Appendix A: Cost Analysis Data

Cost Analysis Data

Two different concentrate volumes were examined; the year 2020 volume of 10 mgd and the year 2035 volume of 30 mgd. The cost estimates are considered "planning level." The estimates give an order of magnitude and do not give construction costs. Tools developed during CASS Phase II were used for estimates of the RO facilities, pipelines and evaporation ponds. Other costs were fond on the Web, by direct contact and other listed sources including Mike Mickley's Report #69. All costs are in 2008 dollars.

Evaporation ponds
RO & MF facilities
Pipelines
CASS II "Design&BuildROwithEvapPonds" Excel spread sheet*
CASS II "Design&BuildROwithEvapPonds" Excel spread sheet*
CASS II "Design&BuildROwithEvapPonds" Excel spread sheet*

Wetlands CH2MHill Technical Memorandum**
Brine Concentrator Report No. 69, Mike Mickley***

Lime Softening PBS&J, 1991 Water Supply Cost Estimates****
Deep Well Disposal PBS&J, 1991 Water Supply Cost Estimates****

VSEP Personal E-Mail, Josh Miller sales, New Logic Research, Inc.

O&M Costs:

Pump Plant 3% of plant cost + electricity Concentrator 6% of plant cost + electricity

Pipe line 0.5% of pipeline cost

Evap pond 0.5% of pond cost + replacement Soften Plant 3% of plant cost + chemicals

RO/MF CASS II "Design&BuildROwithEvapPonds" Excel spread sheet*

Electricity \$.077 kilowatt/hr

Chemicals

Lime Ca(OH)²\$150.00 ton (www.exporters.sg)

Soda Na²CO³ \$150.00 ton estimated

Removal & hauling \$9.62 ton

Land Costs CASS II "Design&BuildROwithEvapPonds" Excel spread sheet*

Interest Rate 4.875% Reclamations construction interest rate for 2008

Cost Index Reclamation Construction Cost Trends (composite rate1 st Qtr/2008)

^{*} Information for spread sheet came from; "Membrane Concentrate Disposal: Practices and Regulation - Program Report No. 69", Michael Mickley, September 2001 and "Reverse Osmosis Treatment of Central Arizona Project Water for the City of Tucson", Reclamation, January 2004

^{** &}quot;Preliminary Analysis of a Conceptual Wetland System for Managing Membran Concentrate", CH2M Hill, March 2008

 $^{^{***}}$ "Membrane Concentrate Disposal: Practices and Regulation - Program Report No. 69", Michael Mickley, September 2001

^{****} UEC Water Supply Plan – Support Document, Chapter 9 Water Quality and Treatment, 2004

^{*****} Land Costs research done by Steve Augustine, Economist, Reclamation

Regional Plan 1. Pipeline to Yuma

Length of Pipe	(miles)
Farm land	71
West desert	69
Canal ROW	34
Towns	4
Total	178

10 MGD pipeline to Yuma

Concentrate	Miles of 24"		
<u>10 mgd</u>	pipeline	Cost per mile	<u>Cost</u>
congested	4	\$835,392	\$3,341,568
uncongested	174	\$694,624	\$120,864,576
Capital Costs			\$124,206,144
NEPA		10%	\$12,420,614
Engineering		20%	\$24,841,229
Mobilization		5%	\$6,210,307
Construction Ma	anagement	25%	\$31,051,536
Contingencies		40%	\$49,682,458
Total Pipeline C	osts		\$248,412,288

<u>Easement</u>	<u>feet</u>	<u>acres</u>	cost per acre	total cost
Farm land	373,771	429	\$24,770	\$10,626,886
West Desert	363,211	417	\$2,477	\$1,032,665
Canal ROW	179,890	206	\$24,770	\$5,114,536
Towns	21,120	24	\$38,107	\$923,806
			Total easement	\$17,697,894

Total Capital Costs	\$266,110,182
---------------------	---------------

O&M		\$621,031
	Interest Rate	4.875%
	Years	50
	Annualized Capital	\$ (14,296,046)
	Annual O&M	\$ (621,031)
	Annualized Costs	\$ (14 917 077)

Regional Plan 1. Pipeline to Yuma

•	ipeline to Yum	a		
Concentrate 30 mgd	Miles of 42" pipeline	Cost per mile	<u>Cost</u>	
congested	4	\$1,880,691	\$7,522,766	
uncongested		\$1,573,294	\$273,753,178	
Capital Cost		ψ1,070,201	\$281,275,944	
NEPA	-	10%	\$28,127,594	
Engineering		20%	\$56,255,189	
Mobilization		5%	\$14,063,797	
	Management	25%	\$70,318,986	
Contingencie		40%	\$112,510,378	
Total Pipeline		Ī	\$562,551,888	
		<u>*</u>		
Easement	<u>feet</u>	acres	cost per acre	cost
Farm land	373,771	429	\$24,770	\$10,626,886
West Desert	363,211	417	\$2,477	\$1,032,665
Canal ROW	179,890	206	\$24,770	\$5,114,536
Towns	21,120	24	\$38,107	\$923,806
		-	Total easement	\$17,697,894
		_		
Total Capital	Costs		\$580,249,781	
		Г		
O&M			\$1,406,380	
	Interest Rate		4.875%	
	Years		50	
	Annualized Capita	al	\$ (31,172,342)	
	Annual O&M		\$ (1,406,380)	
	Annualized Costs	,	\$ (32,578,722)	

Regional Plan 2. Evaporation Ponds East of Gila Bend

10 MGD Evap Ponds Coost per mile uncongreed 45 \$943,976 \$42,478,929						
Concentrate Miles of 24 10 10 mad pipeline Cost pair mile Uncongrested 45 \$943,976 \$42,478,929	10 MGD Evap Pond					
Description Description						
Pumping Plant Lump Sum S1,100,000	10 mgd pipeline	Cost per mile				
Pumping Plant Lump Sum S1,100,000	uncongested 45	\$943 976	\$42 478 929			
Easement faet	uncongested	ψο 10,07 0	ψ12,110,020			
Easement faet			* 4.400.000			
Farm land 83,107 95 \$2,477 \$2,362,865 \$436,094 \$2,798,959 Note: easement is assumed to be 50 feet wide	Pumping Plant	Lump Sum	\$1,100,000			
Farm land 83,107 95 \$2,477 \$2,362,865 \$436,094 \$2,798,959 Note: easement is assumed to be 50 feet wide						
Section 153,384 176 \$2,477 \$436,094 \$2,798,959 Note: easement is assumed to be 50 feet wide		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
Evaporation Ponds	· ·					
Size (miles Total Land 3.63	West Desert 153,384	176	\$2,477	\$436,094	=	
Size (miles*)		easement		\$2,798,959	Note: easement is ass	sumed to be 50 feet wide
Size (miles*)						
Accest						
Land cost \$16,195 \$51,170,440 Earthwork \$12,385 \$39,130,336 Liner \$0.0136 \$165,031,550 Other** \$25,533,233 **Monitoring wells, etc. Sub-total Evap Ponds \$324,444,448 Sub-total pipe, pump & ponds \$324,444,449 Engineering 20% \$4,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ***Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4,875% Years 50						
Land cost	3.63 4.94					
Land cost		lin **			*! :	:
Earthwork \$12,385 \$39,130,336 Liner \$0.0136 \$165,031,550 Other** \$25,533,233 **Monitoring wells, etc. Sub-total Evap Ponds \$280,865,559 Sub-total pipe, pump & ponds \$324,444,488 NEPA 10% \$32,444,449 Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ***Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4,875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)		<u>iiner"</u>	ME4 170 215		"Liner thickness is 120	mili
Liner Other** \$0.0136 \$165,031,550 \$25,532,233 ***Monitoring wells, etc. Sub-total Evap Ponds \$280,865,559\$ Sub-total pipe, pump & ponds \$324,444,488 NEPA 10% \$324,444,449 Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$64,888,8976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Killowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Other** \$25,533,233 **Monitoring wells, etc. Sub-total Evap Ponds \$280,865,559 Sub-total pipe, pump & ponds \$324,444,488 NEPA 10% \$32,444,449 Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4,875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Sub-total Evap Ponds \$280,865,559 Sub-total pipe, pump & ponds \$324,444,488 NEPA 10% \$32,444,449 Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 ****Liner is replaced after 25 years O&M \$3,496,884 ***Cost kw-hr \$3,496,884 Interest Rate 4,875% Years 50 Annualized Capital \$ (35,010,163) Annual C&M \$ (5,255,803)		\$0.0136	\$165,031,550			
Sub-total pipe, pump & ponds \$324,444,488 NEPA 10% \$32,444,449 Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ***Liner is replaced after 25 years O&M \$3,3496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Other**		\$25,533,233		**Monitoring wells, etc.	
NEPA	Sub-total Evap Ponds		\$280,865,559			
NEPA	Cult total mina museum 8 manuals		¢224 444 400			
Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ***Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Sub-total pipe, purip & ponds		\$324,444,488			
Engineering 20% \$64,888,898 Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ***Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	NEPA	10%	\$32 444 449			
Mobilization 5% \$16,222,224 Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Construction Management 25% \$81,111,122 Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Contingencies 40% \$129,777,795 Total pipe, pump & ponds \$648,888,976 Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost 10,000,000 100 6944 175 131 0.077 \$888,242 Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Energy Costs Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost	=					
Energy Costs Flow (gal/d)	=	40%				
Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost	Total pipe, pump & ponds		\$648,888,976			
Flow (gal/d) Head (ft) Q (gpm) Horse Power Kilowatts Cost kw-hr Yearly cost	Enorgy Costs					
10,000,000 100 6944 175 131 0.077 \$88,242 Total Capital Costs Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 ****Liner is replaced after 25 years Interest Rate 4.875% 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)		Q (apm)	Horse Power	Kilowatts	Cost kw-hr	Yearly cost
Total Capital Costs \$651,687,935 Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)						
Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years Salva			170	101	0.077	Ψ30,Z1Z
Annualized replacement liner*** \$1,758,919 ****Liner is replaced after 25 years Salva	10,000,000					
O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	10,000,000					
O&M \$3,496,884 Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)			\$651,687,935			
Interest Rate 4.875% Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Total Capital Costs					
Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Total Capital Costs				***Liner is replaced aft	er 25 years
Years 50 Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Total Capital Costs Annualized repla		\$1,758,919		***Liner is replaced aft	er 25 years
Annualized Capital \$ (35,010,163) Annual O&M \$ (5,255,803)	Total Capital Costs Annualized repla		\$1,758,919 \$3,496,884		***Liner is replaced aft	er 25 years
Annual O&M \$ (5,255,803)	Total Capital Costs Annualized repla O&M Interest Rate		\$1,758,919 \$3,496,884 4.875%		***Liner is replaced aft	er 25 years
	Total Capital Costs Annualized repla O&M Interest Rate Years	acement liner***	\$1,758,919 \$3,496,884 4.875% 50		***Liner is replaced aft	er 25 years
Annualized Costs \$ (40,265,966)	Total Capital Costs Annualized repla O&M Interest Rate Years Annualized Capital	acement liner***	\$1,758,919 \$3,496,884 4.875% 50 \$ (35,010,163)		***Liner is replaced aft	er 25 years
	Total Capital Costs Annualized repla O&M Interest Rate Years Annualized Capital	acement liner***	\$1,758,919 \$3,496,884 4.875% 50 \$ (35,010,163)		***Liner is replaced aft	er 25 years

Regional Plan 2. Evaporation Ponds East of Gila Bend

30 mgd	Miles of 42" pipeline	Cost per mile				
uncongested		15 \$1,573,294	\$70,798,236			
				· 1		
Pumping Plant		Lump Sum	\$3,300,000			
Easement	<u>feet</u>	<u>acres</u>	cost per acre	total cost		
Farm land	83,107	95	\$24,770	\$2,362,865		
West Desert	153,384	176	\$2,477	\$436,094	_	
		easement		\$2,798,959	Note: easement is as	ssumed to be 50 feet wide
Evaporation F	Ponds_					
Size (miles ²)						
10.90	14.82					
	<u>acre</u>	<u>liner*</u>			*Liner thickness is 12	0 mill
Land cost	\$16,195		\$153,652,285			
Earthwork	\$12,385		\$117,498,806			
Liner	,	\$0.0136	\$495,549,282			
Other**			\$76,670,037		**Monitoring wells, et	C.
Sub-total Eva	p Ponds		\$843,370,411		· ·	
			, , ,			
Sub-total pipe	e, pump & ponds		\$917,468,647			
	e, pump & ponds					
NEPA	e, pump & ponds	10%	\$91,746,865			
NEPA Engineering	e, pump & ponds	10% 20%	\$91,746,865 \$183,493,729			
NEPA Engineering Mobilization		10% 20% 5%	\$91,746,865 \$183,493,729 \$45,873,432			
NEPA Engineering Mobilization Construction	Management	10% 20% 5% 25%	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162			
NEPA Engineering Mobilization Construction I	Management s	10% 20% 5%	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459			
NEPA Engineering Mobilization Construction I	Management s	10% 20% 5% 25%	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162			
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu	Management s mp & ponds	10% 20% 5% 25% 40%	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294	Kilonovi	To continue	- Venderent
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d)	Management s mp & ponds Head (ft)	10% 20% 5% 25% 40% Q (gpm)	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power	Kilowatts	Cost kw-hr	Yearly cost
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu	Management s mp & ponds	10% 20% 5% 25% 40%	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294	Kilowatts 392	Cost kw-hr 0.077	Yearly cost \$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000	Management s mp & ponds Head (ft)	10% 20% 5% 25% 40% Q (gpm)	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power			<u> </u>
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000	Management s mp & ponds Head (ft) 100 Costs	10% 20% 5% 25% 40% Q (gpm) 20833	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526 \$1,837,736,253		0.077	\$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d)	Management s mp & ponds Head (ft) 100 Costs	10% 20% 5% 25% 40% Q (gpm)	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526			\$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000 Total Capital (Management s s mp & ponds Head (ft) 100 Costs Annualized rep	10% 20% 5% 25% 40% Q (gpm) 20833	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526 \$1,837,736,253 \$5,281,604 \$10,216,174		0.077	\$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000 Total Capital (Management s Imp & ponds Head (ft) 100 Costs Annualized rep	10% 20% 5% 25% 40% Q (gpm) 20833	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526 \$1,837,736,253 \$5,281,604 \$10,216,174		0.077	\$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000 Total Capital (Management s Imp & ponds Head (ft) 100 Costs Annualized rep Interest Rate Years	10% 20% 5% 40% 40% Q (gpm) 20833	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526 \$1,837,736,253 \$5,281,604 \$10,216,174 4.875% 50		0.077	\$264,726
NEPA Engineering Mobilization Construction I Contingencies Total pipe, pu Energy Costs Flow (gal/d) 30,000,000 Total Capital (Management s Imp & ponds Head (ft) 100 Costs Annualized rep	10% 20% 5% 40% 40% Q (gpm) 20833	\$91,746,865 \$183,493,729 \$45,873,432 \$229,367,162 \$366,987,459 \$1,834,937,294 Horse Power 526 \$1,837,736,253 \$5,281,604 \$10,216,174		0.077	\$264,726

Regional Plan 3. Brine Concentrator/Evaporation Pond

	Miles of 24" pipeline	Cost per mile			
uncongested	28.11	\$943,976	\$26,535,171		
Pipeline costs		Γ	\$26,535,171		
			\$20,000,111		
Brine Conce	entrator Costs				
3 mgd 2001*	3 mgd 2008	# of BC's**	10 mgd		* Mike Mickly's Report No. 69
\$20,000,000	\$27,179,487	10	\$90,598,291		**Each BC is 700 gpm or 1mgd
Brine Concentr	ator Costs		\$90,598,291		
		-			
land_	<u>acres</u>	cost per acre t	otal cost		
BC Facilities	30	\$16,195	\$485,864		
	5 .				
Evaporation					
Size (acres ²)	Total Land				
140	190				
	<u>acre</u>	liner***			***Liner thickness is 120 mill
Land cost	\$16,195		\$3,083,618		Elito. Unortidod to 120 thiii
Earthwork	\$12,385		\$1,733,868		
Liner	ψ12,000	\$0.0136	\$9,945,083		
Other***		ψυ.υ 130	\$1,476,257		****Monitoring wells, etc.
	Dondo	Г	1		Monitoring wells, etc.
Sub-total Evap	Folius		\$16,238,826		
Easement Page 1	<u>feet</u>	<u>acres</u>	cost per acre	total cost	
Farm land	108,293	124	\$38,107	\$4,736,815	
West Desert	40,128	46	\$16,195	\$745,973	_
		easement		\$5,482,788	Note: easement is assumed to be 50 feet wide
Sub-total Pipe,	BC & Pond		\$133,372,288		
NEPA		10%	\$13,337,229		
Engineering		20%	\$26,674,458		
Mobilization	_	5%	\$6,668,614		
Construction M	lanagement	25%	\$33,343,072		
Contingencies		40%	\$53,348,915		
Total Pipe, BC	& Pond		\$267,230,441		
Total Capital C	nete	Г	\$272,713,229		
i otai Oapital O	UUIO		ΨΕΙΣ,Ι 13,229		
Energy Cos	ts	*85 kw-hr per 1000 g	al of feed water		
* ` '	electricity (kw-hr)	Daily Cost	Yearly cost		
850,000	0.077	\$65,450	\$23,889,250		
	Annualized replac	cement liner***	\$105,995		***Liner is replaced after 25 years
O&M			\$5,755,762		
			\$5,100,10 <u>2</u>		
Total O&M		Γ	\$29,751,007		
			,,		
	Interest Rate		4.875%		
	Years		50		
	Annualized Capit	al	\$ (14,650,777)		
	Annual O&M		\$ (29,751,007)		

Regional Plan 3. Brine Concentrator/Evaporation Pond

<u>28.11</u>	Cost per mile \$1,573,294	\$44,225,298		
20	ψ1,070,201			
		\$44,225,298		
		Ψ44,223,296		
trator Costs				
3 mgd 2007	# of BC's**	<u>10 mgd</u>		* Mike Mickly's Report No. 69
\$26,949,153	30	\$269,491,525		**Each BC is 700 gpm or 1mgd
or Costs		\$269,491,525		3.
res	cost per acre t	otal cost		
50	\$16,195	\$809,774		
570				
acre	liner***			***Liner thickness is 120 mill
		\$0 228 820		Enter anomioso to 120 mili
φυ,τ 10	\$0.0136			
	ψυ.υ 130			****Monitoring wells, etc.
onde	Г	1		mornoring wond, etc.
unus		φ45,520,673		
<u>et</u>	acres o	ost per acre	total cost	
108,293	124	\$38,107	\$4,736,815	
40,128	46	\$16,195	\$745,973	
_	easement		\$5,482,788	Note: easement is assumed to be 50 feet wide
•				
C & Pond		\$359,243,696		
	1001	#05.004.0 ==		
nagement				
	40%			
Pond		\$719,297,166		
ts	Г	\$724 770 054		
		ψ1 2 1 ,1 1 3,304		
	*85 kw-hr per 1000 g	al of feed water		
optrioit : (le : 1-1	Della Carri	Vasition		
	-			
U.U//	\$19b,35U	\$/1,66/,/50		
nualized replac	cement liner****	\$317 229		*****Liner is replaced after 25 years
		\$.5,7 <i>0</i> 7,040		
	Г	\$88,692,828		
		4.875%		
		50		
-				
nnual O&M		\$ (88,692,828)		
	Fonds Total Land 570 acre \$16,195 \$5,716 onds et 108,293 40,128 C & Pond hagement Pond ets ectricity (kw-hr) 0.077 nnualized replace terest Rate ears	Fonds Total Land 570 acre liner*** \$16,195 \$5,716 \$0.0136 onds et acres 108,293 124 40,128 46 easement C & Pond 10% 20% 5% hagement 25% 40% Pond sts *85 kw-hr per 1000 g ectricity (kw-hr) Daily Cost 0.077 \$196,350 nnualized replacement liner*****	Ponds Total Land 570 acre liner*** \$16,195 \$9,228,828 \$5,716 \$2,395,025 \$0.0136 \$29,764,213 \$4,138,807 onds \$45,526,873 et acres cost per acre 108,293 124 \$38,107 40,128 46 \$16,195 easement C & Pond \$359,243,696 10% \$359,243,696 10% \$35,924,370 20% \$71,848,739 5% \$17,962,185 9,889,810,924 40% \$143,697,478 Pond \$719,297,166 ectricity (kw-hr) Daily Cost Yearly cost 0.077 \$196,350 \$71,667,750 nnualized replacement liner***** \$317,229 \$16,707,849 terest Rate 4.875% ears 50	Ponds Total Land 570 acre liner**** \$16,195

Regional Plan 4. Softening/RO/VSEP/Evap Ponds

10 MGD pipeline to So Concentrate Miles of 24"	_	P/Evap Ponds		
10 mgd pipeline	Cost per mile			
uncongested 28.11	\$943,976	\$26,535,171	7	
Pipeline costs sub-total		\$26,535,171		
O&M Pipeline sub-total		\$132,676]	
Softening Facilities*	10 mgd Facility \$13,000,000	1		* Lime and soda ash precipitation of hardness
Softening Facility Costs sub-to		\$13,000,000]	
Chemicals Soda Na ₂ CO ₃	Lime Ca(OH) ₂	sludge (disp)		
Tons 22	7	58		
Cost (day) \$3,300	\$1,050	\$500		
Cost (annual) \$1,204,500	\$383,250	\$182,500		
Chemical & Sludge Disposal s	ub-total	\$1,770,250	!	
O&M facility, chemical & sludg	e sub-total	\$2,160,250]	
Secondary RO Facility (10 mgd)			
65% recovery		Size (MGD)	Cost	
MF Portion of Facility		10	\$16,560,000	
RO Portion of Facility		10	\$12,410,000	
•	MF/RO facility Cap		\$28,970,000	
				•
	O&M MF/RO facili	ty sub-total	\$1,760,000	
	_			•
VSEP Facility (3.5 mgd)				
50% recovery	Cost 1mgd**		Cost 3.5 mgd	** Quote from New Logic Research, Inc.
	\$7,900,000		\$27,650,000	
	VSEP facility Capi	tal sub-total	\$27,650,000	
	O&M VSEP facility	sub-total	\$1,659,000	
Evaporation Bondo /4 7	5 mad)	Sizo (20122 ²)	Total	
Evaporation Ponds (1.75	o mgaj	Size (acres ²) 407	Total Land 554	
acre	liner***	407	554	***Liner thickness is 120 mill
Land cost \$16,195		\$8,964,518		
Earthwork \$5,716		\$2,326,432		
Liner	\$0.0136	\$28,911,777		
Other****	*****	\$4,020,273		****Monitoring wells, etc.
Sub-total Evap Ponds		\$44,223,000	1	
] •	
O&M evap ponds sub-total		\$221,115]	
O&M evap ponds sub-total	cost per acre]	
O&M evap ponds sub-total land acres Softening,	cost per acre	\$221,115	1]]	
O&M evap ponds sub-total land acres Softening, RO, VSEP		\$221,115]]	
O&M evap ponds sub-total land acres Softening,	cost per acre \$16,195	\$221,115]]	
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20	\$16,195	\$221,115 total cost \$323,909]	
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities facilities 20	\$16,195 acres	\$221,115 total cost \$323,909 cost per acre	total cost	
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293	\$16,195 <u>acres</u> 124	\$221,115 total cost \$323,909 Cost per acre \$38,107	total cost \$4,736,815	
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities facilities 20	\$16,195 <u>acres</u> 124 46	\$221,115 total cost \$323,909 cost per acre	total cost \$4,736,815 \$745,973	Note: easement is assumed to be 50 feet wirde
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293	\$16,195 <u>acres</u> 124	\$221,115 total cost \$323,909 Cost per acre \$38,107	total cost \$4,736,815 \$745,973	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293	\$16,195 acres 124 46 easement	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195	total cost \$4,736,815 \$745,973	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RC	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RC NEPA Engineering	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20%	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total land acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA Engineering Mobilization	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5%	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total Iand	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 25%	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total and acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RC NEPA Engineering Mobilization Construction Management Contingencies	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 40%	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$28,075,634 \$35,094,543 \$56,151,269	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total Iand	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 40%	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total and acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RC NEPA Engineering Mobilization Construction Management Contingencies	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 40%	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$28,075,634 \$35,094,543 \$56,151,269	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total Iand	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 40% Pond	\$221,115 total cost \$323,909 cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,289 \$280,756,343	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total Iand acres Softening, RO, VSEP, Rodition Facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA Engineering Mobilization Construction Management Contingencies Total Capital Costs Annual energy	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 \$, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,269 \$280,756,343	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total Iand	\$16,195 acres 124 46 easement 0, VSEP, Evap Pond 10% 20% 5% 40% Pond	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$\$6,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	Note: easement is assumed to be 50 feet wide
O&M evap ponds sub-total Iand acres Softening, RO, VSEP, Rodition Facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA Engineering Mobilization Construction Management Contingencies Total Capital Costs Annual energy	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 \$, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,269 \$280,756,343	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total Iand	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$\$6,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total and acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA Engineering Mobilization Construction Management Contingencies Total Capital Costs Annual energy Annualized rep Total O&M Costs	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144 \$6,902,831	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total Ind	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144 \$6,902,831	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total Iand	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$\$6,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144 \$6,902,831 4.875% 50	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	
O&M evap ponds sub-total and acres Softening, RO, VSEP facilities 20 Easement feet Farm land 108,293 West Desert 40,128 Subtotal Capital Softening, RO NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep Total O&M Costs Interest Rate Years Annualized Capital Capit	\$16,195 acres	\$221,115 total cost \$323,909 Cost per acre \$38,107 \$16,195 s, Pipe \$14,037,817 \$28,075,634 \$7,018,909 \$35,094,543 \$56,151,269 \$280,756,343 \$286,563,041 \$661,646 \$308,144 \$6,902,831 4.875% 50 \$ (15,394,821)	total cost \$4,736,815 \$745,973 \$5,482,788 \$140,378,172	

Regional Plan 4. Softening/RO/VSEP/Evap Ponds

	, , , , , , , , , , , , , , , , , , , ,	D/E F :		
30 MGD pipeline to So	ftening/RO/VSE	P/Evap Ponds		
Concentrate Miles of 42" 10 mgd pipeline	Cost per mile			
uncongested 28.11	\$1,573,294	\$44,225,298		
Pipeline costs sub-total	ψ1,010,23 4	\$44,225,298	Ī	
r ipeline costs sub-total		ψ44,223,230		
O&M Pipeline sub-total		\$221,126		
2 2 i pomio dub total		Ψ221,120		
Softening Facilities*	30 mgd Facility			* Lime and/or soda ash precipitation of hardness
	\$27,000,000	ı <u></u>	_	
Softening Facility Costs sub-to-	otal	\$27,000,000		
			_	
Chemicals Soda Na ₂ CO ₃	Lime Ca(OH) ₂	<u>sludge</u>		
Tons 66	21	174		
Cost (day) \$9,900	\$3,150	\$1,500		
Cost (annual) \$3,613,500	\$1,149,750	\$547,500		
Chemical & Sludge Disposal s	sub-total	<u>\$5,310,750</u>		
O&M facility, chemical & slud	an out total	\$6,120,750	1	
Odivi facility, chemical & sidu	je sub-total	\$6,120,730	L	
Secondary RO Facility (30 mad)			
65% Recovery		Size (MGD)	Cost	
MF Portion of Facility		30	\$35,730,000	
RO Portion of Facility		30	\$34,000,000	
	MF/RO facility Cap	ital Sub-total	\$69,730,000	
				•
	O&M MF/RO facilit	y sub-total	\$5,150,000	
				-
VSEP Facility (10.5 mgd	<u>(t</u>			
50% Recovery	Cost 1mgd**		-	** Quote from New Logic Research, Inc.
	\$7,900,000		\$82,950,000	•
	VSEP facility Capit	al sub-total	\$82,950,000	
				•
	O&M VSEP facility	sub-total	\$4,977,000	
Francisco B 1 (5.5	5 ()	2.		
Evaporation Ponds (5.2	<u>o mga)</u>	Size (acres ²)	Total Land	
	lie***	1221	1661	***I iner thickness is 120 mill
acre Land cost \$16.195	liner***	¢26 002 EFF		***Liner thickness is 120 mill
Land cost \$16,195 Earthwork \$5,710		\$26,893,555 \$6,971,759		
Liner	\$0.0136	\$86,735,332		
Other****	ψο.σ.σσ	\$12,060,065		****Monitoring wells, etc.
Sub-total Evap Ponds		\$132,660,711		•
			•	
O&M evap ponds sub-total		\$663,304		
			•	
land acres	cost per acre	total cost	-	
Softening,				
RO, VSEP facilities 20	\$16,195	\$323,909		
	φ10,190	φ3 ∠ 3,303		
Easement feet	acres	cost per acre	total cost	
Farm land 108,293	124	\$38,107	\$4,736,815	
West Desert 40,128	46	\$16,195	\$745,973	
,.20	easement	,		Note: easement is assumed to be 50 feet wide
			, =, . 3=,1 30	
Subtotal Capital Softening, RO	O, VSEP, Evap Ponds	s, Pipe	\$356,566,009	
	,p . Shac	. 1.	,	1
, , , , , , , , , , , , , , , , , , ,				
NEPA	10%	\$35,656,601		
	10% 20%			
NEPA		\$71,313,202		
NEPA Engineering	20%	\$71,313,202 \$17,828,300		
NEPA Engineering Mobilization	20% 5%	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403		
NEPA Engineering Mobilization Construction Management	20% 5% 25% 40%	\$71,313,202 \$17,828,300 \$89,141,502	Ī	
NEPA Engineering Mobilization Construction Management Contingencies	20% 5% 25% 40%	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403	l	
NEPA Engineering Mobilization Construction Management Contingencies	20% 5% 25% 40%	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403	l I	
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe &	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715	l I	
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe &	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715		
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432		*****Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe &	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715		*****Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432 \$20,041,550		*****Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep Total O&M Costs	20% 5% 25% 40% Pond	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432 \$20,041,550	 	*****Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep Total O&M Costs Interest Rate Years	20% 5% 25% 40% Pond costs	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432 \$20,041,550	 	*****Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep Total O&M Costs Interest Rate Years Annualized Ca	20% 5% 25% 40% Pond costs	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432 \$20,041,550 4.875% \$0 \$3,623,028)	 	•••••Liner is replaced after 25 years
NEPA Engineering Mobilization Construction Management Contingencies Total Soft, RO, VSEP, Pipe & Total Capital Costs Annual energy Annualized rep Total O&M Costs Interest Rate Years	20% 5% 25% 40% Pond costs lacement liner*****	\$71,313,202 \$17,828,300 \$89,141,502 \$142,626,403 \$713,132,017 \$718,938,715 \$1,984,938 \$924,432 \$20,041,550	 	•••••Liner is replaced after 25 years

Regional Plan 5. Wetlands Treatment - Surface Discharge into Gila River

	Miles of 24"			
<u>10 mgd</u>	pipeline_	Cost per mile	04.740.004	
uncongested	5	\$943,976	\$4,719,881	1
Pipeline costs	8		\$4,719,881	
Easement	<u>feet</u>	<u>acres</u>	cost per acre	total cost
Farm land	26,400	30	\$38,107	\$1,154,757
		easement		\$1,154,757 Note: easement is assumed to be 50 feet wide
				<u> </u>
Wetland for .	5 mad*		Wetland for 10 mgd	*Preliminary Analysis of a Conceptual Wetland System(CH2M Hill March 7, 2008)
Construction	\$2,900,000		\$58,000,000	
Startup	\$100,000		\$2,000,000	
Other**	,		\$6,000,000	
Wetland cost	s		\$66,000,000	•
Land Costs		<u>acres</u>	cost per acre	Total Cost
Farm land		200	\$38,107	\$7,621,399
		land costs		\$7,621,399
			Ī	
Subtotal wetla	ands & pipe		\$70,719,881	
NEPA		10%	\$7,071,988	
Engineering		20%		
Mobilization		5%		
	Management	25%		
Contingencie	-	40%		
Total wetlands & pipe			\$141,439,762]
			* · · · · , · · · · · · · · · · · ·	1
Total Capital	Costs		\$150,215,919]
	Annual cost remo	oval wetlands	\$176,786	1/3 wetland removed at 12, 24 & 36 years as heavy metals saturate media
	Annual cost repla	acement wetlands	\$1,223,440	1/3 wetland replaced at 12, 24 & 36 years
	O&M Pipeline &	Wetlands	\$353,599	-
Total O&M			\$1,753,825	
	Interest Rate		4.875%	
	Years		50	
	Annualized Capi	tal	\$ (8,069,942)	
	Annual O&M		\$ (1,753,825)	

Regional Plan 5. Wetlands Treatment - Surface Discharge into Gila River

Concentrate		pipeline to Gila		-	
30 mgd	pipeline	Cost per mile			
uncongested	5	\$1,573,294	:	\$7,866,471	
Pipeline costs	S			\$7,866,471	
Easement	feet	acres	cost	per acre	total cost
Farm land	26,400	30		\$38,107	\$1,154,757
		easement			\$1,154,757 Note: easement is assumed to be 50 feet wide
Wetland for .	5 mad*		Wetla	and for 30 mad	*Preliminary Analysis of a Conceptual Wetland System(CH2M Hill March 7, 2008)
Construction	\$2,900,000	ı		\$174,000,000	, a, , a , a , a , a , a , a , a , a ,
Startup	\$100,000			\$6,000,000	
Other**				\$18,000,000	**monitoring wells, etc.
Wetland cost	s			\$180,000,000	
Land Costs		<u>acres</u>	<u>C</u>	ost per acre	Total Cost
Farm land		600		\$38,107	\$22,864,198
		land costs			\$22,864,198
Subtotal wetl	ands & nina			\$187,866,471	
Subtotal Wett	anus & pipe			\$107,000,471	
NEPA		10%	, o	\$18,786,647	
Engineering		20%	b	\$37,573,294	
Mobilization		5%		\$9,393,324	
	Management	25%		\$46,966,618	
Contingencie		40%		\$75,146,588	
Total wetland	ls & pipe			\$375,732,941	
Total Capital	Costs			\$399,751,896	
	Annual cost remo	oval wetlands		\$530,358	1/3 wetland removed at 12, 24 & 36 years as heavy metals saturate media
		acement wetlands		\$3,670,321	1/3 wetland replaced at 12, 24 & 36 years
Normal: O&M Pipeline & Wetlands				\$939,332	
Total O&M				\$5,140,011	
	Interest Rate			4.875%	
	Years			50	
	Annualized Capi	tal	\$	(21,475,584)	
			\$	(E 140 011)	
	Annual O&M		Ф	(5,140,011)	

Regional Plan 6. Deep well Injection Site

10 MGD Pipeline to Injection Well

Concentrate Miles of 24"

10 mgdpipelineCost per mileuncongested50\$943,976

 uncongested
 50
 \$943,976
 \$47,198,810

 Pipeline costs
 \$47,198,810

 Easement
 feet
 acres
 cost per acre
 total cost

 Farm land
 52,800
 61
 \$38,107
 \$2,309,515

 West Desert
 211,200
 242
 \$16,195
 \$3,926,175

easement \$6,235,690 Note: easement is assumed to be 50 feet wide

Injection Well

 Cost per gal/day capacity
 size (gal/day)
 costs

 \$0.69
 10,000,000
 \$6,875,676

 Injection Well costs
 \$6,875,676

 Land Costs
 acres
 cost per acre
 Total Cost

 West Desert
 5
 \$16,195
 \$80,977

 land costs
 \$80,977

Subtotal Capital costs injection well & pipe \$54,074,486

Energy Costs		Annual					
Flow (gal/d)	Head (ft)	Q (gpm)	Horse Power	Kilowatts	Cost kw-hr	Kilowatt-hours	Yearly cost
10,000,000			22000	16412	0.077	143,769,120	\$11,070,222

NEPA \$5,407,449 10% Engineering 20% \$10,814,897 Mobilization 5% \$2,703,724 25% \$13,518,621 Construction Management 40% \$21,629,794 Contingencies Total injection well & pipe \$108,148,972

Total Capital Costs \$114,465,639

Total O&M Costs \$11,306,216

 Interest Rate
 4.875%

 Years
 50

 Annualized Capital
 \$ (6,149,355)

 Annual O&M
 \$ (11,306,216)

 Annualized Costs
 \$ (17,455,572)

Regional Plan 6. Deep well Injection Site

30 MGD Pipeline to Injection Well

Concentrate Miles of 42"

30 mgd pipeline Cost per mile

uncongested 50 \$1,573,294 \$78,664,706

Pipeline costs \$78,664,706

 Easement
 feet
 acres
 cost per acre
 total cost

 Farm land
 52,800
 61
 \$38,107
 \$2,309,515

 West Desert
 211,200
 242
 \$16,195
 \$3,926,175

easement \$6,235,690 Note: easement is assumed to be 50 feet wide

Injection Well

 Cost per gal/day capacity
 size (gal/day)
 costs

 \$0.69
 30,000,000
 \$20,627,027

 Injection Well costs
 \$20,627,027

 Land Costs
 acres
 cost per acre
 Total Cost

 West Desert
 10
 \$16,195
 \$161,955

 land costs
 \$161,955
 \$161,955

Subtotal Capital costs injection well & pipe \$99,291,733

Energy Costs		Annual					
Flow (gal/d)	Head (ft)	Q (gpm)	Horse Power	Kilowatts	Cost kw-hr	Kilowatt-hours	Yearly cost
30,000,000			66000	49236	0.077	431,307,360	\$33,210,667

NEPA \$9,929,173 10% Engineering 20% \$19,858,347 \$4,964,587 Mobilization 5% 25% \$24,822,933 Construction Management 40% \$39,716,693 Contingencies \$198,583,467 Total injection well & pipe

Total Capital Costs \$204,981,112

Total O&M Costs \$33,603,990

 Interest Rate
 4.875%

 Years
 50

 Annualized Capital
 \$ (11,012,053)

 Annual O&M
 \$ (33,603,990)

 Annualized Costs
 \$ (44,616,043)