741E Ø3	Ø.19383E Ø3	Ø.18431E Ø3	Ø.18711E Ø3	Ø.18132E Ø3	Ø.18725E Ø3	Ø.1876ØE Ø3	Ø.18933E Ø3
TIME = 78	Ø.18768E Ø3	Ø.19411E Ø3	Ø.18453E Ø3	Ø.18758E Ø3	Ø.18154E Ø3	Ø.1874ØE Ø3	Ø.1878ØE Ø3	Ø.18953E Ø3
TIME = 79	Ø.1768ØE Ø3	Ø.17753E Ø3	Ø.17381E Ø3	Ø.1739ØE Ø3	Ø.17Ø82E Ø3	Ø.17826E Ø3	Ø.18159E Ø3	Ø.18263E Ø3
TIME = 8Ø	Ø.17Ø59E Ø3	Ø.17Ø63E Ø3	Ø.17329E Ø3	Ø.173Ø9E Ø3	Ø.17Ø31E Ø3	Ø.17789E Ø3	Ø.18121E Ø3	Ø.18223E Ø3
TIME = 81	Ø.17Ø21E Ø3	Ø.17Ø23E Ø3	Ø.173Ø2E Ø3	Ø.17262E Ø3	Ø.17ØØ4E Ø3	Ø.1777ØE Ø3	Ø.18Ø99E Ø3	Ø.182ØØE Ø3
TIME = 82	Ø.16999E Ø3	Ø.17ØØØE Ø3	Ø.17284E Ø3	Ø.17229E Ø3	Ø.16988E Ø3	Ø.17757E Ø3	Ø.18Ø84E Ø3	[illegible]
TIME = 83	Ø.16984E Ø3	Ø.16984E Ø3	Ø.17272E Ø3	Ø.172Ø5E Ø3	Ø.16976E Ø3	Ø.17749E Ø3	Ø.18Ø73E Ø3	Ø.18173E Ø3
TIME = 84	Ø.16973E Ø3	Ø.16973E Ø3	Ø.17263E Ø3	Ø.17187E Ø3	Ø.16968E Ø3	Ø.17742E Ø3	Ø.18Ø64E Ø3	Ø.18164E Ø3
TIME = 85	Ø.16964E Ø3	Ø.16964E Ø3	Ø.17256E Ø3	Ø.17171E Ø3	Ø.16962E Ø3	Ø.17737E Ø3	Ø.18Ø58E Ø3	Ø.18157E Ø3
TIME = 86	Ø.16957E Ø3	Ø.16957E Ø3	Ø.1725ØE Ø3	Ø.17159E Ø3	Ø.16957E Ø3	Ø.17733E Ø3	Ø.18Ø52E Ø3	Ø.18152E Ø3
TIME = 87	Ø.16952E Ø3	Ø.16952E Ø3	Ø.17245E Ø3	Ø.17148E Ø3	Ø.16953E Ø3	Ø.1773ØE Ø3	Ø.18Ø47E Ø3	Ø.18147E Ø3
TIME = 88	Ø.18Ø54E Ø3	Ø.18625E Ø3	Ø.1833ØE Ø3	Ø.18546E Ø3	Ø.18Ø38E Ø3	Ø.18653E Ø3	Ø.18681E Ø3	Ø.18849E Ø3
TIME = 89	Ø.18688E Ø3	Ø.19327E Ø3	Ø.18392E Ø3	Ø.18652E Ø3	Ø.181Ø2E Ø3	Ø.18698E Ø3	Ø.18728E Ø3	Ø.18899E Ø3
TIME = 9Ø	Ø.18736E Ø3	Ø.19377E Ø3	Ø.18428E Ø3	Ø.18721E Ø3	Ø.18138E Ø3	Ø.18723E Ø3	Ø.18759E Ø3	Ø.18931E Ø3
TIME = 91	Ø.18766E Ø3	Ø.194Ø8E Ø3	Ø.18452E Ø3	Ø.18773E Ø3	Ø.18163E Ø3	Ø.18741E Ø3	Ø.18782E Ø3	Ø.18954E Ø3

TIME = 92	Ø.17682E Ø3	Ø.17754E Ø3	Ø.17382E Ø3	Ø.17400E Ø3	Ø.17094E Ø3	Ø.17828E Ø3	Ø.18162E Ø3	Ø.18266E Ø3
TIME = 93	Ø.17062E Ø3	Ø.17065E Ø3	Ø.17332E Ø3	Ø.17330E Ø3	Ø.17044E Ø3	Ø.17792E Ø3	Ø.18126E Ø3	Ø.18227E Ø3
TIME = 94	Ø.18133E Ø3	Ø.18705E Ø3	Ø.18395E Ø3	Ø.18693E Ø3	Ø.18108E Ø3	Ø.18700E Ø3	Ø.18742E Ø3	Ø.18911E Ø3
TIME = 95	Ø.18750E Ø3	Ø.19389E Ø3	Ø.18445E Ø3	Ø.18776E Ø3	Ø.18158E Ø3	Ø.18735E Ø3	Ø.18779E Ø3	Ø.18950E Ø3
TIME = 96	Ø.18786E Ø3	Ø.19428E Ø3	Ø.18472E Ø3	Ø.18829E Ø3	Ø.18186E Ø3	Ø.18755E Ø3	Ø.18802E Ø3	Ø.18974E Ø3
TIME = 97	Ø.18810E Ø3	Ø.19452E Ø3	Ø.18491E Ø3	Ø.18870E Ø3	Ø.18205E Ø3	Ø.18768E Ø3	Ø.18819E Ø3	Ø.18971E Ø3
TIME = 98	Ø.17719E Ø3	Ø.17791E Ø3	Ø.17416E Ø3	Ø.17495E Ø3	Ø.17132E Ø3	Ø.17852E Ø3	Ø.18196E Ø3	Ø.18299E Ø3
TIME = 99	Ø.18203E Ø3	Ø.18777E Ø3	Ø.18451E Ø3	Ø.18818E Ø3	Ø.18167E Ø3	Ø.18740E Ø3	Ø.18794E Ø3	Ø.18963E Ø3
TIME =1ØØ	Ø.18801E Ø3	Ø.19441E Ø3	Ø.18489E Ø3	Ø.18880E Ø3	Ø.18206E Ø3	Ø.18767E Ø3	Ø.18921E Ø3	[illegible]
TIME =1Ø1	Ø.18828E Ø3	Ø.19470E Ø3	Ø.18509E Ø3	Ø.18921E Ø3	Ø.18226E Ø3	Ø.18781E Ø3	Ø.18838E Ø3	Ø.19010E Ø3
TIME =1Ø2	Ø.18845E Ø3	Ø.19488E Ø3	Ø.18523E Ø3	Ø.18953E Ø3	Ø.18241E Ø3	Ø.18791E Ø3	Ø.18851E Ø3	Ø.19023E Ø3
TIME =1Ø3	Ø.17751E Ø3	Ø.17823E Ø3	Ø.17445E Ø3	Ø.17571E Ø3	Ø.17164E Ø3	Ø.17873E Ø3	Ø.18224E Ø3	Ø.18327E Ø3
TIME =1Ø4	Ø.18231E Ø3	Ø.18805E Ø3	Ø.18477E Ø3	Ø.18888E Ø3	Ø.18198E Ø3	Ø.18759E Ø3	Ø.18820E Ø3	Ø.18989E Ø3
TIME =1Ø5	Ø.18827E Ø3	Ø.19467E Ø3	Ø.18513E Ø3	Ø.18946E Ø3	Ø.18234E Ø3	Ø.18784E Ø3	Ø.18845E Ø3	Ø.19016E Ø3
TIME =1Ø6	Ø.18852E Ø3	Ø.19494E Ø3	Ø.18531E Ø3	Ø.18983E Ø3	Ø.18254E Ø3	Ø.18797E Ø3	Ø.18861E Ø3	Ø.19032E Ø3
TIME =1Ø7	Ø.18868E Ø3	Ø.19510E Ø3	Ø.18544E Ø3	Ø.19011E Ø3	Ø.18267E Ø3	Ø.18806E Ø3	Ø.18872E Ø3	Ø.19044E Ø3
TIME =1Ø8	Ø.17772E Ø3	Ø.17844E Ø3	Ø.17465E Ø3	Ø.17627E Ø3	Ø.17189E Ø3	Ø.17887E Ø3	Ø.18244E Ø3	Ø.18347E Ø3
TIME =1Ø9	Ø.17144E Ø3	Ø.17147E Ø3	Ø.17407E Ø3	Ø.17534E Ø3	Ø.17133E Ø3	Ø.17846E Ø3	Ø.18201E Ø3	Ø.18302E Ø3
TIME =11Ø	Ø.18208E Ø3	Ø.18779E Ø3	Ø.18465E Ø3	Ø.18884E Ø3	Ø.18192E Ø3	Ø.18750E Ø3	Ø.18812E Ø3	Ø.18980E Ø3

TIME =111	Ø.18819E Ø3	Ø.19458E Ø3	Ø.18510E Ø3	Ø.18956E Ø3	Ø.18238E Ø3	Ø.18782E Ø3	Ø.18844E Ø3	Ø.19014E Ø3
TIME =112	Ø.18851E Ø3	Ø.19492E Ø3	Ø.18533E Ø3	Ø.19000E Ø3	Ø.18263E Ø3	Ø.18799E Ø3	Ø.18864E Ø3	Ø.19034E Ø3
TIME =113	Ø.18871E Ø3	Ø.19512E Ø3	Ø.18549E Ø3	Ø.19033E Ø3	Ø.18279E Ø3	Ø.18810E Ø3	Ø.18877E Ø3	Ø.19048E Ø3
TIME =114	Ø.17777E Ø3	Ø.17848E Ø3	Ø.17471E Ø3	Ø.17651E Ø3	Ø.17203E Ø3	Ø.17892E Ø3	Ø.18251E Ø3	Ø.18353E Ø3
TIME =115	Ø.17151E Ø3	Ø.17153E Ø3	Ø.17415E Ø3	Ø.17560E Ø3	Ø.17148E Ø3	Ø.17852E Ø3	Ø.18209E Ø3	Ø.18308E Ø3
TIME =116	Ø.17108E Ø3	Ø.17108E Ø3	Ø.17384E Ø3	Ø.17503E Ø3	Ø.17119E Ø3	Ø.17830E Ø3	Ø.18183E Ø3	Ø.18281E Ø3
TIME =117	Ø.17082E Ø3	Ø.17081E Ø3	Ø.17364E Ø3	Ø.17462E Ø3	Ø.17100E Ø3	Ø.17816E Ø3	Ø.18164E Ø3	Ø.18262E Ø3
TIME =118	Ø.18171E Ø3	Ø.18740E Ø3	Ø.18438E Ø3	Ø.18837E Ø3	Ø.18175E Ø3	Ø.18731E Ø3	Ø.18787E Ø3	Ø.18954E Ø3
TIME =119	Ø.18795E Ø3	Ø.19432E Ø3	Ø.18493E Ø3	Ø.18925E Ø3	Ø.18231E Ø3	Ø.18770E Ø3	Ø.18827E Ø3	[illegible]
TIME =120	Ø.18834E Ø3	Ø.19474E Ø3	Ø.18522E Ø3	Ø.18980E Ø3	Ø.18261E Ø3	Ø.18791E Ø3	Ø.18852E Ø3	Ø.19021E Ø3
TIME =121	Ø.18859E Ø3	Ø.19499E Ø3	Ø.18541E Ø3	Ø.19020E Ø3	Ø.18282E Ø3	Ø.18805E Ø3	Ø.18869E Ø3	Ø.19039E Ø3
TIME =122	Ø.17769E Ø3	Ø.17839E Ø3	Ø.17467E Ø3	Ø.17644E Ø3	Ø.17209E Ø3	Ø.17889E Ø3	Ø.18245E Ø3	Ø.18346E Ø3
TIME =123	Ø.17145E Ø3	Ø.17146E Ø3	Ø.17413E Ø3	Ø.17556E Ø3	Ø.17156E Ø3	Ø.17851E Ø3	Ø.18205E Ø3	Ø.18304E Ø3
TIME =124	Ø.18212E Ø3	Ø.18781E Ø3	Ø.18473E Ø3	Ø.18910E Ø3	Ø.18217E Ø3	Ø.18756E Ø3	Ø.18818E Ø3	Ø.18985E Ø3
TIME =125	Ø.18825E Ø3	Ø.19462E Ø3	Ø.18520E Ø3	Ø.18986E Ø3	Ø.18265E Ø3	Ø.18790E Ø3	Ø.18852E Ø3	Ø.19021E Ø3
TIME =126	Ø.18859E Ø3	Ø.19498E Ø3	Ø.18545E Ø3	Ø.19033E Ø3	Ø.18291E Ø3	Ø.18807E Ø3	Ø.18872E Ø3	Ø.19042E Ø3
TIME =127	Ø.18880E Ø3	Ø.19519E Ø3	Ø.18562E Ø3	Ø.19067E Ø3	Ø.18308E Ø3	Ø.18819E Ø3	Ø.18887E Ø3	Ø.19057E Ø3
TIME =128	Ø.17787E Ø3	Ø.17857E Ø3	Ø.17486E Ø3	Ø.17687E Ø3	Ø.17233E Ø3	Ø.17902E Ø3	Ø.18261E Ø3	Ø.18362E Ø3

TIME =129	Ø.17161E Ø3	Ø.17162E Ø3	Ø.1743ØE Ø3	Ø.17597E Ø3	Ø.17178E Ø3	Ø.17863E Ø3	Ø.1822ØE Ø3	Ø.18319E Ø3
TIME =13Ø	Ø.1712ØE Ø3	Ø.17118E Ø3	Ø.174Ø1E Ø3	Ø.17541E Ø3	Ø.17149E Ø3	Ø.17841E Ø3	Ø.18194E Ø3	Ø.18292E Ø3
TIME =131	Ø.17Ø94E Ø3	Ø.17Ø92E Ø3	Ø.17381E Ø3	Ø.175ØØE Ø3	Ø.1713ØE Ø3	Ø.17827E Ø3	Ø.18176E Ø3	Ø.18273E Ø3
TIME =132	Ø.18183E Ø3	Ø.18751E Ø3	Ø.18455E Ø3	Ø.18876E Ø3	Ø.182Ø6E Ø3	Ø.18743E Ø3	Ø.188ØØE Ø3	Ø.18966E Ø3
TIME =133	Ø.188Ø7E Ø3	Ø.19443E Ø3	Ø.1851ØE Ø3	Ø.18964E Ø3	Ø.18261E Ø3	Ø.18782E Ø3	Ø.1884ØE Ø3	Ø.19ØØ3E Ø3
TIME =134	Ø.18847E Ø3	Ø.19485E Ø3	Ø.1854ØE Ø3	Ø.19Ø19E Ø3	Ø.18291E Ø3	Ø.188Ø3E Ø3	Ø.18864E Ø3	Ø.19Ø33E Ø3
TIME =135	Ø.18871E Ø3	Ø.19511E Ø3	Ø.1856ØE Ø3	Ø.19Ø59E Ø3	Ø.18312E Ø3	Ø.18817E Ø3	Ø.18882E Ø3	Ø.19Ø51E Ø3
TIME =136	Ø.17782E Ø3	Ø.17851E Ø3	Ø.17486E Ø3	Ø.17684E Ø3	Ø.17239E Ø3	Ø.179Ø1E Ø3	Ø.18258E Ø3	Ø.18358E Ø3
TIME =137	Ø.17158E Ø3	Ø.17158E Ø3	Ø.17432E Ø3	Ø.17596E Ø3	Ø.17186E Ø3	Ø.17863E Ø3	Ø.18218E Ø3	Ø.18316E Ø3
TIME =138	Ø.18225E Ø3	Ø.18793E Ø3	Ø.18492E Ø3	Ø.1895ØE Ø3	Ø.18247E Ø3	Ø.18768E Ø3	Ø.18831E Ø3	Ø.18997E Ø3
TIME =139	Ø.18838E Ø3	Ø.19474E Ø3	Ø.18539E Ø3	Ø.19Ø26E Ø3	Ø.18294E Ø3	Ø.188Ø2E Ø3	Ø.18865E Ø3	Ø.19Ø33E Ø3
TIME =14Ø	Ø.18872E Ø3	Ø.1951ØE Ø3	Ø.18564E Ø3	Ø.19Ø72E Ø3	Ø.1832ØE Ø3	Ø.1882ØE Ø3	Ø.18885E Ø3	Ø.19Ø54E Ø3
TIME =141	Ø.18892E Ø3	Ø.19531E Ø3	Ø.18581E Ø3	Ø.191Ø6E Ø3	Ø.18337E Ø3	Ø.18831E Ø3	Ø.189ØØE Ø3	Ø.19Ø69E Ø3
TIME =142	Ø.178ØØE Ø3	Ø.17869E Ø3	Ø.175Ø5E Ø3	Ø.17726E Ø3	Ø.17262E Ø3	Ø.17914E Ø3	Ø.18274E Ø3	Ø.18374E Ø3
TIME =143	Ø.18281E Ø3	Ø.18852E Ø3	Ø.18539E Ø3	Ø.19Ø43E Ø3	Ø.18296E Ø3	Ø.188Ø1E Ø3	Ø.1887ØE Ø3	Ø.19Ø37E Ø3
TIME =144	Ø.18877E Ø3	Ø.19514E Ø3	Ø.18575E Ø3	Ø.191Ø1E Ø3	Ø.18332E Ø3	Ø.18826E Ø3	Ø.18895E Ø3	Ø.19Ø64E Ø3
TIME =145	Ø.189Ø2E Ø3	Ø.19541E Ø3	Ø.18594E Ø3	Ø.19137E Ø3	Ø.18352E Ø3	Ø.1884ØE Ø3	Ø.18911E Ø3	Ø.19Ø8ØE Ø3
TIME =146	Ø.18918E Ø3	Ø.19557E Ø3	Ø.186Ø7E Ø3	Ø.19164E Ø3	Ø.18365E Ø3	Ø.18849E Ø3	Ø.18922E Ø3	Ø.19Ø91E Ø3

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TIME =147
   Ø.17822E Ø3 Ø.17891E Ø3 Ø.17528E Ø3 Ø.17779E Ø3 Ø.17287E Ø3 Ø.17930E Ø3 Ø.18294E Ø3 Ø.18394E Ø
TIME =148
   Ø.17194E Ø3 Ø.17194E Ø3 Ø.17470E Ø3 Ø.17684E Ø3 Ø.17230E Ø3 Ø.17889E Ø3 Ø.18250E Ø3 Ø.18348E Ø3
TIME =149
   Ø.18258E Ø3 Ø.18826E Ø3 Ø.18528E Ø3 Ø.19032E Ø3 Ø.18288E Ø3 Ø.18792E Ø3 Ø.18861E Ø3 Ø.19027E Ø
TIME =15Ø
   Ø.18868E Ø3 Ø.19504E Ø3 Ø.18573E Ø3 Ø.19102E Ø3 Ø.18334E Ø3 Ø.18824E Ø3 Ø.18892E Ø3 Ø.19060E Ø3
TIME =151
   Ø.18900E Ø3 Ø.19538E Ø3 Ø.18596E Ø3 Ø.19145E Ø3 Ø.18358E Ø3 Ø.18841E Ø3 Ø.18911E Ø3 Ø.19080E Ø3
TIME =152
   Ø.18918E Ø3 Ø.19557E Ø3 Ø.18611E Ø3 Ø.19176E Ø3 Ø.18374E Ø3 Ø.18852E Ø3 Ø.18925E Ø3 Ø.19093E Ø
TIME =153
   Ø.17825E Ø3 Ø.17893E Ø3 Ø.17534E Ø3 Ø.17793E Ø3 Ø.17297E Ø3 Ø.17934E Ø3 Ø.18297E Ø3 Ø.18397E Ø3
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