ASSUMPTIONS

General Assumptions:

1 million gallons is equal to	3.07	acre feet
Current Discount Rate=	**4.000%**	
	0.04000	
Planning Horizon	**50**	
Annuity of PW (A=P….)	0.047	
Present worth of future cost (P=F)	0.14	
Present worth of annutiy (P=A)	21.48	

Sherman Assumptions

EDR Daily O&M Cost	#NAME?	per kgal
Brine Disposal Cost	#NAME?	per kgal
Brine Average Reject Rate	#NAME?	

Denison Assumptions

Capital Cost of the 2 mgd add-on RO Process	#NAME?	one time
Date to Be Built	2040	
RO O&M Cost	#NAME?	per thousand gallons
2 MGD Water Treated	1121	acre feet/ yr
2 MGD Water Treated	#NAME?	mgd

TDS Assumptions

EPA TDS Limit	500	
Texas TDS Limit	1000	
ENR Index 2011	5041	(Average of January-September)
ENR Index 2001	3574	
Update Factor	1.41	
Without Project: % of time TDS is <1000	#NAME?	
With Project: % of time TDS is <1000	#NAME?	

Chloride Assumptions

Without Project: % of time Chloride is >300	59%
With Project: % of time Chloride is >300	52%

DAMAGE COEFFICIENTS

Combined Municipal Damage Coefficient

Component	Average Annual Cost (2001)	Average Annual Cost (2011)
Residential:		
Water Piping	$22.55	$31.81
Watewater Piping	$12.54	$17.69
Water Heaters	$39.86	$56.22
Faucets	$48.35	$68.20
Toilet Flushing Mechanisms	$11.64	$16.42
Garbage Disposals	$10.96	$15.46
Washing Equipment (Dishes & Clothes)	$36.05	$50.85
Cooking Utensils	$6.10	$8.60
Washable Fabrics(4 People @$800/ea)	$27.64	$38.99
Soap and Detergent Use	$18.55	$26.16

Subtotal Residential Damages	$234.24	$330.39
Public:		
Supply & Production Equipment	$3.49	$4.92
Distribution Piping	$0.45	$0.63
Storage Facilities	$0.38	$0.54
Utility Service Lines	$0.28	$0.39
Water Meters	$0.25	$0.35
Sewage Facilities	$6.32	$8.91
Subtotal Public Damages	$11.17	$15.75
Total Annual Damage Cost Differential	$245.41	$346.14
Damage Cost per 1000 Gallons (With Assumed 100,000 Gallon Annual Usage)	$2.45	$3.46
Damages per 1,000 Gal per 100 mg/l TDS	$0.16	#NAME?

Industrial Damage Coefficient

Table 1-10

Industrial Damage Coefficient

($/1000 Gal/100 mg/l of TDS)

Year	ENR BCI	Indexed Coefficient	Adjusted Coefficient
1967 (Avg.)	676	$0.01	-
1980 (Jan.)	1895	$0.04	-
1999 (Jan.)	3425	$0.07	$0.04
2000 (Jan.)	3503	$0.07	$0.04
2001 (Jan.)	3545	$0.08	$0.05
2011	5041		#NAME?

WATER PROJECTIONS

SHERMAN

	Projected Population and Dema		
Values in Ac-Ft/Yr	**2010**	**2020**	**2030**
Projected Population	39300	44400	50600
Projected Water Demand			
Municipal Demand	10081	11240	12696
Manufacturing, Steam Electric, and Customer Demand	10949	12432	13973
Total Projected Demand	***21030***	***23672***	***26669***
Currently Available Water Supplies			
Trinity Aquifer	4083	4083	4083
Woodbine Aquifer	3463	3463	3463
Greater Texoma Utility Authority (Lake Texoma, Treated, limited by WTP)	8000	8000	8000
Greater Texoma Utility Authority (Lake Texoma, Raw)	5600	5600	5600
Total Current Supplies	***21146***	***21146***	***21146***
Need (Demand-Current Supply)	***0***	***2526***	***5523***
Water Management Stategies			
Water Conservation	67	217	333
Grayson County Water Supply Projects(WTP Expansions and water from GTUA)	0	5600	8400
Supplemental Wells	0	0	0
Total Water Management Strategies	***67***	***5817***	***8733***
Reserve (Shortage)	**183**	**3291**	**3210**

	Projected Population and Dema

Values in Mgd	2010	2020	2030
Projected Population	39300	44400	50600
Projected Water Demand			
Municipal Demand	9.00	10.03	11.33
Manufacturing, Steam Electric, and Customer Demand	9.77	11.09	12.47
Total Projected Demand	18.77	21.13	23.80
Currently Available Water Supplies	0.00	0.00	0.00
Trinity Aquifer	3.64	3.64	3.64
Woodbine Aquifer	3.09	3.09	3.09
Greater Texoma Utility Authority (Lake Texoma, Treated, limited by WTP)	#NAME?	7.14	7.14
Greater Texoma Utility Authority (Lake Texoma, Raw)	5.00	5.00	5.00
Total Current Supplies	18.87	18.87	18.87
Need (Demand-Current Supply)	0.00	2.25	4.93
Water Management Stategies	0.00	0.00	0.00
Water Conservation	0.06	0.19	0.30
Grayson County Water Supply Projects(WTP Expansions and water from GTUA)	0.00	5.00	7.50
Supplemental Wells	0.00	0.00	0.00
Total Water Management Strategies	***0.06***	***5.19***	***7.79***
Reserve (Shortage)	**0.16**	**2.94**	**2.86**

GTUA

Planned Supplies Ac Ft per Year	**2010**	**2020**	**2030**
Projected Demands	**16,037**	**30,134**	**42,683**
		Currently Available Supplies	
Lake Texoma (Potable)	8,000	8,000	8,000
Usable Lake Texoma Raw	5600	5,600	5,600
Supply for Pottsboro (from Denison)	560	560	560
Collin Grayson Municipal Alliance Pipeline Project	1,928	5,400	5,400
Potable Water Available	**10,488**	**13,960**	**13,960**
Currently Available Supplies	**16,088**	**19,560**	**19,560**
Need (demand-Supply)	**0**	**10,574**	**23,123**
		Water Management Strategies	
Conservation (Wholesale Customers)	68	592	1,271
Lake Texoma Pump Station	0	0	0
Additional SEP Supply (Raw)	0	6,726	6,726
Grayson County Water Supply Project (more potable)	200	7,560	10,920
More NTMWD (Current Facilities)	65	0	0
CGMA East-West Pipeline	0	3,255	8,614
Parallel CGMA Pipeline (NTMWD)	0	0	0
Supplies from Strategies	**333**	**18,133**	**27,531**
Total Supplies	**16,421**	**37,693**	**47,091**
Total Potable Supplies	**10,821**	**25,367**	**34,765**
Reserve or (Shortage)	**384**	**7,559**	**4,408**
TOTAL	**8,353**	**29,101**	**37,820**

Planned Supplies MGD	**2010**	**2020**	**2030**
Projected Demands	**16,037**	**30,134**	**42,683**
		Currently Available Supplies	
Lake Texoma (Potable)	7.1	7.1	7.1
Usable Lake Texoma Raw	5.0	5.0	5.0
Supply for Pottsboro (from Denison)	0.5	0.5	0.5

Collin Grayson Municipal Alliance Pipeline Project	1.7	4.8	4.8
Potable Water Available	9.4	12.5	12.5
Currently Available Supplies	14.4	17.5	17.5
Need (demand-Supply)	0.0	9.4	20.6
Water Management Strategies			
Conservation (Wholesale Customers)	0.1	0.5	1.1
Lake Texoma Pump Station	0.0	0.0	0.0
Additional SEP Supply (Raw)	0.0	6.0	6.0
Grayson County Water Supply Project (more potable)	0.2	6.7	9.7
More NTMWD (Current Facilities)	0.1	0.0	0.0
CGMA East-West Pipeline	0.0	2.9	7.7
Parallel CGMA Pipeline (NTMWD)	0.0	0.0	0.0
Supplies from Strategies	0.3	16.2	24.6
Total Supplies	14.7	33.6	42.0
Total Potable Supplies	9.7	22.6	31.0
Reserve or (Shortage)	0.3	6.7	3.9
GTUA TOTAL	**#NAME?**	**#NAME?**	**#NAME?**

DENISON

			Projected Population and Dema
Values in MGD	**2010**	**2020**	**2030**
Projected Population (in City)	**25,000**	**28,000**	**30,000**
Projected Water Demand			
Municipal Water Demand	4.90	5.40	5.70
Manufacturing and Customers	1.26	1.32	1.35
Total Projected Demand	***6.16***	***6.72***	***7.05***
Currently Available Water Supplies			
Lake Randell	1.25	1.25	1.25
Lake Texoma	5.17	5.17	5.17
Trinity Aquifer	0.14	0.14	0.14
Woodbine Aquifer	0.14	0.14	0.14
Total Current Supplies	***6.70***	***6.70***	***6.70***
Need (Demand-Current Supply)	***0.00***	***0.03***	***0.36***
Water Management Strategies			
Water Conservation	0.04	0.13	0.36
2 MGD WTP Expansion and more Texoma	0.00	0.00	0.00
Supplemental Wells	0.00	0.00	0.00
Total Water Management Strategies	***0.04***	***0.13***	***0.36***
Reserve (Shortage)	**0.57**	**0.10**	**0.01**
DENISON TOTAL	***#NAME?***	***6.42***	***6.42***

NTMWD

		MGD	
Planned Supplies MGD	**2010**	**2020**	**2030**
Projected Demands (including losses for Treatment & Delivery)	**387,574**	**492,647**	**580,733**
Existing			
Lake Lavon	*100*	*99*	*98*
Lake Texoma	*69.0*	*69.0*	*69.0*
Lake Chapman	*42*	*42*	*42*
Wilson Creek Reuse	*45*	*54*	*64*
Lake Bonham	*5*	*5*	*5*
East Fork Reuse (with Ray Hubbard Pass through)	*46*	*60*	*78*
Interim GTUA	*14*	*0*	*0*

Upper Sabine Basin	*44*	*26*	*9*
Direct Reuse for Irrigation (Collin & Rockwall Co)	*2*	*2*	*2*
Total Available Supplies	*367*	*358*	*366*
Need (Demand-Supply)	*0*	*82*	*152*
Water Management Strategies	*0*	*0*	*0*
Conservation (Wholesale Customers)	*5*	*24*	*41*
Texoma Pump Station Expansion	*0*	*0*	*0*
Additional Direc Reuse-Rockwall County Irrigation	*0*	*0*	*0*
Renewed Interim GTUA	*0*	*20*	*20*
Main Stem PS (additional East Fork)	*0*	*31*	*13*
Chapman Booster Pump Station	*0*	*0*	*0*
Planned Supplies	*0*	*0*	*0*
Lower Bois d'Arc Creek Res.	*0*	*50*	*107*
Additional Lake Texoma-Blend with new supplies	*0.00*	*0.00*	*61.76*
Fannin County Water Supply System	*0*	*0*	*0*
Marvin Nichols	*0*	*0*	*78*
Toledo Bend Phase 1	*0*	*0*	*0*
Oklahoma	*0*	*0*	*0*
Total Supplies from Strategies	***5***	***125***	***321***
Total Supplies	***372***	***483***	***687***
Reserve or (Shortage)	***26***	***43***	***169***
NWTMD TOTAL	***#NAME?***	***#NAME?***	***#NAME?***

TXU

Water Rights	16400	acre feet per year
	14.64	mgd

RRA

Water Rights	2250	acre feet per year
	2.01	mgd

Chloride and TDS Co

Chloride Concentr

Plan			
	1	**5**	**10**
Without	540	428	410
With	512	406	388

TDS Concentrat

Plan			
	1	**5**	**10**
Without	1000	1000	1000
With	1000	1000	1000

*For TDS concentrations above 1000, the water would be treated so the

UNCERTAINTY

	DIST	L	M	
#NAME?	TRIAN		$0.34	$0.43
#NAME?	TRIAN		$1.58	$1.97
#NAME?	TRIAN		12%	15%

	DIST	L	M	
#NAME?	TRIAN		$3,200,000	$4,000,000
#NAME?	TRIAN		$0.80	$1.00
#NAME?	TRIAN		0.90	1.00

	DIST	L	M	
#NAME?	TRIAN		55%	61%
#NAME?	TRIAN		65%	72%

	DIST	L	M	
#NAME?	TRIAN		48%	53%
#NAME?	TRIAN		33%	37%

	DIST	L		M
#NAME?	TRIAN		$0.18	$0.23

	DIST	L		M
#NAME?	TRIAN		$0.06	$0.07

nd		
2040	**2050**	**2060**
57700	67000	80000
14348	16586	19804
15494	16894	18700
29842	***33480***	***38504***
4083	4083	4083
3463	3463	3463
8000	8000	8000
5600	5600	5600
21146	***21146***	***21146***
8696	***12334***	***17358***
958	1513	1968
8400	14000	19600
0	0	0
9358	***15513***	***21568***
662	**3179**	**4210**

nd

2040	2050	2060
57700	67000	80000
12.80	14.80	17.67
13.83	15.08	16.69
26.63	29.88	34.36
0.00	0.00	0.00
3.64	3.64	3.64
3.09	3.09	3.09
7.14	7.14	7.14
5.00	5.00	5.00
18.87	18.87	18.87
7.76	11.01	15.49
0.00	0.00	0.00
0.85	1.35	1.76
7.50	12.49	17.49
0.00	0.00	0.00
8.35	***13.84***	***19.25***
0.59	**2.84**	**3.76**

	DIST	L	M	
#NAME?	TRIAN		6.43	7.14

2040	2050	2060
52,299	**63,409**	**76,316**

8,000	8,000	8,000
5,600	5,600	5,600
560	560	560
5,400	5,400	5,400
13,960	**13,960**	**13,960**
19,560	**19,560**	**19,560**
32,739	**43,849**	**56,756**

2,176	3,457	4,958
0	0	0
6,726	6,726	6,726
13,440	19,040	24,640
0	0	0
11,400	11,400	11,400
2,792	9,204	16,012
36,534	**49,827**	**63,736**
56,094	**69,387**	**83,296**
43,768	**57,061**	**70,970**
3,795	**5,978**	**6,980**
45,918	**57,930**	**70,338**

2040	2050	2060
52,299	**63,409**	**76,316**

7.1	7.1	7.1
5.0	5.0	5.0
0.5	0.5	0.5

4.8	4.8	4.8
12.5	12.5	12.5
17.5	17.5	17.5
29.2	39.1	50.7

1.9	3.1	4.4
0.0	0.0	0.0
6.0	6.0	6.0
12.0	17.0	22.0
0.0	0.0	0.0
10.2	10.2	10.2
2.5	8.2	14.3
32.6	44.5	56.9
50.1	61.9	74.3
39.1	50.9	63.3
3.4	5.3	6.2
#NAME?	**#NAME?**	**#NAME?**

	DIST	L	M	
#NAME?	TRIAN	6.71		7.45
#NAME?	TRIAN	23.37		25.97
#NAME?	TRIAN	30.38		33.75
#NAME?	TRIAN	36.88		40.98
#NAME?	TRIAN	46.53		51.70
#NAME?	TRIAN	56.49		62.77

ınd

2040	**2050**	**2060**
31,000	**32,000**	**33,000**
5.79	5.95	6.14
1.39	1.44	1.50
7.19	***7.39***	***7.64***
1.25	1.25	1.25
5.17	5.17	5.17
0.14	0.14	0.14
0.14	0.14	0.14
6.70	***6.70***	***6.70***
0.49	***0.69***	***0.94***
0.48	0.54	0.61
1.00	1.00	1.00
0.00	0.00	0.00
1.48	***1.54***	***1.61***
0.99	**0.85**	**0.66**
#NAME?	***7.42***	***7.42***

	DIST	L	M	
#NAME?	TRIAN	5.78		6.42
#NAME?	TRIAN	6.68		7.42

2040	**2050**	**2060**
667,711	**736,064**	**789,466**
97	*95*	*94*
69.0	*69.0*	*69.0*
42	*42*	*42*
64	*64*	*64*
5	*5*	*5*
91	*91*	*91*
0	*0*	*0*

8	*8*	*8*
2	*2*	*2*
378	*377*	*376*
217	*280*	*328*
0	*0*	*0*
53	*63*	*72*
0	*0*	*0*
0	*0*	*0*
20	*0*	*0*
0	*0*	*0*
0	*0*	*0*
0	*0*	*0*
105	*103*	*101*
61.13	*100.84*	*100.84*
0	*0*	*0*
78	*156*	*156*
0	*89*	*89*
0	*0*	*45*
317	***512***	***564***
695	***890***	***940***
99	***233***	***235***
#NAME?	***#NAME?***	***#NAME?***

	DIST	L	M	
#NAME?	TRIAN		62.09	68.98
#NAME?	TRIAN		62.09	68.98
#NAME?	TRIAN		117.67	130.74
#NAME?	TRIAN		117.10	130.11
#NAME?	TRIAN		152.84	169.83
#NAME?	TRIAN		152.84	169.83

ncentration Tables

rations (mg/L)

Percent of Time Equalled or Exceeded

20	50	52	59	80	90	95	99
387	335	319	300	254	228	207	162
367	302	300	296	240	216	196	153

ions (mg/L)

Percent of Time Equaled or Exceeded

20	41	42	50	80	90	95	99
1000	1000	1000	948	737	642	569	474
1000	1000	993	940	731	636	565	470

end product would have a TDS concentration of 1000.

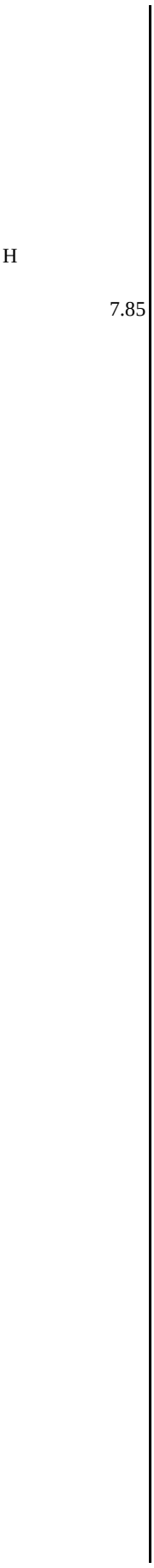
H	
	$0.52
	$2.36
	18%
H	
	$4,800,000
	$1.20
	1.10
H	
	67%
	79%
H	
	58%
	41%

H

$0.28

H

$0.08


H
7.85

H

8.20
28.57
37.13
45.08
56.87
69.05

H

7.06
8.16

H

75.88
75.88
143.81
143.13
186.81
186.81