Appendix 5.3.3-6

Calculation of Overall Heat Transfer
Coefficient(U) and Fouling Factor(f) in Run 5-2

OPERATION CONDITION

FOR

RUN 5-2

1. Operation Period	24th (ct. to 7t	h Nov.
2. Operation Time			230 h
3. Scale Control Method			Hybrid
4. Operation Mode		Recircu	lation
5. Ball Cleaning at F.	Fin B.H of	0.34-0.36	m²K/kW
6. Top Brine Temperature			112°C
7. Flow Rate			
-Make Up Seawater		2.45	m³/h
-Recirculation		6.5	m³/h
-Product Water		0.7	9 m³/h
-Blow Brine		1.6	66 m ³ /h
8. Chenical Consituents of	Brine		
-pH at 25℃			8.12
-M-Alkalinity as CaCO ₃		55 - 6	50 mg/L
-Chloride ion		32,72	20 mg/L
-Concentration factor as	C1-		1.39
9. Dosing Rate of Chemicals			
-Scale Inhibior = PPN(M)			1 mg/L
-Acid = 98% H ₂ SO ₄			72 mg/L

Total Operation Time: 8.0 hr.

Time: 00:00

Date: October 25, 94

Run No. 5-2

Variables	Brine Heater				ű,	Evaporator Stages		4. 			
		*		#2		£ #	*		*		*
Flowrate (kg/h)	6500	0059		6500		6500	0059	2	15500	8	15500
Specific Heat (K)/kg/K)	3.961	3.940	٠.,	3.926		3.912	3.90	8	3.968	88	ж. Э.
inlet Temp. (deg. C)	89.5	76.8		63.3		50.1	37.5	ιń	Ń	31.9	27
Outlet Temp. (deg. C)	112	89.5	v	76.8		63.3	50:1	Σ.		22	M .
Temp. Rise (deg. C)	22.5	12.7		13.5		13.2	12.	9	5.1	5.1	4.9
Flashing Temp. (deg. C)	116	92.4		82.3		8.69	56		Ą	9.	35.7
Heat Transfer Rate (kJ/S)	160.932	90.351		95.690		93.240	88.72	ξi.	87.122	8	83.645
Heat Transfer Area (Sq.m)	4.6723	1.937		1.937		1.937	1.937	4	4.95	92	4.9556
L.M.T.D. (deg. K)	11.899	7.548		10.890	14.5	11.905	11.80	Q	6.8	36	5.5
U (KW/sq.m/K)	2.895	6.180		4.536		4.044	3.88	22	2.572	7.5	2.853
Clean-U Value (kW/sq.m/k)	O. K.	6.6		5.1		5.7	,		•	7.	5.7
f (sq.m KVKW)	0.0891	0.0103		0.0244		0.0512	0.0615	்.	0.1927	22	0.1544

Run No. 5-2	Date: October 25, 94		Time: 04:00		Total Operation Time: 12.0 hr.	lime: 12.0 hr.	
Vociables	Brine Heater			Evaporator Stages			
		***	*	(F)	*	£; ₩	*
Flowrate (kg/h)	6500	6500	6500	6500	9200	15500	15500
Specific Heat (KJ/Kg/10	3.961	3.940	3.925	3.911	3.899	3.967	3.964
Inlet Temp. (deg. C)	88	76.1	62.3	.49	36.2	30.8	27
Outlet Temp. (deg. O	112	68	76.1	62.3	49	35	30.8
Temp. Rise (deg. C)	23	12.9	13.8	13.3	12.8	4.2	33.8
Flashing Temp. (deg. C)	119.5	97.6	87.3	69.1	55.7	39.8	34.5
Heat Transfer Rate (KJ/S)	164.495	91.758	97.794	93.922	90,113	71.731	64.863
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	16.396	7.226	10.650	12.272	11.982	6.681	5.378
U (KW/sq.m/l0	2.147	6.556	4.741	3,951	3.883	2.166	2.434
Clean-U Value (KW/sq.m/k)	3.9	9.9	ri T	5.1	5.1	r.	5.1
f (so m k/kg)	7000	0.000	2	0.30	0.064	3336.0	87760

Date: October 25, 94

Run No. 5-2

Total Operation Time: 16 hr.

Time: 8:00

Variables	Brine Heater				Evaporator Stages	r Stages				
	• • •	#1		#2	*3		*	1G ##		
Flowrate (kg/h)	9200	0059		6500	029		9200	18500		18500
Specific Heat (KJ/Kg/K)	3.961	3.940		3.925	3.912		3.900	3.967		3.965
Inlet Temp. (deg. C)	68	76.4		62.9	49.4		36.8	34		23
Outlet Temp. (deg. C)	112	88		76.4	62.9		49.4	37		3
Temp. Rise (deg. C)	23	12.6		13.5	13.5		12.6	9		7
Flashing Temp. (deg. C)	119	92.2		82.2	69.9		56.4	40.3		36.4
Heat Transfer Rate (KJ/S)	164.495	89.628		95.680	95:346		88.715	122.327	7	40.752
Heat Transfer Area (Sq.m)	4.6723	1.937	:	1.937	1.937		1.937	4.9556		4.9556
LM.T.D. (deg. lQ	15.804	7.890		11.229	12.564		12.238	5.791		6.348
U (kW//sq:m//d	2.228	5.864		4.399	3.918		3.743	4.263		1.296
Clean-U Value (kW/sq.m/lo	3.9	6.6		5.7	5.1		5.1	5.1		5.1
Fisq.m.Krkw	0.1925	0.0190		0.0312	0.0592		0.0711	0.0385	•	0.5758

Run No. 5-2	Date: October 25, 94		Time: 12:00		Total Operation Time: 20 hr.	Time: 20 hr.	
Variables	Brine Heater			Evaporator Stages			
		# 7	# 5	£3	**	# 5	10
Flowrate (kg/h)	0200	6500	9200	9200	6500	18500	18500
Specific Heat (KJ/Kg/IO	3.961	3.940	3.925	3.912	3.900	3.967	3.965
inlet Temp. (deg. C)	68	76.5	63.1	S	57.5	31.4	29
Outlet Temp. (deg. C)	112	68	76.5	63.1	52	36	31.4
Temp. Rise (deg. C)	23	12.5	13.4	13.1	12.5	9.4	2.4
Flashing Temp. (deg. C)	119	93.8	82.9	70.2	56.9	41	35.7
Heat Transfer Rate (kj/S)	164.495	88.918	94.975	92.530	88.024	93.780	48.904
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	15.804	9.750	11.865	12.529	12.092	7.052	5.412
U (kW/sq.m/k)	2.228	4.708	4.133	3,813	3.758	2.684	1.824
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.7	5.1	5.1	5.1	5.1
f (sq.m K/KW)	0.1925	0.0609	0.0459	0.0662	0.0700	0.1766	0.3523

Date: October 25, 94

Run No. 5-2

Time: 16:00

Variables	Brine Heater			Evaporator Stages			
		*	#2	#3	**	9	*
Flowrate (kg/h)	0059	0059	6500	9200	9200	18500	18500
Specific Heat (kJ/kg/l0	3.961	3.940	3.925	3.912	3.900	5.967	3.965
Inlet Temp, (deg. Cl	89.5	76.5	63	20	37.4	37.5	58
Outlet Temp. (deg. C)	112	89.5	76.5	63	25	36	31.5
Temp. Rise (deg. C)	22.5	13	13.5	K 0	12.6	4.5	3.5
Flashing Temp. (deg. C)	118	96	83.1	70.1	56.9	40.8	35.5
Heat Transfer Rate (KJ/S)	160.932	92.481	95.682	91.823	88.727	91.742	71.313
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	14.440	9.572	12.122	12.492	12.128	6.804	5.568
Ü (KW/sq.m/o	2.385	4.988	4.075	3.795	3.777	2.724	2.585
Clean-U Value (kW/sq.m/l0	5.9	6.6	7.3	5.1	χ. Σ.	5.4	5.7
f sq.m K/kW	0.1628	0.0490	0.0493	0.0675	0.0687	0.1714	0.1908

Run No. 5-2	Date: October 25, 94		Time: 20:00		Total Operation Time: 28 hr.	me: 28 hr.	
	Brine Heater			Evaporator Stages			
			*	(7) #		₩.	:
Flowrate (kg/h)	6500	9099	6500	9200	9200	18500	18500
Specific Heat (k)/kg/lo	3.961	3.940	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	89.5	76.4	62.9	49.7	37	31.2	78
Outlet Temp. (deg. C.	112	89.5	76.4	62.9	49.7	36	31.2
Temp. Rise (deg. C)	22.5	13.1	13.5	13.2	12.7	89	3.2
Fiashing Temp. (deg. C)	118	93.3	82.6	70.1	56.6	40.5	35.3
Heat Transfer Rate (kJ/S)	160.932	93.191	95.680	93.231	89.424	97.856	65.199
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. to	14.440	8.778	11.678	12.675	12.165	6.612	5.547
U (KW/sq.m/to	2.385	5.481	4.230	3.797	3.795	2.986	2.372
Clean-U Value (kW/sq.m/l0	3.9	6.6	5.1	5.3	5.7	5.4	5.1
f Sa.m Kikw	0.1628	0.0309	0 0.403	0.0673	AC300	0.4%88	0.2255

Run No. 5-2	Date: October 26, 94		Time: 00:00		Total Operation Time: 32 hr.	n Time: 32 hr.	
Variables	Brine Heater			Evaporator Stages	***		
		# 1	*	の兼	3	4 0	*
Flowrate (kg/h)	6500	6500	0059	9200	0059	18500	18500
Specific Heat (KJ/kg/K)	3.961	3.940	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	68	76.3	62.7	49.6	36.9	31.1	77
Outlet Temp. (deg. C)	112	88	76.3	62.7	49.6	35.5	31.1
Temp. Rise (deg. C)	23	12.7	13.6	13.1	12.7	4.4	4.1
Flashing Temp. (deg. C.	117.5	93.4	82.5	02	56.6	40.5	35.2
Heat Transfer Rate (KJ/S)	164.495	90.338	96.385	92.521	89.422	69.697	83.530
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	13.980	9.356	11.713	12.747	12.274	6.970	5.915
U (kw/sq.m/kg	2.518	4.985	4.248	3.747	3.761	2.597	2.850
Clean-U Value (KW/sq.m/k)	3.9	9.9	5.1	20	7 5	7.6	5.1
f (sq.m.K/kw)	0.1407	0.0491	0.0393	0.0708	0.0698	0.1890	0.1548

Run No. 5-2	Date: October 26, 94		Time: 04:00		Total Operation Time: 36 hr.	. Time: 36 hr.	
Verlables	Brine Heater			Evaporator Stages	3		
		*	* 2	*	9 #	10	*
Flowrate (kg/h)	0059	9290	6500	9200	029	18500	18500
Specific Heat (KJ/kg/K)	3.961	3.939	3.925	3.912	3.900	3.967	3.964
Inlet Temp. (deg. C)	58	36	62.7	49.6	36.9	31	27
Outlet Temp. (deg. C)	211	88	92	62.7	49.6	32	33
Temp. Rise (deg. C)	23	1 3	13.3	13.1	12.7	4	-
Flashing Temp. (deg. C)	118	93.2	82.3	6.69	56.7	40.6	35.2
Heat Transfer Rate (K)/S)	164.495	92.468	94.255	92.521	89.422	81.539	81.492
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	14.598	9.221	11.718	12.638	12.383	7.421	5.979
U (KW/sq.m/i0	2.412	5.177	4.153	3.779	3.728	2.217	2.751
Clean-U Value (KW/sq.m/lo	6 7	9.9	5.1	r.v.	5.4	. 5.1	5.1
f (sq.m K/KW)	0.1582	0.0416	0.0447	0.0685	0.0722	0.2550	0.1675

Date: October 28, 94

Run No. 5-2

Total Operation Time: 40 hr.

Time: 08:00

Flowrate (kg/h) 6500 Specific Heat (kJ/kg/l) 3.960 inlet Temp. (deg. C) 88 Outlet Temp. (deg. C) 112 Temp. Rise (deg. C) 24 Flashling Temp. (deg. C) 119 Heat Transfer Rate (kJ/S) 171.620	6500 3.939 76.4 88	#2 6500 3.925 63.2 76.4	6500 3.912 50 63.2	6500 3.900 37.5 50	18000 3.967 31.3	18000 3.965 29.5 3.1.3
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6500 3.939 76.4 88	6500 3.925 63.2 76.4 13.2	6500 3.912 50 63.2	6500 3.900 37.5 50	18000 3.967 31.3 37	3.965 29.5 31.3
0 G C C C C C C C C C C C C C C C C C C	3.939 76.4 88 11.6	3.925 63.2 76.4 13.2	3.912 50 63.2 13.2	3.900 37.5 50	3.967 31.3 37	3.965
Inlet Temp. (deg. C) 88 Outlet Temp. (deg. C) 112 Temp. Rise (deg. C) 24 Flashing Temp. (deg. C) 119 Heat Transfer Rate (kl/S) 171,620	76.4 88 11.6	63.2 76.4 13.2	50 63.2 13.2	37.5 50 12.5	31.3	29.5 31.3
14	88 11.6	76.4	63.2	5 5 7 7	37	31.3
17.	11.6	13.2	13.2	12.5		
171.				1	5.7	1.8
	93.4	82.8	70.4	57.2	\$	35.6
	82.503	93.557	93.238	88.024	113.072	35.687
Heat Transfer Area (Sq.m) 4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. l0 16.128	10.115	11.794	12.675	12,419	6.435	5.148
U (KWISQ m/K)	4.211	4.095	3.798	3.659	3.546	1.399
Clean-U Value (KW/sq.m/lo	9.9	5.7	۲,	Σ	# 15 C	5.1
Fisq.m KKW	0.0860	0.0481	0.0672	0.0772	0.0859	0.5187

0.2452	0.1643	0.0790	0.0760	0.0574	0.0289	0.1755	f sq.m K/kW)
	5.1	r.,	5.1	5.7	6.6	3.9	Clean-U Value (kW/sq.m/l)
2.266	2.775	3.636	3.675	3.946	5.544	2.315	U (KW/sq.m/l0
5.650	6.925	12.200	12.601	12.054	8.875	15.206	L.M.T.D. (deg. 10
4.9556	4.9556	1.937	1.937	1.937	1.937	4.6723	Heat Transfer Area (Sq.m)
63,442	95.218	85.912	869.68	92.123	95.308	164.495	Heat Transfer Rate (KJ/S)
35.9	41.3	22	6.69	82.3	92.8	118.5	Flashing Temp. (deg. C)
3.2	8.4	12.2	12.7	13	13.4	23	Temp. Rise (deg. C)
31.7	36.5	49.9	62.6	75.6	68	112	Outlet Temp. (deg. C)
28.5	31.7	57.7	49.9	62.6	75.6	88	Inlet Temp. (deg. C)
3.965	3.967	3.900	3.912	3.925	3.939	3.961	Specific Heat (KJ/Kg/K)
18000	18000	6500	6500	6500	6500	0059	Flowrate (kg/h)
•	to Th	**	™	* *	#1		
			Eveporator Stages			Brine Heater	Variables
	rime: 44 hr.	Total Operation Time: 44 hr.		Time: 12:00		Date: October 26, 94	Run No. 5-2
						A HEAL INAMPLES O	PAPPUPALIVES VE XTERRI
			a O	COEEECIENT AND FOLLING FACTOR	OFFERSION AN	I MEAT TOANSEED C	
							SHOWER OF CARDAIN MEAT TO ANCIES

tun No. 5-2	Date: October 26, 94	4		Ħ	Time: 16:00			Total Operation Time: 48 hr.	ration Til	ne: 48 hr.	
Varieties	Brine Heater					Evapora	Evaporator Stages				
		1	*		* 2	£ .		*		5	*
Flowrate (kg/h)	0059		6500		6500	9200	Q	920		18500	18500
Specific Heat (KI/Kg/K)	3.961		3.939		3.925	3.912	2	3.900		3.967	3.965
Inlet Temp. (deg. C)	88.5		75.8		62.6	49.9	o.	37.5		31.5	78
Outlet Temp. (deg. C)	112		88.5		75.8	62.6	φ	49.9		36	31.5
Temp. Rise (deg. O	23.5		12.7	. *	13.2	12.7	7	12.4		4.5	3.5
Flashing Temp. (deg. C	120		93.1		82.8	70.2	.2	57		40.9	35.8
Heat Transfer Rate (KJ/S)	168.058		90.325		93.542	89.698	8	87.319		91.742	74.313
Heat Transfer Area (Sq.m)	4.6723		1.937		1.937	1.937	2	1.937		4.9556	4.9556
L.M.T.D. (deg. 10	17.146	٠.	9.587		12.456	12.927	2	12.273		6.907	5.877
U (KW/sq.m/lo	2.098	٠	4.864		3.877	3.582	23	3.673		2.680	2.448
clean-U Value (KW/sq.m/R)	3.9		9.9		5.	5.1	-	\$		2.1	23
f (sq.m K/KW)	0.2203		0.0541	• .	0.0618	0.0831	=	0.0762		0.1770	0.2123

Run No. 5-2	Date: October 26, 94		Time: 20:00		Total	Total Operation Time: 52 hr.	52 hr.	
	Brine Heater			Evaporator Stages	89 6			
		*	2	e.	•		50	*
Flowrate (kg/h)	6480	6480	6480	6480		6480	18500	18500
Specific Heat (KJ/Kg/K)	3.961	3.939	3.925	3.912	M	3.900	3.967	3.965
Inlet Temp. (deg. C)	68	75.7	62.6	49.9		37.5	31.6	
Outlet Temp. (deg. C)	112	6 8	75.7	62.6		49.9	36	31.6
Temp. Rise (deg. C)	23	13.3	13.1	12.7		12.4	4.4	3.6
Flashing Temp. (deg. C)	120	93	82.4	70		57.1	4	35.9
Heat Transfer Rate (kj/S)	163.989	94.307	92.547	89.422	87	87.050	89.704	73.351
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937		1.937	4.9556	4.9556
L.M.T.D. (deg. K)	16.980	9.082	12.090	12.710	12	12.382	6.970	5.919
U.(KW/sq.m/K)	2.067	5.361	3.952	3,632	M)	3.629	2.597	2.504
Clean-U Value (KW/sq.m/lo	8.5	9.9	5.1	5.1		5.1	5.1	5.1
# feet my killion	\$7.00	0.0350	0.0520	6070.0	Č	F07.00	0.1890	0.2038

Date: October 27, 94

Run No. 5-2

Time: 00:00

				Evaporator Stages			
Variables	Brine Heater						
		**	#5	6	*	10	*
Flowrate (kg/h)	0059	6500	6500	6500	9200	18200	18200
Specific Heat (kj/kg/k)	3.961	3.939	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	88.5	75.9	62.8	50.1	37.9	31.9	28
Outlet Temp. (deg. C)	112	88.5	75.9	62.8	50.1	36	31.9
Temp. Rise (deg. C)	23.5	12.6	13.1	12.7	12.2	4.1	3,9
Flashing Temp. (deg. C)	121	92.7	82.6	70.4	57.5	41.3	36.2
Heat Transfer Rate (kj/S)	168.058	89.615	92.837	89.703	85.916	82.234	78.177
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	18.302	680.6	12.090	12.927	12.525	7.155	6.042
U (KW/sq.m/lo	1.965	5.090	3.964	3.583	3.541	2.319	2.611
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.4	Ř	5.1	ភ	23
Elsq.m K/kw)	0.2524	0.0449	0.0562	0.0831	0.0863	0.2351	0.1869

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 5-2	Date: October 27, 9	z		Time: 04:00		Total Op	Total Operation Time: 60 hr.	
Veriables	Brine Heater				Evaporator Stages	500		
		~		**	67 #k	**	9#	9#
Flowrate (kg/h)	0029		9059	6500	9200	0059	18500	18500
Specific Heat (kj/kg/k)	3.961	m	3.939	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	88.5		75.8	62.8	25	37.7	31.6	28
Outlet Temp. (deg. O	112	.*	88.5	75.8	62.8	S	36	31.6
Temp. Rise (deg. C)	23.5	٠	12.7	1	12.8	12.3	4.4	3.6
Flashing Temp. (deg. C)	121		92.8	82.1	70.1	57.3	4.	36
Heat Transfer Rate (kJ/S)	168.058	8	90.325	92.127	90.408	86.617	89.704	73.351
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	18.302	6	9.239	11.612	12.638	12.454	0.6.9	6.022
U (KW/sq.m/lo	1.965		5.047	4.096	3.693	3.591	2.597	2.458
Clean-U Value (kW/sq.m/l0	5 £		9.9	5.4	5.1	5.1	5.1	5.7
f isg.m K/kW	0.2524	0	0.0466	0.0481	0.0747	0.0824	0.1890	0.2107

Date: October 27, 94

Run No. 5-2

Time: 06:00

Variables	Brine Heater			Evaporator Stages	90		
		带	#2	₩ ₩	*	io **	9#
Flowrate (kg/h)	029	9200	029	0059	9200	18000	18000
Specific Heat (kj/kg/10	3,961	3,939	3.925	5.912	3.900	3.968	3.966
Inlet Temp. (deg. C)	88.5	76.1	29	50.3	38	31.7	8
Outlet Temp. (deg. Cl	. 112	88.5	76.1	63	50.3	37	31.7
Temp. Rise (deg. C)	23.5	12.4	13.1	12.7	12.3	8 .33	17
Flashing Temp. (deg. C)	121	92.7	82.2	70.5	57.5	41.3	36.2
Heat Transfer Rate (k)/5)	168.058	88.195	92.842	89.707	86.623	105.140	33.707
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	18.302	9.023	11.425	12.818	12.345	6.599	5.305
U (KW/sq.m/lo	1.965	5.046	4.195	3.613	3.622	3.215	1.282
Clean-U Value (KW/sq.m/K)	6	9.9	2.	5.1	5.1	5	2.3
f (sq.m Kkw)	0.2524	0.0466	0.0423	0.0807	0.0800	0.1150	0.5838

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 5-2	Date: October 27, 94		Time: 12:00		Total Operation Time: 68 hr.	n Time: 68 hr.	
Veriables	Brine Heater			Evaporator Stages			
		*	#5	8	**	lo #k	45
Flowrate (kg/h)	6500	9200	9200	6500	6500	18000	18000
Specific Heat (KJ/Kg/K)	3.961	3.939	3.925	3.912	3.900	3.968	3.965
Inlet Temp. (deg. C)	88.5	75.7	62.8	50.1	37.9	32.6	29
Outlet Temp. (deg. C)	112	88.5	75.7	62.8	50.1	37	32.6
Temp. Rise (deg. C)	23.5	12.8	12.9	12.7	12.2	4.4	3.6
Flashing Temp. (deg. C)	121	93.2	82.7	70.4	57.5	41.8	36.1
Heat Transfer Rate (kj/5)	168.058	91.035	91.418	89.703	85.916	87.292	71.379
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. l)	18.302	9.737	12.347	12.927	12.525	6.763	5.090
U (KW/sq.m/K)	1.965	4.827	3.822	3.583	3,541	2.605	2.830
Clean-U Value (kW/sq.m/i0	3.9	6.6	5.1	5.1	5.7	ro E	5.7
f Sq.m K/kW)	0.2524	0.0557	0.0655	0.0831	0.0863	0.1879	0.1573

tun No. 5-2	Date: October 27, 94		Ţ	Time: 16:00		ř	Total Operation Time: 72 hr.	Ime: 72 hr.		
Variables	Brine Heater				Evaporator Stages	r Stages				1 .
		#		#2	#3		**	# £	•	
Flowrate (kg/h)	0029	6500	; ;	9200	9200		9200	18300	18	18300
Specific Heat (k)/kg/10	3,967	3.939		3.925	3.912		3.901	3.968	ĸ	3.965
Inlet Temp. (deg. C)	88.5	75.8		62.9	50.4		38.5	32.5		83
Outlet Temp. (deg. C)	112	88.5		75.8	62.9		50.4	37		32.5
Temp. Rise (deg. C)	23.5	12.7		12.9	12.5		11.9	4.5		3.5
Flashing Temp. (deg. C)	122	93.4		82.8	7.07		57.9	41.8		36.7
Heat Transfer Rate (kj/S)	168.058	90.325	6	91.420	88.295	3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	83.812	90.764	6	70.552
Heat Transfer Area (Sq.m)	4.6723	1.937		1.937	1.937		1.937	4.9556	4.9	4.9556
L.M.T.D. (deg. K)	19.438	9.932	•	12,347	13.069		12.521	6.804	L.	5.774
U 00W/sq.m/lo	1.850	4.695		3.823	3.488		3.456	2.692	7	2.466
Clean-U Value (kW/sq.m/k)	5	9.9		2.7	5.1		5.7	5.1		5.1
fisq.m KNew	0.2840	0.0615	0	0.0655	0.0906		0.0933	0.1754	0.2	0.2095
										1

						:		•
	Run No. 5-2	Date: October 27, 94	2	rime: 20:00		Total Operation Time: 76 hr.	lme: 76 hr.	
	Variables	Brine Heater			Evaporator Stages			* .
			**	# 5	F7	*	9	9*
	Flowrate (kg/h)	029	0059	9200	0059	9200	18200	18200
4 .	Specific Heat (KJ/Kg/10	3.961	3.939	3.925	3.912	3.901	3.968	3.965
	Inlet Temp. (deg. C)	88.5	75.8	62.9	50.4	38.1	32	
	Outlet Temp. (deg. C)	112	88.5	75.8	62.9	50.4	37	
	Temp. Rise (deg. C)	23.5	12.7	12.9	12.5	12.3	s o	
	Flashing Temp. (deg. C)	122	93.4	82.8	7.07	57.9	41.6	36.5
•	Heat Transfer Rate (kj/S)	168.058	90.325	91.420	88.295	86.625	100:293	60.141
	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
٠.	L.M.T.D. (deg. 10	19.438	9.932	12.347	13.069	12.670	6.796	5.873
	U (kW/sq.m/l0	1.850	4.695	3.823	3.488	3.530	2.978	2.066
	Clean-U Value (KW/sq.m/t0	3.9	9.9	5.1	5.1	5.1	5.7	5.1
	f (sq.m K/kW)	0.2840	0.0615	0.0655	9060.0	0.0872	0.1397	0.2878
			-	***				

Date: October 28, 94

Run No. 5-2

Total Operation 11me: 80 hr.

Time: 00:00

Variables	Brine Heater			Evaporator Stages	•		
		#1	#3	#3	**	*	*
Flowrate (kg/h)	0059	0059	6500	6500	0059	18200	18200
Specific Heat (KJ/Kg/K)	3.961	3.939	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	88.5	75.7	62.7	50.1	37.9	31.9	28.5
Outlet Temp. (deg. C)	112	88.5	75.7	62.7	50.1	36	31.9
Temp. Rise (deg. C)	23.5	12.8	13	12.6	12.2	4.1	3.4
Flashing Temp. (deg. C)	122.5	93.2	82.7	7.07	57.8	41.4	36.3
Heat Transfer Rate (kj/S)	168.058	91.035	92.125	88.995	85.916	82.234	68.157
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	20.000	9.737	12.383	13.321	12.849	7.258	5.939
U (KW/sq.m/k)	1.798	4.827	3.841	3.449	3.452	2.286	2.316
Clean-U Value (KW/sq.m/l0	3.9	9.9	5.7	5.7	<u> </u>	Ç.	5.1
f (sq.m K/kW)	0.2996	0.0557	0.0643	0.0939	0.0936	0.2413	0.2357

							•	
	CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR	ALL HEAT TRANSE	ER COEFFICIENT	AND FOULING FAC	TOR			
	Run No. 5-2	Date: October 28, 1	3	Time: 04:00		Total Operation Time: 84 hr.	ı Time: 84 hr.	
	Vorlebles	Brine Heater			Evaporator Stages			
			**	# 5	en **	**	10 *#	*
	Flowrate (kg/h)	029	9200	0059	029	9200	18200	18200
	Specific Heat (KJ/kg/X)	3.961	3.939	3.925	3.912	3.900	3.967	3.965
	Inlet Temp. (deg. C)	88.5	75.7	62.8	50.2	37.9	31.8	28
	Outlet Temp. (deg. C)	112	88.5	75.7	62.8	50.2	36	31.8
	Temp. Rise (deg. C)	23.5	12.8	12.9	12.6	12.3	4.2	3.8
	Flashing Temp. (deg. C)	124	92.3	81.9	70.6	27.7	41.4	36.3
	Heat Transfer Rate (kJ/S)	168.058	91.035	97.418	88.998	86.621	84.239	76.172
	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2	L.M.T.D. (deg. k)	21.666	8.681	11.465	13.106	12.670	7.300	6.207
1	U (KW/sq.m/r)	1.660	5.414	4.116	3.506	3.529	2.329	2.476
	Clean-U Value (kW/sq.m/k)	3.9	9:9		Г.	5.1	7.	5.5
	f sq.m K/kW	0.3460	0.0332	0.0469	0.0892	0.0872	0.2333	0.2078

Date: October 28, 94

Run No. 5-2

Time: 06:00

#1 #2 #3 #4 #1 #2 #3 #4 #1 #2 #3 #4 #1 #2 #3 #4 #2 #3 #4 #3 #4 #3 #4 #4 #3 #4 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #4 #4 #3 #3 #3 #4 #4 #3 #3 #3 #3 #3 #4 #4 #3 #3 #3 #3 #3 #3 #4 #4 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3 #3	Verdablee	Brine Heater			Evapora	Evaporator Stages				
6500 6500 6500 6500 6500 6500 6500 88 75.5 62.5 49.9 3.77 88 75.5 62.5 49.9 37.7 71.1 88 75.5 62.5 49.9 37.7 72.4 12.5 13 12.6 12.2 14.0 92.1 82.1 70.3 57.4 14.672 1.937 1.937 1.937 71.60 88.892 92.120 88.891 85.912 84.892 92.120 88.891 85.912 71.60 88.892 92.120 88.991 85.912 71.60 89.399 11.943 13.706 12.633 71.60 3.9 6.6 5.1 5.1 5.1 71.00 3.3 6.6 5.1 5.1 70.0032 0.0089			#1	#2	£#		*	5		9#
62.5 5.912 3.900 3.900 37.7 62.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 49.9 37.7 7.5 62.5 7.4 3.9 37.7 7.5 7.4 3.9 37.7 7.5 7.6 3.5 7.4 3.9 37.7 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	Flowrate (kg/h)	029	6500	0059	59	8	9200	18200	8	18200
88 75.5 62.5 49.9 37.7 112 88 75.5 62.5 49.9 124 12.5 13 12.6 12.2 124 12.5 13 12.6 12.2 125 12.6 12.2 127 22 12.2 128.892 92.120 88.991 85.912 137 1.937 1.937 1.937 1.937 1.937 1.937 1.937 1.681 5.134 3.982 3.506 3.511 1.100 3.9 6.6 5.1 5.1 1.100 0.0892 0.0888	Specific Heat (kg/kg/K)	3.960	3.939	3.925	3.9	12	3.900	3.968	89	3.965
24 12.5 62.5 49.9 24 12.5 13 12.6 12.2 j. Cl	inlet Temp. (deg. Cl	88	75.5	62.5	4	6.	57.7	'n	1.7	29.5
12.5 12.6 12.2 1C 124 92.1 82.1 70.3 57.4 10/S) 171.620 88.892 92.120 88.991 85.912 1.937 1.937 1.937 1.937 1.937 21.846 8.939 11.943 13.106 12.633 1.1681 5.134 3.982 3.506 3.511 1.17/N 5.1 5.1 5.1 1.17/N 5.1 5.1 5.1	Outlet Temp. (deg. C)	112	88	75.5	79		6.64		37	31.7
F.C. 124 92.1 82.1 70.3 57.4 (1.52) 88.892 92.120 88.991 85.912 1.937 1.	Temp. Rise (deg. C)	24	12.5	13	7	9.	12.2		5.3	2.2
(kg/s) 171.620 88.892 92.120 88.991 85.912 (5g.m) 4.6723 1.937 1.9	Flashing Temp. (deg. C)	124	92.1	82.1	χχ	.3	57.4	*	41.2	36
Seq.m) 4.6723 1.937 1.937 1.937 21.846 8.939 11.943 13.106 12.633 1.681 5.134 3.982 3.506 3.511 1.m/No 3.9 6.6 5.1 5.1 1.7m/No 3.9 6.6 5.1 5.1 1.0892 0.0892 0.0892	Heat Transfer Rate (KJ/S)	171.620	88.892	92.120	88.9	2	85.912	106.3	80	44.104
21.846 8.939 11.943 13.106 12.633 1.681 5.134 3.982 3.506 3.511 1.m/N 5.1 5.1 5.1	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.9	57	1.937	4.95	95	4.9556
1,681 5,134 3.982 3,506 3,511 1.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1	LM.T.D. (deg. K)	21.846	8.939	11.943	13.1	8	12.633	6.4	203	5.324
1.m/lo 5.1 5.1 5.1 5.1	U (kw/sq.m/lo	1.681	5.134	3.982	10,10	8	3.511	3,304	3	1.671
0.0888	Clean-U Value (kW/sq.m/k)	3.9	9.9	5.1			75 7		5.1	5.7
	f 6g.m KXW	0.3383	0.0433	0.0551	0.08	92	0.0888	0.1066	99	0.4022

CALCULATIONS OF OVERALL HEAT TRANSE Run No. 5-2 Date: October 28, 9	RALL HEAT TRANSFER CO	DEFEICIENT AN	ER COEFFICIENT AND FOULING FACTOR 11:00	ğ	Total Operation	Total Operation Time: 92 hr.	
Veriables	Brine Heater			Evaporator Stages			
Flowrate (kg/h)	0059	6500	6500	0029	6500	18500	18500
Specific Heat (kJ/kg/10	3.960	3.939	3.925	3.912	3.900	3.968	3.965
inlet Temp. (deg. C)	88	75.6	62.8	50.4	37.7	52	
Outlet Temp. (deg. C)	112	88	75.6	62.8	50.4	37	
femp. Rise (deg. C)	24	12.4	12.8	12.4	12.7	ın	
Flashing Temp. (deg. C	124	93.4	82.9	6.02	58.1	41.6	36.5
Heat Transfer Rate (kj/S)	171.620	88.182	90.708	87.587	89.438	101.947	61.132
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	21.846	10.396	12.638	13.354	13.035	6.796	5.873
U (KW/sq.m/fo	1.681	4.379	3.706	3.386	3.542	3.027	2.101
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	7.	5.1	5.1	5.1
44457	1000		1	000		1 1 1	

Run No. 5-2	Date: October 28, 94	· प		Time: 16:00			Ď	Total Operation Time: 96 hr.	Ime: 96 hr.		
Veriebles	Brine Heater				ŭ	Evaporator Stages	50				[
		*		# 2		£ #3		*	S #	*	- <u> </u>
Flowrate (kg/h)	6500	9	6500	0059		6500		9200	18500	18	18500
Specific Heat (KJ/Kg/IO	3.960	3.939	39	3.925		3.912		3.901	3.968	ĸ	3.965
Inlet Temp. (deg. C)	88	ř.	75.5	62.7	. •	50.3	1. 1. 1.3	38.1	32.1		8
Outlet Temp. (deg. Cl	112		88	75.5		62.7		50.3	37	•	32.1
Temp. Rise (deg. C)	24	¥	12.5	12.8	٠.	12.4		12.2	4.9		7.7
Flashing Temp. (deg. C)	124	8 6	93.3	82.8		7.0.7		85	41.6		36.6
Heat Transfer Rate (kj/S)	171.620	88.892	92	90.705		87.585		85.920	806.66	63.	63.170
Heat Transfer Area (5q.m)	4.6723	1.937	37	1.937		1.937		1.937	4.9556	9	4.9556
L.M.T.D. (deg. 10	21.846	10.318	8	12.638		13.247		12.849	6.756	is.	5.915
U (KW/sq.m/k)	1.681	4.448	8	3.705		3.413		3.452	2.984	ci.	2.155
Clean-U Value (kW/sq.m/lo	6.5		6.6	Σ <u>.</u> ς		5.1		5.1	5.7		5.
f (sq.m k/kw)	0.5383	0.0733	23	0.0738	v.	0.0969		0.0936	0.1390	0.2	0.2680
		-									ĺ

Run No. 5-2	Date: October 28, 94		Time: 20:00	Time: 20:00	Total Operation Time: 100 hr.	lme: 100 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	N **	€5 3	*	IG #k	*
Flowrate (kg/h)	6350	6350	6350	0320	6350	18300	18300
Specific Heat (KJ/kg/K)	3.960	3.939	3.925	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	88	75.6	62.6	50.2	38.1	31.9	
Outlet Temp. (deg. C)	112	88	75.6	62.6	50.2	36.5	31.9
Temp. Rise (deg. C	24	12.4	13	12.4	12.1	4.6	2.9
Flashing Temp. (deg. C)	124	93.2	82.7	70.6	57.9	41.5	36.4
Heat Transfer Rate (KJ/S)	167.660	86.147	89.997	85.562	83.248	92.773	58,455
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	21.846	10.170	12.492	13.247	12.812	7.052	5.830
U (KW/sq.m/f0	1.643	4.573	3.719	3.335	3.355	2.655	2.023
Clean-U Value (KW/sq.m/l0	o, Ki	9.9	5.5	5.1	5.1	5.1	5.1
+ fen m Kilaan	OXEDA	מבניניים	OCTO C	0.4040	7000		00000

Date: October 29, 94

Run No. 5-2

Total Operation Time: 104 hr.

Time: 00:00

Variables	Brine Heater			Evaporator Stages			
		*	# 5	9	*	9	*
Flowrate (kg/h)	6350	6350	6350	6350	6350	18200	18200
Specific Heat (kJ/kg/K)	3.960	3.939	3.925	5.912	3.900	3.967	3.965
inlet Temp. (deg. C)	88	75.4	62.4	49.9	37.7	31.8	28.5
Outlet Temp. (deg. C)	112	88	75.4	62.4	49.9	36	31.8
Temp. Rise (deg. C)	24	12.6	13	12.5	12.2	4.2	3.3
Flashing Temp. (deg. C)	124	92.8	82.2	70.4	57.6	41.2	36.1
Heat Transfer Rate (KJ/S)	167.660	87.534	89.992	86.246	83.930	84.239	66.152
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	21.846	9.784	12.164	13.284	12.849	7.094	5.794
U (KW/sq.m/lo	1.643	4.619	3.820		3.372	2.396	2.304
Clean-U Value (KW/sq.m/lo	6.5	9.9	7.2	ν. Vi	5.1	%	2.
f (sq.m K/kW)	0.3524	0.0650	0.0657	0.1023	0.1005	0.2212	0.2380

Variables Evaporator Stages Evaporator Stages # # # # # # # # # # # # # # # # # # #	Run No. 5-2	Date: October 29, 94		Time: 08:00		Total Operation Time: 112 hr.	Time: 112 hr.	
#1 #2 #3 #4 #4 #4 #4 #4 #4 #4 #4	Verteklee	Britis Header			Evaporator Stages			
M/Kg//lo 6350 6350 6550 6550 g, Cl 3.961 3.925 3.912 3.902 g, Cl 88.5 75.6 62.5 49.9 37.4 g, Cl 112 75.6 62.5 49.9 37.4 g, Cl 23.5 12.9 13.1 12.5 49.9 37.4 g, Cl 23.5 12.9 13.7 71.6 5.8.7 49.9 58.7 d, Cl 3.4 94.2 83.7 71.6 58.7 58.7 d, Cl 1.937 1.937 1.937 1.937 1.937 1.937 m/sq. m/lo 3.4 4.242 3.439 3.096 3.139 m/sq. m/lo 3.4 6.6 5.1 5.1 5.1 m/sq. m/lo 3.6 5.1 5.1 5.1 m/sq. m/lo 3.4 0.0942 0.0942 0.0255 0.0255 0.0255 0.0255 0.0255 0.0255 0.0255 0.0255 <			**	*	8	*	to #	*
88.5 5.955 3.925 3.912 3.900 88.5 75.6 62.5 49.9 37.4 112 88.5 75.6 62.5 49.9 37.4 23.5 12.9 13.1 12.6 49.9 12.5 3.5 12.6 83.7 71.6 58.7 12.5 3.9 164.180 89.628 90.688 86.937 85.990 3.1 1.937 1.937 1.937 14.449 14.141 1.473 4.242 3.439 3.096 3.139 1.474 5.1 5.1 5.1 1.475 0.0842 0.0947 0.1270 0.1225	Flowrate (kg/h)	6350	6350	6350	6350	6350	18400	18400
0 49.5 49.9 37.4 C 112 88.5 75.6 62.5 49.9 37.4 g.C 123.5 12.9 13.7 12.6 12.5 49.9 g.C 126 94.2 83.7 71.6 58.7 12.5 g.C 164.180 89.628 90.688 86.337 85.990 (Kg/s) 4.6723 1.937 1.937 1.937 1.937 tq.m/lo 3.3 4.242 3.439 3.096 3.139 rq.m/lo 3.3 6.6 5.1 5.1 5.1 rq.m/lo 3.3 6.6 5.1 5.1 5.1 rq.m/lo 3.3 0.0842 0.0842 0.0225 0.1225	Specific Heat (kJ/kg/K)	3.961	3.939	3.925	3.912	3.900	3.968	3.965
Outlet Temp. (deg. C) 112 88.5 75.6 62.5 49.9 Temp. Rise (deg. C) 23.5 12.9 13.1 12.6 12.5 12.5 Flashing Temp. (deg. C) 126 94.2 83.7 71.6 58.7 Heat Transfer Rate (ld/s) 164.180 89.628 90.688 86.937 85.990 Heat Transfer Rate (ld/s) 4.6723 1.937 1.937 1.937 1.937 LM.T.D. (deg. K) 23.851 10.907 13.616 14.499 14.141 UKW/sq.m/K) 3.3 6.6 5.4 5.1 5.1 Clean-U Value (KW/sq.m/K) 3.2 6.6 5.1 5.1 5.1 f sq.m K/kW) 0.0842 0.0842 0.0947 0.1270 0.1225	Inlet Temp. (deg. C)	88.5	75.6	62.5	49.9	37.4	32.2	29
Temp. Rise (deg. Cl 23.5 12.9 13.1 12.6 12.5 Flashing Temp. (deg. Cl 126 94.2 83.7 71.6 58.7 Heat Transfer Rate (td/S) 164.180 89.628 90.688 86.937 85.990 Heat Transfer Area Sq.ml 4.6723 1.937 1.937 1.937 1.937 1.937 L.M.T.D. (deg. lol) 23.851 10.907 13.616 14.499 14.141 Ult/Wisq.m/lol 1.473 4.242 3.439 3.096 3.139 Clean-U Value (kW/sq.m/lol) 3.9 6.6 5.1 5.1 5.1 f.sq.m K/kW) 0.4224 0.0842 0.0947 0.1270 0.1225	Outlet Temp. (deg. C)	112	88.5	75.6	62.5	49.9	37	32.2
126 94.2 83.7 71.6 58.7 164.180 89.628 90.688 86.937 85.990 4.6723 1.937 1.937 1.937 1.937 23.851 10.907 13.616 14.499 14.141 1.473 4.242 3.439 3.096 3.139 5.3 6.6 5.1 5.1 5.1 0.0424 0.0842 0.0947 0.1270 0.1225	Temp. Rise (deg. C.	23.5	12.9	13.1	12.6	12.5	4.8	3.2
164.180 89.628 90.688 86.937 85.990 4.6723 1.937 1.937 1.937 1.937 23.851 10.907 13.616 14.499 14.141 1.473 4.242 3.439 3.096 3.139 3.9 6.6 5.1 5.1 5.1 0.4224 0.0842 0.0947 0.1270 0.1225	Flashing Temp. (deg. C)	126	94.2	83.7	71.6	58.7	42.1	36.8
4.6723 1.937 1.937 1.937 1.937 23.851 10.907 13.616 14.499 14.141 1.473 4.242 3.439 3.096 3.139 3.9 6.6 5.1 5.1 5.1 0.4224 0.0842 0.0947 0.1270 0.1225	Heat Transfer Rate (KJ/S)	164.180	89.628	90.688	86.937	85.990	97.341	64.856
23.851 10.907 13.616 14.499 14.141 1.473 4.242 3.439 3.096 3.139 3.9 6.6 5.1 5.1 5.1 0.424 0.0842 0.0947 0.1270 0.1225	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
1,473 4,242 3,439 5.096 3,139 3,9 6,6 5,1 5,1 5,1 0,424 0,0842 0,0947 0,1270 0,1225	L.M.T.D. (deg. 10	23.851	10.907	13.616	14.499	14.141	7.237	6.060
3.9 6.6 5.1 5.1 5.1 0.424 0.0842 0.0947 0.1270 0.1225	U (KW/sq.m/lo	1.473	4.242	3.439	3.096	3.139	2.714	2.160
0.4224 0.0842 0.0947 0.1270 0.1225	Clean-U Value (KW/sq.m/k)	O.	9.9	5.1	5.1	5.1	5.1	5.1
	f (sq.m K/kW)	0.4224	0.0842	0.0947	0.1270	0.1225	0.1723	0.2669

Date: October 29, 94

Run No. 5-2

Total Operation Time: 116 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		#	#2	£	*	9#	9
Flowrate (kg/h)	9200	0059	6500	6500	0059	18400	18400
Specific Heat (kj/kg/l0	3.961	3.939	3.925	3.912	3.901	3.968	3.966
inlet Temp. (deg. C)	88.5	75.8	62.9	50.4	38.2	32.3	29.5
Outlet Temp. (deg. C)	112	88.5	75.8	62.9	50.4	37	32.3
Temp. Rise (deg. C)	23.5	12.7	12.9	12.5	12.2	4.7	2.8
Flashing Temp. (deg. C)	125	94.2	83.7	71.6	58.7	42.1	36.8
Heat Transfer Rate (kj/S)	168.058	90.325	91.420	88.295	85.922	95.314	56.751
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	22.763	10.837	13.325	14.034	13.493	7.196	5.788
U (kW/sq.m/k)	1.580	4.303	3.542	3.248	3.287	2.673	1.979
Clean-U Value (kW/sq.m/l0	9.0	6.6	5.1	5.1	Σ ;	5.3	5.1
f.tsq.m K/kW	0.3764	0.0809	0.0863	0.1118	0.1081	0.1781	0.3093

Run No. 5-2	Date: October 29, 94		Time: 16:00		Total Operation Time: 120 hr.	n Time: 120 hr.	
Veriables	Brine Heater			Evaporator Stages			
		*	7	₹	*	10 **	*
Flowrate (kg/h)	0029	6500	9200	6500	6500	18300	18300
Specific Heat (kj/kg/l0	3.960	3.938	3.924	3.912	3.901	3.968	3.965
Inlet Temp. (deg. O	88	75.3	62.4	50.2	38.3	32.5	
Outlet Temp. (deg. C	112	88	75.3	62.4	50.2	37	32.5
Temp, Rise (deg. C)	24	12.7	12.9	12.2	11.9	2.5	
Flashing Temp. (deg. C)	124	93.5	83.3	71.1	58.4	42	36.8
Heat Transfer Rate (kj/5)	171.620	90.312	91.408	86.168	83.808	90.764	90.704
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	21.846	10.613	13,433	13.920	13.273	7.011	6.284
U (KW/sq.m/ld	1.681	4.393	3,513	3.196	3.260	2.612	2.913
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.7	5.1	5.1	. 5.1	5.7
+ (so m K/kW)	0.5383	0.0764	0.0886	0.1169	70440	0.4067	0.1472

Date: October 29, 94

Run No. 5-2

Total Operation Time: 124 hr.

Time: 20:00

Variables	Brine Heater	· · · · · · · · · · · · · · · · · · ·		7	Evaporator Stages	1000			
	-	**	#		£.#		**	#2	9#
Flowrate (kg/h)	0059	9200	65	9200	9200		9200	18400	18400
Specific Heat (kJ/kg/K)	3.960	3.938	3.924	24	3.911	F.)	3.900	3.968	3.965
inlet Temp. (deg. C)	88	75		62	49.6		37.5	32	28.5
Outlet Temp. (deg. C)	112	88		75	62		49.6	37	32
Temp. Rise (deg. C)	24	13		₩	12.4		12.1	LO	3.5
Flashing Temp. (deg. C)	124	93.1	82.5	2.5	70.5		57.8	41.5	36.4
Heat Transfer Rate (KJ/S)	171.620	92.441	92.108	80	87.570	88	85.203	101.396	70.933
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	37	1.937	•	1.937	4.9556	4.9556
LM.T.D. (deg. K)	21.846	10.263	12.929	29	13.783	[]	13.348	6.692	5.980
U (KW/sq.m/0	1.681	4.650	3.678	78	3.280	₩.	3.295	3.058	2.393
Clean-U Value (kW/sq.m/f0	3.9	9.9	5.1	T.	5.1		5.1	5.1	5.1
f (sq.m. K/kW)	0.3383	0.0635	0.0758	œ	0.1088	ö	0.1074	0.1310	0.2217

Run No. 5-2	Date: October 30, 94		Time: 00:00		Total Operation Time: 128 hr.	Time: 128 hr.	
Variables	Brine Heater			Evaporator Stages			
		#	#2	#3	**	€0 **	**
Flowrate (kg/h)	6400	6400	6400	6400	6400	18400	18400
Specific Heat (KJ/Kg/10	3.960	5.939	3.925	3.912	3.900	3.968	3.965
Inlet Temp. (deg. C)	88	75.6	62.4	49.7	37.5	32.1	28.5
Outlet Temp. (deg. C)	112	88	75.6	62.4	49.7	37	32.1
Temp. Rise (deg. C)	24	12.4	13.2	12.7	12.2	4.9	3.6
Flashing Temp. (deg. C)	125	93.3	82.4	70.7	57.8	41.4	36.3
Heat Transfer Rate (KJ/S)	168.980	86.826	92:098	88.3.14	84.587	99.368	72.960
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	22.945	10.283	12.236	13.681	13.279	6.547	5.815
U (KW/sq.m/l0	1.576	4.359	3.886	3.332	3.289	3.063	2.532
Clean-U Value (KW/sq.m/lo	3.9	9.9	5.1.	, T	5.1	5.1	5.1
f leg m Kilda	0.4780	0.0770	0.0643	0.4040	0.1080	0.4204	D 1989

Date: October 30, 94

Run No. 5-2

Total Operation Time: 132 hr.

Time: 04:00

Variables	Brine Heater				Evaporator Stages	2002				
		#1		#2	#3			10 #		•
Flowrate (kg/h)	6400	6400		6400	6400		6400	18400		18400
Specific Heat (kJ/kg/lo	3.960	3.938		3.924	3.911		3.900	3.968		3.965
Inlet Temp. (deg. C)	87	74.8		67.9	49.4		57.4	32.2		28
Outlet Temp. (deg. C)	112	87		74.8	61.9		49.4	36.5		32.2
Temp. Rise (deg. C.	25	12.2		12.9	12.5		12	4.3		4.2
Flashing Temp. (deg. C)	124	92.2		84.5	2	:	57.6	41.6		36.6
Heat Transfer Rate (KJ/S)	175.993	85.403	•	89.989	86.915		83.196	87.198		85.118
Heat Transfer Area (Sq.m)	4.6723	1.937		1.937	1.937		1.937	4.9556		4.9556
L.M.T.D. (deg. 10	22.202	10.101		12.018	13.392	•	13.310	7.032	art art	6.267
U (KW/sq.m/l0	1.697	4.365		3.866	3.351		3.227	2.502		2.741
Clean-U Value (KW/sq.m/K)	3.9	9.9		7.	5.1		5.1	5.1		5.1
f.sq.m.k/kw	0.3330	0.0776		0.0626	0.1024		0.1138	0.2036		0.1688

Run No. 5-2	Date: October 50, 94		Time: 08:00		Þ	Total Operation Time: 136 hr.	ne: 136 hr.	
Variables	Brine Hester			Evaporator Stages	ığış			
		•	#5	*		**	10 **	*
Flowrate (kg/h)	6400	6400	6400	6400		6400	18400	18400
Specific Heat (KJ/kg/K)	3.960	3.939	3.924	3.911	٠	3.900	3.968	3.966
Inlet Temp. (deg. Cl	88	75.4	62.3	49.7		37.3	32	8
Outlet Temp. (deg. C)	112	88	75.4	62.3		49.7	37	32
Temp. Rise (deg. C)	5 7	12.6	13.1	12.6		12.4	ĸ	8
Flashing Temp. (deg. C)	126	93.2	82.8	7		28	41.4	36.2
Heat Transfer Rate (kj/S)	168.980	88.224	91.397	87.618	. *	85.971	101.396	40.537
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937		1.937	4.9556	4.9556
LM.T.D. (deg. 10	24.035	10.239	12.856	14.072		13.569	6.587	5.135
U (KW/sq.m/ld	1.505	4.448	3.670	3.214		3.271	3.106	1.593
Clean-U Value (KW/sq.m/l0	9.5	6.6	5.1	rų.		5.7	5.7	5.1
f sq.m K/kW)	0.4082	0.0733	0.0764	0.1150		0.1096	0.1258	0.4317

Date: October 30, 94

Run No. 5-2

Total Operation Time: 148 hr.

Time: 20:00

Verlables	Brine Heater			Evaporator Stages			
		*	# 5	en #		10	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (kj/kg/10	3.961	3.940	3.926	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	89.5	77.2	63.6	50.4	37.5	32.1	28.5
Outlet Temp. (deg. C)	112	89.5	77.2	63.6	50.4	36	32.1
Temp. Rise (deg. C)	22.5	12.3	13.6	13.2	12.9	6 . к	3.6
Flashing Temp. (deg. C)	114	93.8	82.7	6 69	56.7	41.2	36.4
Heat Transfer Rate (kj/S)	158.456	86.164	94.925	91.813	89.447	77.364	71.374
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D.: (deg. 10	8.980	9.106	10.924	11.683	11.576	6.969	5.919
U (KW/sq.m/lo	3.777	4.885	4.486	4.057	3.989	2.240	2.433
Clean-U Value (kW/sq:m/l0	6 .	9.9	.	, L	5.3	2.7	٠. بو
f (sq.m K/KW)	0.0084	0.0532	0.0268	0.0504	0.0546	0.2503	0.2149

Run No. 5-2	Date: October 31, 94		Time: 00:00		Total Opera	Total Operation Time: 152 hr.	
Variables	Brine Heater			Evaporator Stages	500		
		*	# 5	£ #	**	10 Th	9
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (K)/kg/10	3.961	3.940	3.926	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	82	77.2	63.6	50.2	37.3	31.9	28.5
Outlet Temp. (deg. C)	112	88	77.2	63.6	50.2	36	31.9
Temp. Rise (deg. C)	23	11.8	13.6	13.4	12.9	4.1	3.4
Flashing Temp. (deg. C)	114	93.6	82.7	8	56.6	4	36.1
Heat Transfer Rate (k)/5)	161.965	82.656	94.925	93.201	89.443	81.330	67.408
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	9.106	9.282	10.924	11.865	11.687	6.847	5.733
U (KW/sq.m/l0	3.807	4.597	4.486	4.055	3.951	2.397	2.373
Clean-U Value (KW/sq.m/k)	3.9	6.6	5.1	ņ.	5.1	25.	5.1
f-tom WW	E3000	0330 0	bach u	. 00000	6		

Date: October 31, 94

Run No. 5-2

Total Operation Time: 156 hr.

Variables	Brine Heater			Evaporator Stages			
		*	# 2	の業	**	£ £	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (kj/kg/K)	3.961	3.940	3.926	3.912	3.900	3.967	3.965
Inlet Temp. (deg. C)	68	17.7	63.5	50.1	57.2	31.8	28.5
Outlet Temp. (deg. C)	112	68	17.1	63.5	50.1	36	31.8
Temp. Rise (deg. C)	23	11.9	13.6	13.4	12.9	4.2	3.3
Flashing Temp. (deg. C)	114	93.3	82.5	70.1	56.5	40.8	36.1
Heat Transfer Rate (KJ/S)	161.965	83.355	94.922	93.199	89.441	83.313	65.425
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	9.106	8.972	10.810	12.087	11.687	6.681	5.794
U (kW/sq.m/k)	3.807	4.797	4.533	3.981	3.951	2.516	2.279
Clean-U Value (kW/sq.m/lo	3.9	6.6	25	5.1	5.1	5.7	5.7
f 'sq.m k/kW)	0.0063	0.0570	0.0245	0.0551	0.0570	0.2013	0.2428

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Variables #1 #2 #3 #4 #5 Flowrate (right) 6490 6490 6490 6490 18200 Specific Heat (right) 3.961 3.940 3.974 3.967 Iniet Temp. (deg. C) 89 77.1 63.7 50.3 3.74 3.19 Outlet Temp. (deg. C) 112 89 77.1 63.7 50.3 3.65 Temp. Rise (deg. C) 23 11.9 13.4 12.9 4.6 Flashing Temp. (deg. C) 23 11.9 13.4 12.9 4.6 Heat Transfer Rate (klys) 164.242 84.527 94.844 94.514 90.708 92.266 Heat Transfer Rate (klys) 11.361 9.202 10.989 11.977 11.979 6.532 LM.T.D. (deg. Io 11.361 9.202 10.989 11.979 8.369 2.890 clean-U Value (kW)sq. m/vlo 3.094 4.742 4.464 9.076 9.0768 2.890 clean-U Value (kW)sq. m/vlo 3.9 <th>Run No. 5-2</th> <th>Date: October 31, 94</th> <th></th> <th>Time: 08:00</th> <th></th> <th>Total Operation Time: 160 hr.</th> <th>Time: 160 hr.</th> <th></th>	Run No. 5-2	Date: October 31, 94		Time: 08:00		Total Operation Time: 160 hr.	Time: 160 hr.	
6490 6490 6490 6490 11 12 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14	Veriables	Brine Heater			Evaporator Stages			
4.0 6490 6690			**	#2	£.	**	lo M	9
3.961 3.926 3.926 3.926 3.900 3 89 77.1 63.7 50.3 57.4 112 89 77.1 63.7 50.3 23 11.9 13.4 12.9 12.9 23 11.9 13.4 13.4 12.9 53 84.54 94.84 94.514 90.703 92.8 1,m0 4.6723 1.937 1.937 1.937 41.937 41.937 41.797 6 1,m0 3.99 4.742 4.464 4.074 3.369 2 1,m0 3.9 6.6 5.1 5.1 5.1 5.1 1,00 3.9 6.6 5.1 5.1 5.1 6 1,00 3.9 6.6 5.1 5.1 5.1 6	Flowrate (kg/h)	06790	6490	6490	6490	6490	18200	18200
D 112 63.7 50.3 37.4 L 23 77.1 63.7 50.3 L 23 17.4 63.7 50.3 L 23 13.4 13.4 12.9 L 0 11.5 93.5 82.7 70.2 56.8 KU/S) 164.242 84.527 94.844 94.514 90.703 93. Sq.m/S 4.6723 1.937 1.937 1.937 1.937 4.1 A. 11.361 9.202 10.969 11.976 11.797 6 A. 11.861 3.094 4.742 4.464 4.074 3.969 2.1 A. 11.870 3.9 6.6 5.1 5.1 5.1 5.1 A. 11.870 3.9 5.1 5.1 5.1 5.1 5.1	Specific Heat (kj/kg/)0	3.961	3.940	3.926	3.912	3.900	3.967	3.966
112 89 77.1 63.7 50.3 23 11.9 13.4 12.9 50.3 115.5 93.5 82.7 70.2 56.8 164.242 84.527 94.844 94.514 90.703 95.8 10 4.6723 1.937 1.937 1.937 4.1 11.361 9.202 10.969 11.976 11.797 6. 10 3.094 4.742 4.464 4.074 3.969 2.1 10 3.9 6.6 5.1 5.1 5.1 5.1 10 5.0 0.0668 0.0559	Inlet Temp. (deg. C)	68	77.1	63.7	50.3	57.4	31.9	3
23 11.9 13.4 12.9 12.9 115.5 93.5 82.7 70.2 56.8 164.242 84.527 94.844 94.514 90.703 10 4.6723 1.937 1.937 1.937 11.361 9.202 10.969 11.976 11.797 10 3.99 4.742 4.464 4.074 3.969 10 3.9 6.6 5.1 5.1 5.1 10 5.9 0.0559 0.0559	Outlet Temp. (deg. C)	112	68	17.1	63.7	50.3	36.5	31.9
115.5 93.5 82.7 70.2 56.8 164.242 84.527 94.844 94.514 90.703 n) 4.6723 1.937 1.937 1.937 1.1361 9.202 10.969 11.976 11.797 N0 3.094 4.742 4.464 4.074 3.969 N0 3.9 6.6 5.1 5.1 5.1 N0 3.9 0.0559 0.0559 0.0559	Temp. Rise (deg. C	23	11.9	13.4	13.4	12.9	4.6	1.9
164.242 84.527 94.844 94.514 90.703 n) 4.6723 1.937 1.937 1.937 11.361 9.202 10.969 11.976 11.797 5.094 4.742 4.464 4.074 3.969 10 5.9 6.6 5.1 5.1 5.1 10 5.6 0.0559 0.0559 0.0559	Flashing Temp. (deg. C)	115.5	93.5	82.7	70.2	56.8	#	 36.3
4.6723 1.937 1.937 1.937 1.937 11.361 9.202 10.969 11.976 11.797 3.094 4.742 4.464 4.074 3.969 3.9 6.6 5.1 5.1 5.1 0.0668 0.0594 0.0279 0.0494 0.0559	Heat Transfer Rate (kJ/S)	164.242	84.527	94.844	94.514	90.703	92.266	 38.092
11.361 9.202 10.969 11.976 11.797 3.094 4.742 4.464 4.074 3.969 3.9 6.6 5.1 5.1 5.1 0.0668 0.0594 0.0279 0.0494 0.0559	Heat Transfer Area 6q.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
3.094 4.742 4.464 4.074 3.969 3.9 6.6 5.1 5.1 5.1 0.0668 0.0594 0.0279 0.0494 0.0559	L.M.T.D. (deg. 10	11.361	9.202	10.969	11.976	11.797	6.532	5.293
3.9 6.6 5.1 5.1 5.1 0.0668 0.0594 0.0279 0.0494 0.0559	U (KW/sq.m/id	3.094	4.742	4.464	4.074	3.969	2.850	1.452
0.0668 0.0594 0.0279 0.0494 0.0559	Clean-U Value (kW/sq.m/l0	3.9	6.6	5.1	7.	5.1	r.	5.1
	f sq.m K/kW)	0.0668	0.0594	0.0279	0.0494	0.0559	0.1548	0.4926

Date: October 31, 94

Run No. 5-2

Total Operation Time: 164 hr.

Time: 12:00

(4) #1 #2 #3 #4 #5 (5) 6500 6500 6500 6500 18200 (6) 3.940 3.926 3.913 3.968 18200 (6) 3.940 3.926 3.913 3.901 3.968 (6) 41 51 38.4 32.2 32.2 (6) 41 51 36.5 43.5 43.5 43.5 (6) 22.5 12.2 13.2 13.1 51 41.6 43.5	Veriables	Brine Heater			Evaporator Stages			
III 6500 6500 6500 6500 18200 Bg. Cl 3.961 3.940 3.926 3.913 3.901 3.968 Bg. Cl 3.961 3.940 3.926 3.913 3.901 3.968 Bg. Cl 77.3 64.1 51 38.4 32.2 Ideg. Cl 112 17.3 64.1 51 36.5 Sg. Cl 22.5 12.2 13.2 13.1 12.6 4.3 Sg. Cl 1166. Gl 94.5 83.7 71 57.7 41.6 Area (Sg. m) 160.332 86.800 93.580 92.553 88.747 86.250 Area (Sg. m) 12.557 9.875 11.937 11.937 11.937 2.475 IXWASQ. MIV 3.9 6.6 5.1 5.1 5.1 Sg. Cl 5.1 5.1 5.1 5.1 Sg. Cl 5.1 5.1 5.1 5.1 Sg. Cl 5.1 5.1 <t< th=""><th></th><th></th><th>*</th><th># 2</th><th>e **</th><th>**</th><th>10</th><th>*</th></t<>			*	# 2	e **	**	10	*
Lig/Ligy Lo. 3.961 3.926 3.913 3.961 3.968 eg. Cl 89.5 77.3 64.1 51 36.5 ideg. Cl 112 13.2 13.1 12.6 4.3 ig. Cl 22.5 12.2 13.2 13.1 12.6 4.3 ig. Cl 22.5 12.2 13.2 13.1 12.6 4.3 ig. Cl 116.5 34.5 83.7 71 57.7 41.6 Rate (kl/S) 160.332 86.800 93.580 92.553 88.747 86.250 Area (g.m) 46723 1.937 1.937 1.937 1.937 1.937 2.475 ko 12.557 9.875 11.794 12.310 11.909 7.032 ko 12.557 9.875 4.096 3.887 3.847 2.475 ko 5.1 5.1 5.1 5.1 5.1 5.1 ko 5.1 5.1 5.1 5.1 5.1<	Flowrate (kg/h)	0059	6500	0059	9200	0059	18200	18200
eg. Cl 89.5 77.3 64.1 51 38.2 (deg. Cl 112 89.5 77.3 64.1 51 36.5 9g. Cl 22.5 12.2 13.2 13.1 12.6 4.3 9g. Cl 22.5 94.5 83.7 71 57.7 41.6 9. (deg. Cl 116.5 94.5 83.7 71 47.6 41.6 Rate (kJ/s) 160.93 86.800 93.580 92.553 88.747 49.656 4 Area (sq.m) 46723 1.937 1.937 1.937 1.937 1.937 4.9556 4 No 12.557 9.875 11.794 12.310 11.909 7.032 2475 KW/sq:m/N 3.9 6.6 5.1 <t< td=""><td>Specific Heat (KJ/Kg/K)</td><td>3.961</td><td>3.940</td><td>3.926</td><td>3.913</td><td>3.901</td><td>3.968</td><td>3.966</td></t<>	Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	3.901	3.968	3.966
(deg. C) 112 89.5 77.3 64.1 51 36.5 9g. C) 22.5 12.2 13.2 13.1 12.6 4.3 9. (deg. C) 116.5 94.5 83.7 71 57.7 41.6 Rate (kl/S) 160.332 86.800 93.580 92.553 88.747 86.250 Area (sq.m) 4.6723 1.937 1.937 1.937 1.937 4.9556 A 12.557 9.875 11.794 12.310 11.909 7.032 A 2.743 4.956 3.882 3.847 2.475 A 5.1 5.1 5.1 5.1 5.1 A 5.0639 0.0639 0.0639 0.02090	Inlet Temp. (deg. C)	89.5	77.3	64.1	25	28.4	32.2	30
90. Cl 22.5 12.2 13.2 13.1 12.6 4.3 N. (deg. Cl) 116.5 94.5 83.7 71 57.7 41.6 Rate (k//s) 160.932 86.800 93.580 92.553 88.747 86.250 Area (sq.m) 4.6723 1.937 1.937 1.937 1.937 4.9556 O 12.557 9.875 11.794 12.310 11.909 7.032 Co 2.743 4.538 4.096 3.882 3.847 2.475 (kW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 Co 1.082 0.0688 0.0480 0.0615 0.0639 0.2080	Outlet Temp. (deg. C)	112	89.5	77.3	64.1	<u>م</u>	36.5	32.2
Area (KW/Sq, m/K) 116.5 94.5 85.7 71 57.7 41.6 Rate (K/S) 160.932 86.800 93.580 92.553 88.747 86.250 4.9556 Area (Sq, m) 4.6723 1.937 1.937 1.937 1.937 4.9556 A 2.743 4.538 4.096 3.882 3.847 2.475 KW/Sq, m/K) 3.9 6.6 5.1 5.1 5.1 5.1 Coolers 0.0688 0.0480 0.0615 0.0639 0.2080	Temp. Rise (deg. C)	22.5	12.2	13.2	13.1	12.6	4.3	79
Rate (k//S) 160.932 B6.800 93.580 92.553 88.747 86.250 Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 4.9556 Q 12.557 9.875 11.794 12.310 11.909 7.032 Q 2.743 4.538 4.096 3.882 3.847 2.475 KW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 C 0.0639 0.0639 0.0639 0.2080	Flashing Temp. (deg. C)	116.5	94.5	83.7	7	27.7	41.6	io.
Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 4 (0 12.557 9.875 11.794 12.310 11.909 7.032 (2 2.743 4.538 4.096 3.882 3.847 2.475 (KW/sq.m/K) 3.9 6.6 5.1 5.1 5.1 5.1 (COSS) 0.0688 0.0480 0.0615 0.0639 0.2080 0	Heat Transfer Rate (kj/S)	160.932	86.800	93.580	92.553	88.747	86.250	44.107
(AW/sq.m/lo 12.557 9.875 11.794 12.310 11.909 7.032 2.743 4.558 4.096 3.882 3.847 2.475 (KW/sq.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 0.0688 0.0480 0.0615 0.0639 0.2080 0	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
(KW/sq.m/N) 3.9 3.882 3.847 2.475 6.6 5.1 5.1 5.1 5.1 6.6 5.1 5.1 5.1 5.1 6.0639 0.0639 0.2080 0.2080	L.M.T.D. (deg. 10	12.557	9.875	11.794	12.310	11.909	7.032	5.83
(KW/sq.m/K) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 5.1 (KW/sq.m/K) 0.0639 0.2080 (KW/sq.m/K)	U (kw/sq.m/k)	2.743	4.538	4.096	3.882	3.847	2.475	1.526
0.0688 0.0480 0.0615 0.0639 0.2080	Clean-U Value (KW/sq.m/K)	o. Si	9.9	5.1	۲.	F.9	23	7.5
	f (sq.m K/kW)	0.1082	0.0688	0.0480	0.0615	0.0639	0.2080	0.4591

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 5-2	Date: October 31, 94	,	Time: 16:00		Total Operatic	Total Operation Time: 168 hr.	
Variables	Brine Heater			Evaporator Stages			
		7 #	#2	8	**	\$ *	*
Flowrate (kg/h)	9200	9200	6500	6500	9059	18000	18000
Specific Heat (kj/kg/K)	3.961	3.940	3.926	3.913	3.901	3.968	3.965
Inlet Temp. (deg. C)	89.5	77.2	63.9	50.9	38.2	32.3	5 2
Outlet Temp. (deg. C)	112	89.5	77.2	63.9	50.9	37	32.3
Temp. Rise (deg. C)	22.5	12.3	13.3	13	12.7	4.7	8.3
Flashing Temp. (deg. C)	116	94.1	83.1	7.07	57.5	41.6	57
Heat Transfer Rate (KJ/S)	160.932	87.511	94.285	91.843	89.448	93.242	65.429
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. lo	11.899	9.452	11.272	12.164	11.836	6.677	6.204
U (kW/sq.m/k)	2.895	4.780	4.318	3.898	3.902	2.818	2.128
Clean-U Value (kW/sq:m/k)	6	6.6	5.1	5.1	7.	5.1	5.3
f (sq.m K/kW)	16B0.0	0.0577	0.0355	0.0605	0.0602	0.1588	0.2738
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							

Date: October 31, 94

Run No. 5-2

Total Operation Time: 172 hr.

Veriables	Brine Heater			Evaporator Stages			
		#1	#2	⇔	**	ID **	*
Flowrate (kg/h)	6500	6500	9200	6500	9200	18000	18000
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	3.901	2.967	3.965
Inlet Temp. (deg. C)	68	77.1	63.7	50.6	37.8	32.2	29
Outlet Temp. (deg. C)	112	68	77.1	63.7	50.6	36	32.2
Temp. Rise (deg. C)	23.	11.9	13.4	13.1	12.8	89.	3.2
Flashing Temp. (deg. C)	117	76	83	70.7	57.3	41.5	36.7
Heat Transfer Rate (kj/S)	164.495	84.657	94.990	92.544	90.146	75.381	63.446
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	13.351	9.771	11.307	12.419	11.982	7.234	5.957
U (KW/sq.m/ko	2.637	4.473	4.337	3.847	3.884	2.103	2.149
clean-U Value (KW/sq.m/lo	3.9	9.9	7.7	5.1	5.1	5.7	5.1
f (sq.m K/KW)	0.1228	0.0721	0.0345	0.0639	0.0614	0.2795	0.2692

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 5-2	Date: November Of	3 , 2	Time: 00:00		Total Operatio	Total Operation Time: 176 hr.	
Vertebles	Brine Heater			Evaporator Stages			
		**	# 2	£.	*	10 76	45 %
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	3.900	3.968	3.965
inlet Temp. (deg. C)	8	77.2	63.8	50.5	57.7	32.2	28.5
Outlet Temp. (deg. C)	112	68	77.2	63.8	50.5	36.5	32.2
Temp. Rise (deg. C)	23	11.8	13.4	13.3	12.8	4.3	3.7
Flashing Temp. (deg. C)	117.5	93.8	83.1	70.8	57.2	41.3	36.6
Heat Transfer Rate (kj/S)	161.965	82.656	93.531	92.512	88.757	85.303	73:357
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	13.980	9.510	11.307	12.492	11.982	6.722	6.063
U (KW/sq:m/lo	2.480	4.487	4.271	5.823	3.824	2.561	2.442
Clean-U Value (KW/sq.m/l0	3.9	9.9	7.7.	5.3	5.1	5.1	5.5.1
f (sq.m K/KW)	0.1469	0.0713	0.0381	0.0655	0.0654	0.1945	0.2135
							I

Date: November 01, 94

Run No. 5-2

Total Operation Time: 180 hr.

Variables	Brine Heater			Evaporator Stages	seden				
		*	#2	£ #	**	*	S #8	•	
Flowrate (kg/h)	6400	6400	6400	6400		6400	18200		18200
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	n)	3.900	3.968		3.965
Inlet Temp. (deg. C)	88	77.1	63.7	50.4		37.5	32		28.5
Outlet Temp. (deg. O	112	68	17.1	63.7		50.4	36.5		32
Temp. Rise (deg. C)	23	11.9	13.4	13.3		12.9	4.5		83.
Flashing Temp. (deg. C)	118	94	83.4	70.8		57.1	41.1		36.4
Heat Transfer Rate (kj/S)	161.965	83.355	93.529	92.509		89.447	90.261	7	70.162
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	•	1.937	4.9556	4	4.9556
L.M.T.D. (deg. K)	14.598	9.771	11.754	12.601	7	12.018	6.596		2.980
U (KW/sq.m/lo	2.575	4.404	4.108	3.790	M	3.843	2.761		2.367
Clean-U Value (kw/sq.m/k)	O.H	6.6	5.1	2.00		5.1	5.		5.1
f sq.m K/kw)	0.1647	0.0755	0.0473	0.0678	8	0.0642	0.1661		0.2263

Run No. 5-2	Date: November 01, 94		Time: 06:00		Total Operation Time: 184 hr.	ime: 184 hr.	
Variables	Brine Heater			Evaporator Stages			
			# # **	en **	*	10 18	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18000	18000
Specific Heat (kj/kg/lo	3.961	3.940	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	68	77.3	64.1	50.9	38.2	32.4	30
Outlet Temp. (deg. C)	112	68	77.3	64.1	50.9	38	32.4
Temp. Rise (deg. C)	23	11.7	13.2	13.2	12.7	5.6	2.4
Fiashing Temp. (deg. C)	118.5	94.1	83.4	7	27.7	41.7	36.8
Heat Transfer Rate (kj/S)	163.230	82.597	92.860	92.541	88.760	111.106	47.589
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4,9556
L.M.T.D. (deg. 10	15.206	9.814	11.460	12.346	12.055	9.00.9	5.513
U (KW/sq.m/k)	2.298	4.345	4.183	3.870	3.801	3.690	1.742
Clean-U Value (KW/sq.m/l0	6.5	9.9	5.1	.5.1	5.7	 5.1	5.7
to ten my Wilden	0.4788	90200	0.0420	**************************************	OF JOS	0700	C072 C

Date: November 01, 94

Run No. 5-2

Total Operation Time: 188 hr.

TIMe: 12:00

Variables	Brine Heater			Evaporator Stages	tages		
,		#1	#2	8	**	10 %	9
Flowrate (kg/h)	6500	6500	9200	0059	9059	18200	18200
Specific Heat (KJ/kg/iO	3.961	3.940	3.927	3.913	3.901		3.966
Inlet Temp. (deg. O	88	77.4	64.6	51.5	38.5		30
Outlet Temp. (deg. C)	112	68	77.4	64.6	51.5	38	32.8
Temp. Rise (deg. C)	23	11.6	12.8	13.1	12.7	5.2	2.8
Flashing Temp. (deg. O	118.5	36	84.3	72	R. 80	42.2	57.4
Heat Transfer Rate (KJ/S)	164.495	82.527	90.752	92.565	89.46		56.139
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937		4.9556
L.M.T.D. (deg. K)	15.206	10.779	12.201	12.856	12.274		5:583
U (KW/sq.m/io	2.315	3.953	3.840	3.717	3.763		2.029
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.7	5.7	5.1	5 6	5.1
f (sq.m KVKW)	0.1755	0.1015	0.0643	0.0730	0.0697	0.1105	0.2968

Run No. 5-2	Date: November 01, 94	1,94	Time: 16:00		Total Operation Time: 192 hr.	Time: 192 hr.	
Variables	Brine Heater			Evaporator Stages			
		7	#:	**	*	¥.	8
Flowrate (kg/h)	0059	6500	9200	0059	9059	18500	18500
Specific Heat (kJ/kg/lO	3.961	3.940	3.927	3.914	3.902	3.968	3.966
Inlet Temp. (deg. C)	8	77.5	64.7	51.8	39.6	32.2	29.5
Outlet Temp. (deg. O	112	88	77.5	64.7	51.8	57	32.2
Temp. Rise (deg. C)	23	11.5	12.8	12.9	12.2	4.8	2.7
Flashing Temp. (deg. C.	118.5	94.8	84.2	71.8	58.8	42.6	39.3
Heat Transfer Rate (kj/5)	164.495	81.816	90.754	91.156	85.950	97.870	55.022
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. 10	15.206	10.523	11.982	12,456	12:091	7.754	8.378
U (KW/sq.m/k)	2.315	4.014	3.910	3.778	3.670	2.547	1.325
Clean-U Value (KW/sq.m/lo	6.K	9.6	5.1	5.1	5.1	5.1	. 5. 5.
f (sq.m K/kW)	0.1755	0.0976	0.0596	0.0686	0.0764	0.1965	0.5585

Date: November 01,94

Run No. 5-2

Total Operation Time: 196 hr.

Variables	Brine Heater			Evapon	Evaporator Stages			
		#	#5	#3		*	10) 78:	***
Flowrate (kg/h)	9200	6500	0059	19	9200	0059	18200	18200
Specific Heat (KJ/Kg/K)	3.961	3,940	3.927	Ş.	3.914	3.902	3.968	3.965
Inlet Temp. (deg. C)	68	77.5	64.6	S.	51.6	39.2	32	23
Outlet Temp. (deg. C)	112	88	77.5	9	9.6	57.6	37	32
Temp. Rise (deg. C)	23	11.5	12.9		13	12.4	L	M
Flashing Temp. (deg. C)	120	94.3	***************************************	7	71.8	58.5	42.3	38.9
Heat Transfer Rate (kj/S)	164.495	81.816	91.462		09	87.353	100.293	60.141
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937		37.	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	16.980	896.6	11.797		.02	12.055	7.525	8.310
U (KW/sq.m/K)	2.073	4.237	4.002	3.7	3.763	3.741	2.689	1.460
Clean-U Value (KW/sq.m/l0	3.9	9.6	. 5.1	# 10 # 2	5.1	5.1	53.7	5:3
f (sq. m K/kw)	0.2259	0.0845	0.0538	9690'0	96	0.0712	0.1757	0.4887

Run No. 5-2	CALLULATIONS OF OVERALL REAL TRANSPER CO. 84 Run No. 5-2		K COEFFICIENT AND FOULING CACLLOR , 94 Time: 00:00	ž	Total Operation Time: 200 hr.	Time: 200 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#5	(C)	**	\$#	9#
Flowrate (kg/h)	029	9200	0059	0059	9200	18000	18000
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	5.913	3.902	3.968	3.965
inlet Temp. (deg. C)	68	77.2	64.3	51.5	39.2	32.3	53
Outlet Temp. (deg. C)	112	68	77.2	64.3	51.5	37	32.3
Temp. Rise (deg. C)	23	11.8	12.9	12.8	12.3	4.7	3.3
Flashing Temp. (deg. C)	120.5	8.76	8	7.17	58.6	42.7	38.9
Heat Transfer Rate (kJ/S)	164.495	83.947	91.455	90.442	86.647	93.242	65.429
Heat Transfer Anea (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	17.558	10.630	12.128	12.746	12.237	7.816	8.139
U (kW/sq.m/ko	2.005	4.077	3.893	3.663	3.656	2.407	1.622
Clean-U Value (KW/sq.m/K)	3.9	6.6	5.7	5.1	5.1	5.1	5.7
f (co m) K/MM)	10 242 T	0.0070	0.000	0.0769	3770	70700	ACCA O

Date: November 02, 94

Run No. 5-2

Total Operation Time: 204 hr.

Veriebles	Brine Heater			· ·	EV	Evaporator Stages			
		'*	*	#2		£	**	io N	9
Flowrate (kg/h)	029		6500	9200		9200	0059	18000	18000
Specific Heat (k)/kg/10	3.961		3.940	3.927		3.913	3.901	3.968	3.965
Inlet Temp. (deg. C)	68		77.3	64.5		51.5	39	32.3	8
Outlet Temp. (deg. C)	112		68	77.3		64.5	51.5	37	32.3
Temp, Rise (deg. C)	23		11.7	12.8		٤,	12.5	4.7	K.
Flashing Temp. (deg. O	120.5		94.5	83.7		71.9	58.6	42.6	38.5
Heat Transfer Rate (KJ/S)	164.495	•	83.237	90.749		91.857	88.054	93.242	65.429
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937		1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	17.558	•	10.262	11.651		12.820	12.510	7.713	7.733
U (KNV/sq.m/k)	2.005		4.188	4.021		3.699	3.693	2.440	1.707
Clean-U Value (kW/sq.m/to	6 10 10 10 10 10 10 10 10 10 10 10 10 10		9.9	5.1		5.1	2.4	5.	7.
f sq.m K/KW)	0.2423		0.0873	0.0526		0.0743	0.0747	0.2138	0.3896
							2 4.4		

Run No. 5-2	Date: November 02, 94		Time: 08:00		Total Operation Time: 206 hr.	Time: 208 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	e #	*		*
Flowrate (kg/h)	6500	6500	6500	0059	9200	18000	18000
Specific Heat (kJ/kg/10	3.961	3.940	3.927	3.914	3.902	3.968	3.966
inlet Temp. (deg. C	68	77.4	64.7	51.7	39.4	32.3	3.
Outlet Temp. (deg. C)	112	68	77.4	64.7	51.7	38	32.3
Temp. Rise (deg. C)	23	11.6	12.7	13	12.3	5.7	1.3
Flashing Temp. (deg. C)	120.5	94.3	83.7	71.9	58.8	42.8	38.7
Heat Transfer Rate (KJ/S)	164.495	82.527	90.044	91.862	86.651	113.089	25.779
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	17.558	10.003	11.505	12.602	12.237	7.282	7.030
U (kW/sq.m/l0	2.005	4.259	4.041	3.763	3.656	3.134	0.740
Clean-U Value (kW/sq.m/K)	6.6	6.6	5.1	5.7		5.1	5.7
# KG m K/kW	0.2423	22800	0.054A	90900	35500	0.1020	1 1553

Date: November 02, 94

Run No. 5-2

Total Operation Time: 212 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages	Stages			
		# 1	#2	en #		**	10 **	•
Flowrate (kg/h)	6500	9200	9200	6500		0059	18000	18000
Specific Heat (kj/kg/K)	3.961	3.940	3.926	3.913		3.902	3.968	3.966
inlet Temp. (deg. C)	88.5	77	64.2	51.5		39.4	33.2	30.5
Outlet Temp. (deg. C)	112	88.5	77	64.2		51.5	38	33.2
Temp. Rise (deg. C)	23.5	11.5	12.8	12.7		12.1	4.8	2.7
Flashing Temp. (deg. C)	121	94.9	83.2	22		82	43	38.3
Heat Transfer Rate (kJ/S)	168.058	81,805	90.742	89.734		85.240	95.240	53.542
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937		1.937	4.9556	4.9556
LM.T.D. (deg. 10	18.302	11.181	11.430	13.143		12.596	7.153	6.355
U (kw/sq.m/ld	1.965	3.777	4.099	3.525		3.494	2.694	1.700
Clean-U Value (KW/sq.m/)0	3.9	9.9	5.0	5.1		5.1	5.3	5.1
f (sq.m.K/kw)	0.2524	0.1132	0.0479	0.0876		0.0902	0.1751	0.3921

Variables	Brine Heater			Evaporator Stages			
		#	#2	en %	**	6	
Flowrate (kg/h)	0059	9200	6500	029	6500	17500	17500
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	3.901	3.968	3.966
inlet Temp. (deg. C)	88.5	76.6	3 3	51.2	38.9	33.3	30
Outlet Temp. (deg. C)	112	88.5	76.6	29	51.2	38	33.3
Temp. Rise (deg. C)	23.5	11.9	12.6	12.8	12.3	4.7	3.3
Flashing Temp. (deg. C)	121	94.6	83.1	71.9	58.8	43.1	37.6
Heat Transfer Rate (KJ/S)	168.058	84.645	89.317	90.435	86.641	90.666	63.621
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	18.302	10.997	11.690	13.288	12.778	7.196	5.794
U (KW/sq.m/l0	1.965	3.974	3.945	3.514	3.500	2.542	2.216
Clean-U Value (kW/sq.m/K)	6.	9.9	5.5	5.7	5.7	5.1	5.1
f sq.m K/kW)	0.2524	0.1001	0.0574	0.0885	0.0896	0.1972	0.2552

Date: November 02, 94

Run No. 5-2

Total Operation Time: 220 hr.

Variables	Brine Heater			Evaporator Stages	tages			
		**	*	#3	*	_	*	9.0
Flowrate (kg/h)	0059	0059	9200	9200	60	6500	17200	17200
Specific Heat (Kj/Kg/K)	3.961	3.940	3.926	3.913	, ki	3.901	3.968	3.966
inlet Temp. (deg. C)	88.5	76.8	63.9	51.1		38.6	33.1	82
Outlet Temp. (deg. C)	112	88.5	76.8	63.9		51.1	38	33.1
Temp. Rise (deg. C)	23.5	11.7	12.9	12.8		12.5	6.9	4.1
Flashing Temp. (deg. C)	121.5	94.8	83.2	71.9		58.7	43	37.3
Heat Transfer Rate (kJ/S)	168.058	83,225	91.445	90.433	88	88.046	92.902	77.682
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	•	937	4.9556	4.9556
L.M.T.D. (deg. 10	18.872	11.145	11.687	13.396	12.	853	7.173	6.019
U (KWV/sq.m/ro	1.906	3.855	4.040	3.485	Hri	3.537	2.613	2.604
Clean-U Value (kW/sq.m/fo	6.8	9.0	Ž,	5.1		7.	5.7	2.3
f. (sq.m. K/K/W)	0.2683	0.1079	0.0515	0.0909	0.0	867	0.1866	0.1879

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 5-2	Date: November 03, 94	8 '80		Time: 00:00		Total Operatio	Total Operation Time: 224 hr.	
Variables	Brine Heater				Evaporator Stages			
				# 2	€#	**	10 %	*
Flowrate (kg/h)	0059		0059	0059	0059	9200	17200	17200
Specific Heat (KJ/kg/K)	3.961		3.940	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	88.5	*** ;	76.9	64.1	<u>22</u>	38.6	33.1	23
Outlet Temp. (deg. C)	112		88.5	76.9	64.1	51.1	37.5	33.1
Temp. Rise (deg. C)	23.5		11.6	12.8	13	12.5	4.4	4.1
Flashing Temp. (deg. C)	121.5		94.7	85.4	71.9	58.7	43	37.2
Heat Transfer Rate (KJ/S)	168.058		82.515	90.740	91.848	88.046	83,419	77.682
Heat Transfer Area (5q.m)	4.6723		1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. K)	18.872		10.999	11.761	13.254	12.853	7.486	5.915
U (KW/sq.m/to	1.906		3.873	3.983	3.578	3.537	2.249	2.650
Clean-U-Value (kW/sq.m/l0	3.9		9.9	5.1	5.1	5.1	5.1	5.4
f (sq.m.K/kw)	0.2683		0.1067	0.0550	0.0834	0.0867	0.2486	0.1813

Date: November 03, 94

Run No. 5-2

Total Operation Time: 228 hr.

Variables	Brine Heater			Evaporator Stages			
		#	#2	#3	*	9	*
Flowrate (kg/h)	0059	6500	0059	0059	9200	17200	17200
Specific Heat (kj/kg/K)	3.961	3.939	3.926	3.913	3.901	3.968	3.966
inlet Temp. (deg. O	88.2	76.6	63.8	50.8	38.3	£2.	8
Outlet Temp. (deg. C)	112	88.2	76.6	63.8	50.8	37.5	88
Temp. Rise (deg. O	23.8	11.6	12.8	13	12.5	4.5	4
Flashing Temp. (deg. C)	122	93.7	83.7	71.4	58.2	42.6	36.9
Heat Transfer Rate (KJ/S)	170.195	82.508	90.732	91.841	88.040	85.314	75.787
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. l0	19.542	10.226	12.420	13.037	12.636	7,114	5.667
U:0kW/sq.m/l0	1.864	4.165	3.772	3.637	3.597	2.420	2.699
Clean-U Value (kW/sq.m/l0	6.2	9.9	2.3	5.1	7.3	5.1	S
f sq.m K/kW)	0.2801	0.0836	0.0691	0.0789	0.0819	0.2172	0.1745

Run No. 5-2	Date: November 03,	36 50		Time: 08:00		Total Operation Time: 252 hr.	ime: 232 hr.	
Veribles	Brine Heater				Evaporator Stages			
		l	#1	#2	O **	*	10	•
Flowrate (kg/n)	0059		0290	0059	9200	9200	17500	17500
Specific Heat (k/kg/lo	3.960		3.939	3.926	3.913	3.901	3.968	3.967
Inlet Temp. (deg. C)	***		76.6	63.8	50.8	38.3	33	33
Outlet Temp. (deg. C)	112		88	76.6	63.8	50.8	88	33
Temp. Rise (deg. C)	24		11.4	12.8	K	12.5	'n	0
Flashing Temp. (deg. C)	123		93.7	83.4	71.1	58.1	42.6	36.8
Heat Transfer Rate (KJ/S)	171.620		81.083	90.732	91.841	88.040	96.451	0.000
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937	1.937	1.937	4.9556	4.9556
LM:T.D. (deg. 10	20.735		10.377	12.091	12.711	12.527	6.796	ERR
U (KW/sq.m/lo	1771		4.034	3.874	3.730	3.628	2.864	E
Clean-U Value (kW/sq.m/lo	3.9		6.6	ř.	5.1	5.3	5.1	1
f. Sq.m K/kW	0.3081		0.0964	0.0621	0.0720	0.0795	0.1531	ER

Date: November 03,94

Run No. 5-2

Total Operation Time: 236 hr.

Time: 12:00

Variables	Brine Hester			Evaporator Stages	sede;			
		#1	#2	£#	*		9#	9
Flowrate (kg/h)	0059	6500	0290	0059	9200	0	17500	17500
Specific Heat (kj/kg/K)	3.960	3.939	3.926	3.913	3.901	.	3.968	3.966
inlet Temp. (deg. C)	88	76.9	64.2	51.4	39	•	33.4	OF.
Outlet Temp. (deg. C)	112	88	76.9	64.2	51.4	4	38	33.4
Temp. Rise (deg. C)	24	7.7.	12.7	12.8	12.	M	4.6	3.4
Flashing Temp. (deg. C)	123	94.6	84.5	72.3	59.2	7	43.2	37.5
Heat Transfer Rate (KJ/S)	171.620	78.952	90.032	90.440	86.645		88.737	65.549
Heat Transfer Anea (Sq.m)	4.6723	1.937	1.937	1.937	1.937		4.9556	4.9556
L.M.T.D. (deg. 10	20.735	11.252	12.927	13.504	12.99		7.259	5.630
U. (KW/sq.m/fo	1.77	3.622	3.596	3.458	5.442	2	2.467	2.349
Clean-U Value (KW/sq.m/K)	6.5	9.9	23	2.3	5.7		5.1	5.3
f (sq.m K/KW)	0.3081	0.1245	0.0820	0.0931	0.0944		0.2093	0.2295
一十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二								

Run No. 5-2	Date: November 03,94		Time: 16:00		Total Operation Time: 240 hr.	ime: 240 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	*2	€#	*	# 5	**
Flowrate (kg/h)	6500	6500	0299	6500	0059	17500	17500
Specific Heat (ki/kg/k)	3.960	3.939	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C	88	76.5	63.7	50.8	38.4	33.1	
Outlet Temp. (deg. C)	112	88	76.5	63.7	50.8	38	33.1
Temp. Rise (deg. C)	24	11.5	12.8	12.9	12.4	4.9	:
Flashing Temp. (deg. C)	123.5	94.6	84.3	71.9	58.8	42.8	37.1
Heat Transfer Rate (KJ/S)	171.620	81.793	90.730	91.134	87.336	94.522	79.037
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	21.292	11.399	13.180	13.649	13.247	6.965	5.811
U (KW/sq.m/l0	1.725	3.704	3.254 4.254	3.447	3.404	2.739	2.745
Clean-U Value (KW/sq.m/l0	О	9.9	5.3	5.7	5.1	7.3	5.1
f (sq.m K/KW)	0.3233	0.1184	0.0853	0.0940	0.0977	0.1691	0.1683

Date: November 03, 94

Run No. 5-2

Total Operation Time: 244 hr.

Variables	Brine Heater	*.		Evaporator Stages	· · · · · · · · · · · · · · · · · · ·		
		*	##	(r) Th	*	10 **	•
Flowrate (kg/h)	9200	0059	0059	9200	9200	17500	17500
Specific Heat (KJ/kg/K)	3.960	3,939	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	88	76.7	63.8	50.9	38.3	33.1	82
Outlet Temp. (deg. C)	112	88	76.7	63.8	50.9	38	33.1
Temp. Rise (deg. O	24	11.3	12.9	12.9	12.6	Q.4.9	4.1
Flashing Temp. (deg. C)	124	\$6	84.4	72	58.9	63	37
Heat Transfer Rate (KJ/S)	171.620	80.373	91.442	91.136	88.745	94.522	79.037
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	21.846	11.759	13.109	13.649	13.321	7.173	5.702
U (KW/sq:m/f0	1.681	3.529	3.601	3.447	3.439	2.659	2.795
Clean-U Value (KW/sq.m/fo	O. P.	8.6	F.8	5.7	5.4	5.3	5.1
f (sq.m K/KW)	0.3383	0.1319	0.0816	0.0940	0.0947	0.1800	0.1617
1000年の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の		2.7			201 201 201 201 201 201 201 201 201 201		

0.0932	0.0926	0.0793	0.0853	0.3382	f.sq.m K/kW
F.6	5.1	5.1	9.9	3.9	Clean-U Value (kW/sq.m/k)
3.457	3,464	3.631	4.223	1.682	U (kW/sq.m/k)
13.359	13.686	13.000	10.697	20.936	L.M.T.D. (deg. 10
1.937	1.937	1.937	1.937	4.6723	Heat Transfer Area (Sq.m)
89.446	97.841	91.442	87.498	164.495	Heat Transfer Rate (kj/S)
58.8	72	84.3	94.7	123.5	Flashing Temp. (deg. C)
12.7	13	12.9	12.3	23	Temp. Rise (deg. C)
50.8	63.8	76.7	68	112	Outlet Temp. (deg. C)
38.1	50.8	63.8	76.7	68	Inlet Temp. (deg. C)
3.901	3.913	3.926	3.940	3.961	Specific Heat (kj/kg/K)
9200	6500	6500	9200	0059	Flowrate (kg/h)
*	£#3	#2	£ #		
595	Evaporator Stay			Brine Heater	Variables
Total Operation Time: 246 hr.		Time: 00:00	1, 94	Date: November O	Run No. 5-2
			THE COURT OF THE C		
	ACTOR	AND FOULING FA	P COEFFICIENT	ALL HEAT TRANSFE	CALCIII ATIONS OF OVER
		#3 6500 3.913 50.8 63.8 63.8 63.8 13 72 91.841 1.937 13.686 3.464	#3 6500 3.913 50.8 63.8 63.8 13 72 91.841 1.937 13.686 3.464	# COEFFICIENT AND FOULING FACTOR # Time: 00:00 Evaporator Stages # 3 # 6500 6500 6500 5.940 3.926 3.913 76.7 63.8 50.8 89 76.7 63.8 12.3 12.9 13 94.7 84.3 72 87.498 91.442 91.841 1.937 1.937 1.937 10.697 13.000 13.686 # 6.6 5.1 5.1	MASFER COFFFICIENT AND FOULING FACTOR ber 04, 94 Time: 00:00 Evaporator Stages e1 # 2 # 3 c0 6500 6500 6500 61 3.940 3.926 3.913 62 89 76.7 63.8 72 84.3 72 85 94.7 84.3 72 95 87.498 91.442 91.841 23 1.937 1.937 1.937 24 4.223 3.651 3.464 89 5.1 5.1 5.1

Date: November 04, 94

Run No. 5-2

Total Operation Time: 252 hr.

Variables	Brine Heater			Evaporator Stages	785		
		**	#2	£#	**	9#	9#
Flowrate (kg/h)	9200	9200	9200	0059	9200	17000	17000
Specific Heat (k)/kg/l0	3.961	3.940	3.926	3.913	3.901	3.968	3.965
Inlet Temp. (deg. C)	88	76.4	63.4	50.7	38.6	32.8	28.5
Outlet Temp. (deg. C)	112	68	76.4	63.4	50.7	37	32.8
Temp. Rise (deg. C)	23	12.6	ĸ	12.7	12.1	4.2	4.3
Flashing Temp. (deg. C)	113.5	93.7	83.2	71.4	58.4	42.6	36.6
Heat Transfer Rate (kj/S)	164.495	89.628	92.142	89.716	85.224	78.697	80.520
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	8.234	9.669	12.164	13.359	12.812	7.505	5.681
U (kW/sq.m/k)	4.276	4.786	3.911	3.467	3.434	2.116	2.860
Clean-U Value (KW/sq.m/K)	3.9	6.6	25	5.7	r.v.	1.6	.
f. (sq.m.)(//kW)	-0.0225	0.0574	0.0596	0.0923	0.0951	0.2765	0.1536

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR Run No. 5-2 Date: November 04, 94 Time: 08:00

Run No. 5-2	Date: November 04, 94	₹	Time: 08:00		Total Operation Time: 256 hr.	Time: 256 hr.	
Variables	Brine Heeter			Evaporator Stages			
		*	#3	M **	**	40	*
Flowrate (kg/h)	0059	9200	6500	9200	6500	17100	17100
Specific Heat (KJ/Kg/K)	3.961	3.940	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	58	76.6	63.7	5	38.8	32.8	30
Outlet Temp. (deg. C)	112	88	76.6	63.7	57	38	32.8
Temp. Rise (deg. C)	23	12.4	12.9	12.7	12.2	5.2	2.8
Flashing Temp. (deg. C)	113	93.9	83.4	71.5	58.7	42.7	36.6
Heat Transfer Rate (KI/S)	164.495	88.208	91,440	89.723	85.934	98.014	52.746
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	7.237	9.830	12.128	13.143	12.849	086.9	5.072
U (kw/sq.m/to	4.865	4.633	3.893	3.524	3.453	2.834	2.099
Clean-U Value (KW/sq.m/lo	6.50	6.6	5.1	rio L	5.4	5.1	អ
fisq.m K/kW)	-0.0508	0.0643	0.0608	0.0877	0.0935	0.1568	0.2804

Date: November 04, 94

Run No. 5-2

Total Operation Time: 260 hr.

Time: 12:00

Variables	Brine Heater	•		Evaporator Stages			
		#1	#2	£ #	**	in the	*
Flowrate (kg/h)	6500	9200	9200	029	0059	17100	17100
Specific Heat (kj/kg/K)	3.961	3.940	3.926	3.913	3.902	3.968	3.966
Inlet Temp. (deg. C)	68	76.7	3	51.5	39.4	33.1	ဇ္ဇ
Outlet Temp. (deg. C)	112	8 8	7.97	8	51.5	88	33.1
Temp. Rise (deg. C)	23	12.3	12.7	12.5	12.1	6.7	3.1
Flashing Temp. (deg. C)	114	94.6	84.1	72	59.2	43.2	37.2
Heat Transfer Rate (kJ/S)	164.495	87.498	90.027	88.319	85.240	92.362	58.398
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	9.106	10.585	12.710	13.284	12.812	7.381	5.505
U (KW/sq.m/k)	3.866	4.268	3.657	3,432	3.435	2.525	2.141
Clean-U Value (KW/sq.m/k)	68	6.6	Σ.	ry Z	5.7	F.8.	<u>R</u>
f. (Sq.m K/kW)	0.0022	0.0828	0.0774	0.0953	0.0951	0.1999	0.2711

Run No. 5-2	Date: November 04,	3 X	Time: 16:00		Total Operation Time: 264 hr.	me: 264 hr.	
Vertebbes	Brine Heater			Evaporator Stages			
		*	#5	50 卷	*	\$5 #k	**,
Flowrate (kg/h)	6500	0059	0059	6500	9200	17100	17100
Specific Heat (KJ/Kg/K)	3.961	3.939	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	88.5	76.3	63.6	51.1	39.1	33.1	29
Outlet Temp. (deg. C)	112	88.5	76.3	63.6	51.1	38	33.1
Temp. Rise (deg. C)	25.5	12.2	12.7	12.5	5	4.9	4.1
Flashing Temp. (deg. C)	114	93.9	82.9	713	58.8	43	37.2
Heat Transfer Rate (kj/S)	168.058	86.775	90.017	88.310	84.529	92.362	77.231
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	9.232	10.326	11.836	12.961	12.774	7.173	5.915
U (KW/sq.m/l0	3.896	4.339	3.927	3.518	3.416	2.598	2.635
Clean-U Value (kW/sq.m/k)	6.5	9.9	5.7	5.1	5.1	5.7	28
A (************************************	2000	00000	0.0586	0.0882	0.0966	0.1888	0.1835

Date: November 04,94

Run No. 5-2

Total Operation Time: 268 hr.

Veriables	Brine Heater			Evaporator Stages	sedes		
		*	# 5	£ #	*#	S: #	6
Flowrate (kg/h)	0059	9200	0059	0059	0200	17100	17100
Specific Heat (kj/kg/K)	3.961	3.940	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	88.5	9.92	63.6	2	38.8	32.8	23
Outlet Temp. (deg. C)	112	88.5	76.6	63.6	ሯ	38	32.8
Temp. Rise (deg. C)	23.5	11.9	£	12.6	12.2	5.2	3.8
Flashing Temp. (deg. O	114	93.5	82.8	71.6	58.5	42.7	36.8
Heat Transfer Rate (KJ/S)	168.058	84.645	92.147	89.015	85.934	98.014	71.578
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	9.232	9.771	11.501	13.321	12.633	6.980	5.690
U (KW/sq.m/to	3.896	4.472	4.136	3.450	3.512	2.834	2.538
Clean-U Value (KW/sq.m/K)	3.9	6.6	5.1	7.2	5	Ż,	5.3
f (sq.m K/kw)	0.0003	0.0721	0.0457	0.0938	0.0887	0.1568	0.1979

Run No. 5-2	Date: November 05,	32 , 35		Time: 00:00		Total Operation Time: 272 hr.	Time: 272 hr.	
	Brine Heater				Evaporator Stages	2		
			- -	#2	e. **	*	\$	*
Flowrate (kg/h)	6500		6500	929	0059	9290	17100	17100
Specific Heat (KI/Kg/K)	3.961		3.940	3.926	3.913	3.901	3.968	3.965
inlet Temp. (deg. C)	88		76.6	63.7	50.9	38.6	32.7	28.5
Outlet Temp. (deg. O	112		88	76.6	63.7	50.9	37.5	32.7
Temp. Rise (deg. C)	23		12.4	12.9	12.8	12.3	8.4	4.2
Flashing Temp. (deg. C)	114.5		93.8	82.9	71.5	58.4	42.5	36.6
Heat Transfer Rate (KJ/S)	164.495		88.208	91.440	90.428	86.635	90.471	79.109
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	9.904		9.716	11.576	13.180	12.670	7.133	5.746
U (KW/sq.m/io	3.555		4.687	4.078	3.542	3.530	2.559	2.778
Clean-U Value (kW/sq.m/k)	3.9		6.6	5.1	5.1	5.5	5.7	5.1
f (sq.m K/kW)	0.0249		0.0618	0.0491	0.0862	0.0872	0.1946	0.1639

Date: November 05,94

Run No. 5-2

Total Operation Time: 276 hr.

Variables	Brine Heater			Evapo	Evaporator Stages			. 4
		# 1	# 2	£	8	**	89	9 *
Flowrate (kg/h)	0059	6500	9200		9059	9200	17100	17100
Specific Heat (kJ/kg/K)	3.961	3.939	3.926	M	3.913	3.901	3.968	3.965
Inlet Temp. (deg. C)	88.5	76.5	63.6		50.8	38.5	32.6	28.5
Outlet Temp. (deg. C)	112	88.5	76.5		63.6	50.8	37.5	32.6
Temp. Rise (deg. C)	23.5	12	12.9		12.8	12.3	4.9	4.1
Flashing Temp. (deg. C)	114.5	93.5	82.8		71.2	58.2	42.4	36.5
Heat Transfer Rate (kj/S)	168.058	85,355	91.437	.	90.426	86.633	92.355	77.225
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937		.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	10.035	908.6	11.576	42	12.964	12.562	7.069	5.707
U (kW/sq.m/l0	3.584	4.494	4.078	N O	.601	3.560	2.636	2.731
Clean-U Value (KW/sq.m/l0	3.9	6.6	5.7		5.1	7.5	5.3	5.1
f 6q.m K/kW	0.0226	0.0710	0.0491	0	0.0816	0.0848	0.1832	0.1704
		-						

Run No. 5-2	Date: November 05,	3	Time: 06:00		rotal Operation Time: 280 nr.	NG: 260 MF.	
	Brine Heater			Evaporator Stages			
			# 2	es **	**	9#	8
Flowrate (kg/h)	0059	9200	9200	029	6500	18200	18200
Specific Heat (KJ/kg/K)	3.961	3,939	3.926	3.913	3.901	3.968	3.966
Inlet Temp. (deg. C)	88.5	76.3	63.6	፳	38.7	32.8	29.5
Outlet Temp. (deg. C)	112	88.5	76.3	63.6	75	37.5	32.8
Temp. Rise (deg. C)	23.5	12.2	12.7	12.6	12.3	4.7	K
Flashing Temp. (deg. C)	114	92.2	82.3	71.2	58.1	42.6	36.8
Heat Transfer Rate (kj/S)	168.058	86.775	90.047	89.015	86.637	94.285	66.161
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	9.232	8.368	11.172	12.890	12.237	7.196	5.486
U (KW/sq.m/l0	3.896	5.354	4.160	3.565	3.655	2.644	2.434
Clean-U Value (kW/sq.m/k)	3.9	6.6	1.0	5.1	5.1	5.1	5.7
f (sa.m K/kw)	0.0003	0.0353	0.0443	0.0844	0.0775	0.1821	0.2148

Date: November 06, 94

Run No. 5-2

Total Operation Time: 316 hr.

Vertexter	Drine Hander			Evaporator Stages			
		*	# 5	C #	*	10. 74.	•
Flowrate (kg/h)	0059	6500	6500	9200	0059	17100	17100
Specific Heat (kj/kg/lO	3.960	3.939	3.925	3.912	3.900	3.968	3.966
Inlet Temp. (deg. C)	88	76.2	63.3	50.4	37.7	32.7	23
Outlet Temp. (deg. C)	112	88	76.2	63.3	50.4	38	32.7
Temp. Rise (deg. C)	24	11.8	12.9	12.9	12.7	5.3	3.7
Flashing Temp. (deg. C)	117	93.6	83.2	71.6	58.3	42.4	36.1
Heat Transfer Rate (kJ/S)	171.620	83.923	91.430	91.125	89.438	99.899	69.694
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. l0	13.653	10.408	12.347	13.756	13.25/	6.704	5.025
U (KW/sq.m/K)	2.690	4.163	3.823	3.420	3.485	5.007	2.799
Clean-U Value (kW/sq.m/K)	0 ;	9.9	5.1	5.4	Σ, in	5.7	5.7
f (sq.m K/k/W)	0.1153	0.0887	0.0655	0.0963	6060.0	0.1365	0.1612

Variables Brine Heater Flowrate (kg/h) 6500 6500 Specific Heat (kl/kg/l) 3,960 3,939 Inlet Temp. (deg. C) 88 76.2 Outlet Temp. (deg. C) 112 88 Temp. Rise (deg. C) 24 11.8 Flashing Temp. (deg. C) 177.620 83.923 Heat Transfer Rate (kl/s) 177.620 83.923 Heat Transfer Area (Sq.m) 4.6723 1.937 L.M.T.D. (deg. K) 13.653 10.630 U (kW/sq.m/k) 2.690 4.076	Time: 00:00		Total Operation Time: 520 hr.	e: 320 hr.	
6500 3.960 88 112 24 117 171.620 83 4.6723 13.653		Evaporator Stages			
6500 3.960 88 112 24 117 171.620 83 13.653 10 2.690	*	en **	*	10 *	9
3.960 88 112 24 117 177.620 83 13.653 10	6500	6500	6500	17100	17100
88 111 24 171.620 83 4.6723 10 2.690 4	3.925	3.912	3.900	3.968	3.965
24 117 171.620 83 4.6723 10 13.653 10	63.3	50.3	37.7	32.7	. 78
24 117 171.620 83 4.6723 1 13.653 10	76.2	65.3	50.3	38	32.7
117.620 8 4.6723 13.653	12.9	73	12.6	5.3	4.7
171.620 4.6723 13.653 7	83.2	71.4	58.1	42.4	36.1
4.6723 13.653 2.690	91.430	91.830	88.733	99.899	88.524
13.653	1.937	1.937	1.937	4.9556	4.9556
2.690	12.347	13.578	13.106	6.704	5.414
	3.823	3.491	3.495	3.007	3.299
Clean-U Value (kW/sq.m/k) 6.6	5.7	5.1	5.1	5.1	7.
f (sq.m K/kW) 0.0938	0.0655	0.0903	0.0900	0.1365	0.1070

Date: November 07, 94

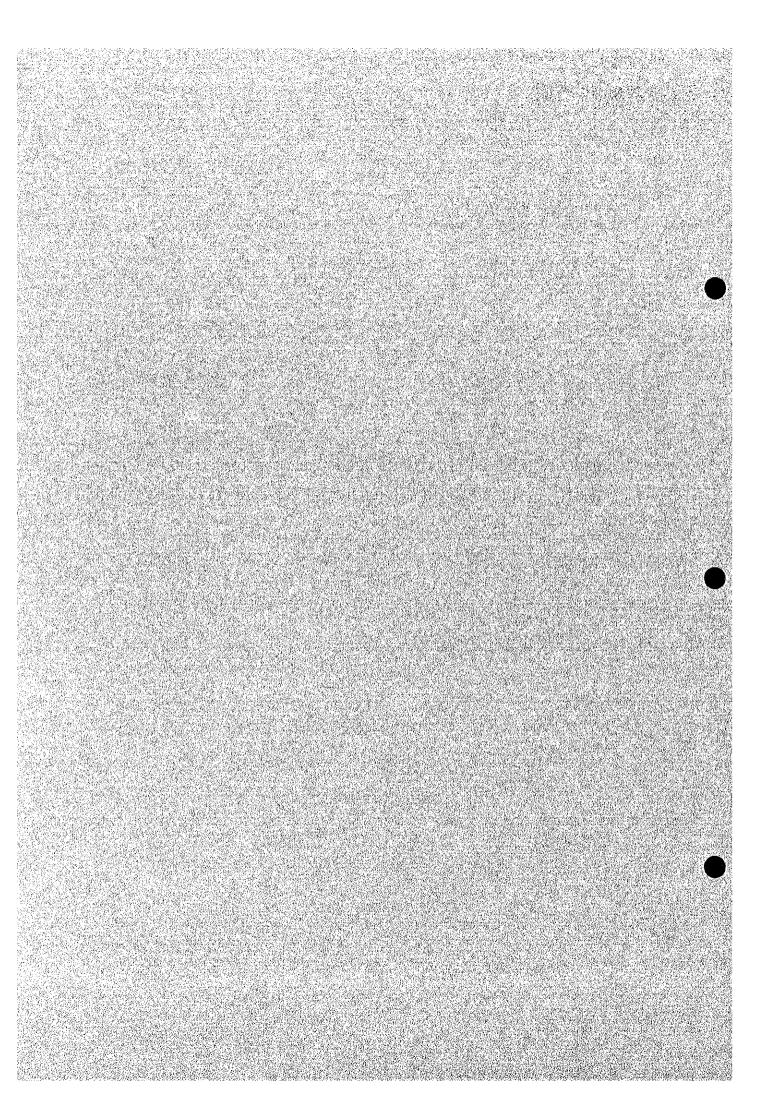
Run No. 5-2

Total Operation Time: 324 hr.

Variables	Brine Heater			Evaporator Stages			
		*	# 5	07 兼	*	\$0 \$k	*
Flowrate (kg/h)	6500	6500	6500	6500	9200	17200	17200
Specific Heat (kj/kg/l0	3.960	3.939	3.925	3.912	3.900	3.968	3.965
inlet Temp. (deg. C)	88	76.2	63.3	50.2	37.7	32.4	88
Outlet Temp. (deg. C)	112	88	76.2	63.3	50.2	28	32.4
Temp. Rise (deg. C)	24	11.8	12.9	13.1	12.5	5.6	4.4
Flashing Temp. (deg. C)	117.5	94.5	83.7	7.17	58.4	42.3	35.9
Heat Transfer Rate (kj/5)	171.620	83.923	91.430	92.535	88.028	106.168	83.356
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. l0	14.289	11.400	12.892	13.939	13.499	6.715	5.405
U (KW/sq.m/K)	2.571	3.801	3.661	3.427	3.367	3.190	3.112
Clean-U Value (kW/sq.m/i0	3.9	6.6	5.3	5.7	5.1	5.7	5.1
f (sq.m K/KW)	0.1326	0.1116	0.0770	0.0957	0.1010	0.1174	0.1252

Appendix 5.3.3-7

Calculation of Overall Heat Transfer Coefficient(U) and Fouling Factor(f) in Run 8



OPERATION CONDITION

FOR RUN 8

1. Operation Period	16th Nov. to 6th	Dec.
2. Operation Time		472 h
3. Scale Control Method	PPN(M) I	osing
4. Operation Mode	Recircul	lation
5. Ball Cleaning at	FF in BH of 0.34-0.36	n²K/kW
6. Top Brine Temperature		112°C
7. Flow Rate		
-Make Up Seawater		2 m ³ /h
-Recirculation	6.5	m³/h
-Product Water	0.9	m³/h
-Blow Brine	1.5	2 m³/h
8. Chenical Consituents of	Brine	• •
-pH at 25℃		8.52
-M-Alkalinity as CaCO ₃	18	0 mg/L
-Chloride ion	33,10	0 mg/L
-Concentration factor as	s C1-	1.40
9. Dosing Rate of Chemica	ls	
-Scale Inhibior = PPN(M		2 mg/L
-Acid = 98% H ₂ SO ₄		· [

Date: November 16, 94

Run No. 8

Total Operation Time: 8 hr.

Time: 20:00

	Brine Heater	sater					Ž	Evaporator Stages	tages				
			· ·	#		#2		en ##		*	10 11	*	_
Flowrate (kg/h)	-	9200		6500		9200	-	6500		0059	18500	18	18500
Specific Heat (kj/kg/k)		3.962		3.940		3.925	1.	3.911		3.898	3.966	3.	3.964
Inlet Temp. (deg. C)		83.8	: : .	76.1	a , A	25		48.2		35	30.2	•	5.92
Outlet Temp. (deg. C)	γ (Σ (Δ)	112		8.68		76.1		62		48.2	34.5	•	30.2
Temp. Rise (deg. C)		22.2		13.7		14.1	47 - 1 - 3	13.8		13.2	4.3		3.7
Flashing Temp. (deg. C)		114.5	÷	91.3		80.8		9.79		54.1	39.1		33.4
Heat Transfer Rate (KJ/S)	;	158.794	:	97.460		99.916		97.440		92.908	87.646	75.	75.374
Heat Transfer Area (Sq.m)		4.6723		1.937		1.937		1.937		1.937	4.9556	4.9	4.9556
LM.T.D. (deg. K)	,-	9.692	٠	5.916		10.171		11.107		11.237	6.515	đ	4.815
U (kw/sq.m/k)		3.507		8.505		5.072		4.529		4.269	2.715	, kó	3.159
Clean-U Value (KW/sq.m/K)		3.9		9.9		5.		5.7		5.7	5.1		5.1
f (sq.m K/kW)		0.0288		-0.0339	• .	0.0011	·	0.0247		0.0382	0.1723	2.	0.1205

Run No. 8	Date: November 17, 6	17, 94		Time: 00:00		Total operatio	Total Operation Time: 12 hr.	
	Brine Heater				Evaporator Stages			
			*	# 5	CO #	*	¥5	*
Flowrate (kg/h)		6500	0059	9200	6500	9200	18500	18500
Specific Heat (KJ/Kg/K)		3.962	3.940	3.925	3.911	3.898	3.966	3.964
Inlet Temp. (deg. C)		8 9 .9	76.1	62	48.1	34.8	30	
Outlet Temp. (deg. C)		112	6.68	76.1	62	48.1	34	
Temp. Rise (deg. C)		22.1	13.8	14.1	13.9	13.3	₹.	
Flashing Temp. (deg. C)		114.5	91.5	80.9	2.79	54.1	38.9	33.3
Heat Transfer Rate (kJ/S)	15	158.081	98.173	99.916	98.145	93.609	81.527	81.481
Heat Transfer Area (Sq.m)	9	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10		9.666	6.094	10.288	11.254	11.384	8.702	5.038
U (KW/sq.m/fo		3.500	8.316	5.014	4.502	4.245	2.455	3.264
Clean-U Value (KW/sq.m/l0		3.9	9.9		5	5.1	7.0	
f (sq.m K/kw)		0.0293	-0.0313	0.0034	0.0260	0.0395	0.2113	0.1103

Date: November 17, 94

Run No. 8

Total Operation Time: 16 hr.

Time: 04:00

Voriables	Brine Heater			Evaporator Stages	Ses		
		*	**	ery ***	*	lo Tak	90
Flowrate (kg/h)	0059	0059	9059	0059	0059	18500	18500
Specific Heat (K)/kg/K)	3.962	3.940	3.925	3.911	3.898	3.966	3.964
Inlet Temp. (deg. C)	8.68	76.2	62.1	48.1	35	29.9	8
Outlet Temp. (deg. C)	112	8.68	76.2	62.1	48.1	4 6	29.9
Temp. Rise (deg. C)	22.2	13.6	14.1	4	13.7	4.1	3.9
Flashing Temp. (deg. C)	114	92.3	80.8	67.6	54.3	38.9	 33.3
Heat Transfer Rate (KJ/S)	158.794	96.750	99.919	98.852	92.203	83.565	79.444
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LIM.T.D. (deg. 10	8.904	7.302	10.054	11.061	11.536	6.744	5.104
U (KW/sq.m/K)	3.817	6.840	5.131	4.614	4.126	2.501	3.141
Clean-U Value (kW/sq.m/k)	6.6	9.9	, S	T;	ri.	5.1	5.7
f (sq.m +//kW)	9500:0	-0.0053	-0.0012	0.0207	0.0463	0.2038	0.1223
				99			

Run No. 8	Date: November 17, 94		Time: 06:00		Total Operation Time: 20 hr.	me: 20 hr.	
Variables	Brine Meater			Evaporator Stages			
		*	#2	£ **	**	15 Mr	**
Flowrate (kg/n)	0059	0059	0059	029	0059	18500	18500
Specific Heat (ki/kg/k)	3.962	3.940	3.925	3.911	3.898	3.967	3.964
Inlet Temp. (deg. C)	88.88	76.2	62.2	48.3	55.1	30.2	27
Outlet Temp. (deg. C)	112	8.68	76.2	62.2	48.3	35	30.2
Temp. Rise (deg. C)	22.2	13.6	14	13.9	13.2	4.8	3.2
Flashing Temp. (deg. C)	115	7.16	6.08	67.7	54.4	39.1	33.4
Heat Transfer Rate (kJ/S)	158.794	96.750	99.212	98.150	92.910	97.841	65.190
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	10.431	6.479	10.138	11.027	11.460	6.193	4.617
'u (KW/sq:m/lö	3.258	7.709	5.052	4.595	4.185	3.188	2.849
Clean-U Value (kW/sq.m/lo	3.9	6.6	5.1	5.	r,	X	r.
f (sq.m K/kW)	0.0505	-0.0218	0.0019	0.0215	0.0428	0.1176	0.1549

Date: November 17, 94

Run No. 8

Total Operation Time: 24 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		#1	#2	99	*	ko Wa	• •
Flowrate (kg/h)	029	0059	6500	0059	9200	18500	18500
Specific Heat (kJ/kg/lo	3.962	3.940	3.925	3.911	3.899	3.967	3.964
Inlet Temp. (deg. C)	868	76.2	62.2	48.5	35.6	30.4	27.5
Outlet Temp. (deg. C)	112	8.68	76.2	62.2	48.5	35	30.4
Temp. Rise (deg. C)	22.2	13.6	14	13.7	12.9	4.6	2.9
Flashing Temp. (deg. C)	115	91.6	80.7	67.6	54.5	39.4	33.8
Heat Transfer Rate (KJ/S)	158.794	96.750	99.212	96.740	90.806	93.766	59.082
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. 10	10.431	6.336	9.903	10.845	11.243	6.428	4.702
U (KW/sq.m/k)	3.258	7.884	5.172	4:605	4.170	2.944	2.536
Clean-U Value (kW/sq.m/lo	3.9	6.6	5.7	5.1	. 53	5.4	5.7
f (sq.m K/k/M)	0.0505	-0.0247	-0.0027	0.0211	0.0437	0.1436	0.1983

Run No. 8	Date: November 17, 94	I		Time: 16:00		Total Operation Time: 28 hr.	Time: 28 hr.	
Variables	Brine Heater				Evaporator Stages		AA'	
		#1		# 2	(*) **	*	\$#	*
Flowrate (kg/h)	0059		6500	9200	0059	0059	18500	18500
Specific Heat (kj/kg/lo	3.962		3.940	3.924	3.910	3.898	3.966	3.964
Inlet Temp. (deg. C)	8.58		75.5	61.6	48	34.8	30.1	26
Outlet Temp. (deg. C)	112		83.68	75.5	6.16	84	33.5	30.1
Temp. Rise (deg. C)	22.2		14.3	13.9	13.6	13.2	3.4	4.1
Flashing Temp. (deg. C)	115.5		91.6	80.7	9.79	54.3	39.1	33.4
Heat Transfer Rate (KJ/S)	158.794	101.719	719	98.486	96.021	92.904	69.296	83,519
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	11.135		6.527	10.684	11.489	11.683	7.166	5.077
U (KW/sq.m/xo	3.052		8.046	4.759	4.315	4.105	1.951	3.320
Clean-U Value (KW/sq.m/K)	9.2		9.9	5.1	5.1	5.1	5.1	5.3
f (sq.m K/kW)	0.0712	2 -0.0272	272	0.0140	0.0357	0.0475	0.3164	0.1052

Date: November 17, 94

Rum No. 8

Total Operation Time: 32 hr.

Time: 20:00

t(g/m) 6500 6500 6500 6500 18500 teat (t(f)(g/m)) 3,961 3,986 3,910 3,898 3,966 teat (t(f)(g/m)) 89,5 75,5 61,5 47,7 34,4 29,6 mp. (deg. C) 112 89,5 75,5 61,5 47,7 33 se (deg. C) 22,5 14 14 13,8 13,3 3,4 remp. (deg. C) 22,5 14 14 13,8 3,4 29,6 remp. (deg. C) 115,8 92,2 81,2 67,7 54,2 38,8 remp. (deg. C) 115,8 99,581 99,993 97,428 93,600 69,291 risfer Rate (t(s)) 160,932 99,581 99,193 97,428 93,600 69,291 sier (deg. C) 11,637 7,683 11,387 1,937 1,937 1,940 7,370 m/O 2,962 6,691 4,56 5,1 5,1 5,1 5,1 ri		Brine Heater			Evaporator Stages			
6500 6500 6500 6500 6500 18500 3.961 3.982 3.944 3.966 3.966 88.5 75.5 61.5 47.7 34.4 29.6 112 89.5 75.5 61.5 47.7 33 22.5 14 14 13.8 13.3 3.4 160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 4.9556 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.047 5.1 5.1 3.9 6.6 5.1 5.1 5.1 3.9 6.6 5.1 5.1 5.1 5.0 0.0813 0.0244 0.0382 0.0510 0.3310			*	*	**	*	to #	*
3.9561 3.9264 3.924 3.940 3.986 3.966 89.5 75.5 61.5 47.7 34.4 29.6 112 89.5 75.5 61.5 47.7 33 22.5 14 14 13.8 13.3 3.4 115.8 92.2 81.2 67.7 54.2 38.8 160.932 99.581 99.193 97.428 93.600 69.231 4.6723 1.937 1.937 1.937 4.9356 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.047 5.1 5.1 3.9 6.6 5.1 5.1 5.1 0.0813 0.0021 0.0244 0.0382 0.0510 0.3310	Flowrate (kg/h)	0059	9200	0059	6500	0059	18500	18500
89.5 75.5 61.5 47.7 34.4 29.6 112 89.5 75.5 61.5 47.7 33 22.5 14 14 13.8 3.4 29.6 115.8 92.2 81.2 67.7 54.2 38.8 160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 11.940 7.370 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.00813 0.0021 0.0382 0.0510 0.3310	Specific Heat (KJ/kg/N	3.961	3.939	3.924	3.910	3.898	3.966	3.964
112 89.5 75.5 61.5 47.7 33 22.5 14 14 13.8 13.3 3.4 115.8 92.2 81.2 67.7 54.2 38.8 160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 1.937 4.9556 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.556 4.047 1.897 3.9 6.6 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0392 0.0510 0.3310	inlet Temp. (deg. C)	89.5	75.5	61.5	7.78	34.4	29.6	25.5
22.5 14 14 13.8 13.3 3.4 115.8 92.2 81.2 67.7 54.2 38.8 160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 1.937 4.9556 11.631 7.683 11.789 11.783 11.940 7.370 2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	Outlet Temp. (deg. C)	112	89.5	75.5	67.5	47.7	33	29.6
115.8 92.2 81.2 67.7 54.2 38.8 160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 1.937 4.9556 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 5.0813 -0.0021 0.0244 0.0392 0.0510 0.3310	Temp. Rise (deg. C)	22.5	14	41	13.8	73.3 3.3	3.4	4
160.932 99.581 99.193 97.428 93.600 69.291 4.6723 1.937 1.937 4.956 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	Flashing Temp. (deg. C)	115.8	92.2	81.2	2.79	54.2	38.8	33
4.6723 1.937 1.937 1.937 4.9556 11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0392 0.0510 0.3310	Heat Transfer Rate (kJ/S)	160.932	99.581	99.193	97.428	93.600	69.291	83.513
11.631 7.683 11.289 11.783 11.940 7.370 2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.962 6.691 4.536 4.269 4.047 1.897 3.9 6.6 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	L.M.T.D. (deg. 10	11.631	7.683	11.289	11.783	11.940	7.370	5.182
5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	U (KW/sq.m/l0	2.962	6.691	4.536	4.269	4:047	1.897	3.252
0.0813 -0.0021 0.0244 0.0382 0.0510 0.3310	Clean-U Value (kW/sq.m/k)	3.9	9.9	5.7	5.3	25	5.	5.
	4.37	0.0813	-0.0021	0.0244	0.0382	0.0510	0.3310	0.1114

Run No. 8	Date: November 18, 94	3	ij.	Time: 00:00		Ĕ	Total Operation Time: 36 hr.	Time: 36 hr.	
Variables	Brine Heater				Evaporator Stages	Stages			
		**		77	en ₩		*	9	9#
Flowrate (kg/h)	029		6500	9059	0059		6500	18500	18500
Specific Heat (kj/kg/lo	3.961		3.939	3.924	3.910		3.898	3.966	3.964
inlet Temp. (deg. C)	89.5		75.5	61.5	47.6		34.4	29.4	25.5
Outlet Temp. (deg. C)	•	112 8	89.5	75.5	61.5		47.6	33	29.4
Temp. Rise (deg. C)	22.5		14	74	13.9		13.2	3.6	3.9
Flashing Temp. (deg. C)	•	116 . 9	92.5	81.3	8.79		54.1	38.7	32.8
Heat Transfer Rate (ki/S)	160.932	32 99.581	841	99.193	98.133		92.895	73.366	79.438
Heat Transfer Area (Sq.m)	4.6723		1.937	1.937	1.937		1.937	4.9556	4.9556
L.N.T.D. (deg. 10	11.899		8.071	11.402	11.930		11.905	7.354	5.104
U (KW/sq.m/lo	2.895		6.370	4.491	4.247		4.029	2.013	3.141
Clean-U value (KW/sq.m/i0	6.6		6.6	5.1	5.7		5.1	5.4	5.1
C455/4 34:000 A	10897	94 0,0055	155	0.0056	0.0394		0.0524	0.3006	0.1223

Date: November 18, 94

Run No. 8

Total Operation Time: 40 hr.

Time: 04:00

Variables	Brine Heater			Evaporator Stages	9			
		*	# 2	E #	*		10 14	*
Flowrate (kg/h)	9200	9200	029	0059	9200		18500	18500
Specific Heat (KJ/Kg/K)	3.961	3.939	3.924	3.910	3.898		3.966	3.964
Inlet Temp. (deg. C)	89.5	75.4	61.3	47.4	34.2		29.2	25.5
Outlet Temp. (deg. C)	112	89.5	75.4	61.3	47.4		33	29.2
Temp. Rise (deg. C)	22.5	14.1	14.1	13.9	13.2		33.88	3.7
Flashing Temp. (deg. C)	116	92.3	81.2	2.73	25		38.5	32.7
Heat Transfer Rate (KJ/S)	160.932	100.291	29.897	98.128	92.891	7	7.441	75.363
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4	4.9556	4.9556
L.M.T.D. (deg. k)	11.899	7.843	11.437	12.042	12.015		7.234	5.129
U (kw/sq.m/to	2.895	6.601	4.509	4.207	3.991		2.160	2.965
Clean-U Value (kW/sq.m/lo	3.9	9.9	5.7	5.2	5.1		5.1	5.1
f (Sq.m K/KW)	0.0891	-0.0000	0.0257	0.0416	0.0545	0	0.2669	0.1412

Variables			Time: 06:00		Total Operatio	Total Operation Time: 44 hr.	
	Brine Heeter			Evaporator Stages			
		#1	#3	6 7	*	to #	*
Flowrate (kg/h)	0059	0059	9200	6500	9200	18500	18500
Specific Heat (kJ/kg/K)	3.961	3.940	3.924	3.910	3.898	3.966	3.964
Inlet Temp. (deg. C)	89.5	75.9	61.7	47.7	34.4	29	26
Outlet Temp. (deg. C)	112	89.5	75.9	61.7	47.7	33.5	29
Temp. Rise (deg. C)	22.5	13.6	14.2	14	13.3	4.5	
Flashing Temp. (deg. C)	116	92.2	81.4	8	54.2	38.6	32.4
Heat Transfer Rate (KJ/S)	160.932	96.741	100.618	98.842	93.600	94.708	61.107
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. lo	11.899	7.564	11.130	11.965	11.940	7.114	4.743
U (ReW/sq.m/to	2.895	6.603	4.667	4.265	4.047	2.601	2.600
Clean-U Value (kw/sq.m/lo	6 .	9.9	5.	5.1	5.1	5.1	5.7
f sq.m K/kW)	0.0891	-0.0001	0.0182	0.0384	0.0510	0.1884	0.1886

Date: November 18, 94

Run No. 8

Total operation Time: 48 hr.

Time: 12:00

Variables	Brine Heater				Evaporator Stages	ges			
		# 1		#2	00 *		**	io #k	9
Flowrate (kg/h)	6500	6500		0059	9200		0059	18500	18500
Specific Heat (kJ/kg/k)	3.961	3.940		3.924	3.910		3.898	3.966	3.964
inlet Temp. (deg. C)	89.5	75.8	•	61.5	47.8		34.5	29.2	25.5
Outlet Temp. (deg. C)	112	89.5		75.8	61.5		47.8	33	29.2
Temp. Rise (deg. C)	22.5	13.7		14.3	13.7		13.3	3.8	3.7
Flashing Temp. (deg. C)	116.5	92.6		81.4	8	٠.	54.3	38.7	32.7
Heat Transfer Rate (kj/5)	160.932	97.451	•	101.323	96.723		93.602	77.441	75.363
Heat Transfer Area (Sq.m)	4.6723	1.937		1.937	1.937		1.937	4.9556	4.9556
L.M.T.D. (deg. 10	12.557	8.107		11.278	12.082		11.940	7.439	5.129
U (KW/Sq.m/fd	2.743	6.206		4.638	4.133		4.047	2.101	2.965
Clean-U Value (kW/sq.m/lo	6.2	9.9	i.	5.1	5.1		ጆ	5.1	5.1
f (sq.m. K/kw)	0.1082	0.0096		0.0195	0.0459		0.0510	0.2800	0.1412

Run No. 8	Date: November 18, 94	3		Time: 16:00		Total Operation Time: 52 hr.	Ė
Volte	Brine Heater				Evaporator Stages		
			*	#2	#3		**
Flowrate (kg/h)	65	6500	6500	0059	0059	6500 181	18500 18500
Specific Heat (kj/kg/K)	3.962	62	3.940	3.924	3.910	3.897 3.0	3.965 3.963
inlet Temp. (deg. C)	**	83.8	75.5	61.2	47.3	34	28.8 25
Outlet Temp. (deg. C)		112	8.68	75.5	61.2	47.3	32.5 28.8
Temp. Rise (deg. C)	8	22.2	14.3	14.3	13.9	13.3	3.7 3.8
Flashing Temp. (deg. C)	116.5	5.5	92.5	81.2	9.79	54 3	38.4 32.3
Heat Transfer Rate (KJ/S)	158.794	7 6	101.719	101.314	98.125	93.592 75.	75.398 77.396
Heat Transfer Area (Sq.m)	4.6723	23	1.937	1.937	1.937	1.937 4.9556	556 4.9556
L.M.T.D. (deg. 10	12.468	. 89	277.7	11.392	12.042	12:161 7.0	7.600 5.169
U (KW/sq.m/K)	2.726	56	6.757	4.591	4.207	3.973	2.002 3.021
Clean-U Value (kW/sq.m/l0	.	3.9	6.6	5.1	5.1	5.3	5.1 5.1
f (sq.m K/KW)	0.1104	90	-0.0035	0.0217	0.0416	0.0556 0.3035	35 0.1349

Date: November 18, 94

Run No. 8

Total Operation Time: 56 hr.

Time: 20:00

#1 #2 #3 #500 6500 6500 6500 6500 89.5 75.4 61 46.9 89.5 75.4 61 22.5 14.1 14.4 14.1 11.6 92.8 81.1 67.4 11.89 8.481 11.426 12.112 2.895 6.105 4.609 4.242	Variables	Brine Heater			Evaporator Stages			
6500 6500 6500 6500 6500 3.961 3.924 3.910 89.5 75.4 61 46.9 22.5 14.1 14.4 14.1 116 92.8 81.1 67.4 160.932 100.291 102.019 99.530 4.6723 1.937 1.937 11.899 8.481 11.426 12.112 11. 2.895 6.105 6.6 5.1 5.1	,		**	#2	£ #	*	lo th	*
3.961 3.939 3.924 3.910 89.5 75.4 61 46.9 112 89.5 75.4 61 22.5 14.1 14.4 14.1 160.932 100.291 102.019 99.530 99 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 11 2.895 6.105 4.609 4.242 3.9 6.6 5.1 5.1	Flowrate (kg/h)	029	0059	0059	9200	0059	18500	18500
89.5 75.4 61 46.9 112 89.5 75.4 61 22.5 14.1 14.4 14.1 1160.932 100.291 102.019 99.530 93 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 11 2.895 6.105 4.609 4.242	Specific Heat (KJ/Kg/K)	3.961	3.939	3.924	3.910	3.897	3.965	3.963
22.5 14.1 14.4 14.1 116 92.8 81.1 67.4 160.932 100.291 102.019 99.530 99 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 11 2.895 6.105 4.609 4.242 3 3.9 6.6 5.1 5.1 5.1	Inlet Temp. (deg. C)	89.5	75.4	9	46.9	33.6	28.3	24
22.5 14.1 14.4 14.1 116 92.8 81.1 67.4 160.932 100.291 102.019 99.530 99.467 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 11.426 2.895 6.105 4.609 4.242 3.9 6.6 5.1 5.1	Outlet Temp. (deg. C)	112	89.5	75.4	2	46.9	32	28.3
116 92.8 81.1 67.4 160.932 100.291 102.019 99.530 99 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 11 2.895 6.105 4.609 4.242 3 3.9 6.6 5.1 5.1 5.1	Temp. Rise (deg. C)	22.5	14.1	14.4	14.1	13.3	3.7	43
160.932 100.291 102.019 99.530 4.6723 1.937 1.937 1.937 11.899 8.481 11.426 12.112 2.895 6.105 4.609 4.242 3.9 6.6 5.1 5.1	Flashing Temp. (deg. C)	116	92.8	1.18	67.4	53.6	37.9	31.7
4.6723 1.937 11.899 8.481 11.426 12.112 2.895 6.105 4.609 4.242 3.9 6.6 5.1 5.1 5.1 5.1	Heat Transfer Rate (kJ/S)	160.932	100.291	102.019	99.530	93.584	75.393	87.570
11.899 8.481 11.426 12.112 2.895 6.105 4.609 4.242 3.9 6.6 5.1	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.895 6.105 4.609 4.242 3.9 6.6 5.1 5.1	L.M.T.D. (deg. 10	11.899	8.481	11.426	12.112	12.161	7.600	5.260
5.9 6.6 5.1 5.1	U (kw/sq.m/lo	2.895	6.105	4.609	4.242	3.973	2.002	3.359
DAYS CONTRACT CONTRAC	Clean-U Value (kW/sq.m/k)	6.6	6.6	5.4	. .	5.1	Š	5.1
26000	f (sq.m K/kw)	0.0891	0.0123	0.0209	0.0396	0.0556	0.3035	0.1016

#1 #2 #3 Brine Heeter #1 6500 6500 6500 6500 6100 6500 6500 6100 6500	Run No. 8	Date: November 19, 94		Time: 00:00		Total Operation Time: 60 hr.	Time: 60 hr.	
#1 #2 #3 (c) 6500 6500 6500 6500 (d) 3.961 3.939 3.924 3.910 (e) 89 75.4 61 46.9 (c) 112 89 75.4 61 (d) 6.0 0.729 1.937 1.937 (d) 6.8 6.1 6.1 (e) 46.9 (e) 6.90 6500 6500 (e) 6.90 650 (e) 6.90 6	Variables	Brine Heater			Evaporator Stages			
(A) 5.961 5.939 5.924 3.910 (A) 3.961 3.939 3.924 3.910 (A) (B) 75.4 61 46.9 (A) (A) (A) (A) (A) (A) (A) <t< th=""><th></th><th></th><th>**</th><th>Z #</th><th>£#</th><th>**</th><th>10 **</th><th>*</th></t<>			**	Z #	£#	**	10 **	*
ro 3.961 3.939 3.924 3.910 B9 75.4 61 46.9 C0 112 89 75.4 61 G1 23 13.6 14.4 14.1 G. C) 117 92 80.8 67.1 G(VS) 164.495 96.727 102.019 99.530 sq.min 4.6723 1.937 1.937 1.937 q.min 3.351 7.950 11.083 11.776 q.min 3.3 6.6 5.1 5.1 q.min 3.9 6.6 5.1 5.1 q.min 0.0128 0.0077 0.0144 0.0331	Flowrate (kg/h)	0059	0059		0059	6500	18500	18500
CO 112 89 75.4 61 CO 112 89 75.4 61 CO 13.6 14.4 14.1 CO 117 92 80.8 67.1 GQ/S) 164.495 96.727 102.019 99.530 SQ,m) 4.6723 1.937 1.937 1.937 13.351 7.950 11.083 11.776 Q,m/O 3.9 6.6 5.1 5.1 Q,1228 0.0077 0.0144 0.0331	Specific Heat (kj/kg/k)	3.961	3.939		3.910	3.897	3.965	3.963
CO 112 89 75.4 61 23 13.6 14.4 14.1 G.C. 117 92 80.8 67.1 G(VS) 164.495 96.727 102.019 99.530 (Sq.m) 4.6723 1.937 1.937 1.937 2.637 6.282 4.752 4.364 G.MVO 3.9 6.6 5.1 5.1	inlet Temp. (deg. C)	88	75.4		46.9	33.6	28.2	24
23 13.6 14.4 14.1 3.C) 117 92 80.8 67.1 (kJ/s) 164.495 96.727 102.019 99.530 (Sq.m) 4.6723 1.937 1.937 1.937 13.351 7.950 11.083 11.776 2.637 6.282 4.752 4.364 q.m/o 3.9 6.6 5.1 5.1 6.728 0.0077 0.0144 0.0331	Outlet Temp. (deg. C)	112	86		2	46.9	32.5	28.2
9. C) 117 92 80.8 67.1 0(J/S) 164.495 96.727 102.019 99.530 Sq.m) 4.6723 1.937 1.937 1.937 13.351 7.950 11.083 11.776 2.637 6.282 4.752 4.364 q.m/N 3.9 6.6 5.1 5.1 q.m/N 5.9 0.0077 0.0144 0.0331	Temp. Rise (deg. C)	23	13.6		14.1	13.3	4.3	4.2
(iq/s) 164.495 96.727 102.019 99.530 (Sq.m) 4.6723 1.937 1.937 1.937 13.351 7.950 11.083 11.776 2.637 6.282 4.752 4.364 q.m/N 3.9 6.6 5.1 5.1 q.m/N 0.0128 0.0077 0.0144 0.0331	Flashing Temp. (deg. C)	117	92	8.08	1.79	53.5	57.7	31.7
(Sq.m) 4,6723 1.937 1.93	Heat Transfer Rate (KI/S)	164.495	96.727		99.530	93.584	87.621	85.533
13.351 7.950 11.083 11.776 2.637 6.282 4.752 4.364 q.m/l0 3.9 6.6 5.1 5.1	Heat Transfer Area (Sq.m)	4.6723	1.937		1.937	1.937	4.9556	4.9556
2.637 6.282 4.752 4.364 3.9 6.6 5.1 5.1 0.1228 0.0077 0.0144 0.0331	LM.T.D. (deg. K	13.351	7.950		11.776	12.051	7.135	5.327
5.9 6.6 5.1 5.1 0.1228 0.0077 0.0144 0.0331	U (KW/sq.m/lo	2.637	6.282		4.364	4.009	2.478	3.240
0.0331	Clean-U Value (KW/sq.m/K)	3.9	9.9		5.1	5.3	5.1	5.1
	f (sq.m.K/KW)	0.1228	0.0077	0.0144	0.0331	0.0534	0.2075	0.1125