Appendix 5.3.3-3

Calculation of Overall Heat Transfer
Coefficient(U) and Fouling Factor(f) in Run3

OPERATION CONDITIONS

FOR

RUN 3

1. Operation Period	25th	July 1	to 13th	Aug.
2. Operation Time		4 .	4	56 h
3. Scale Control Method		PI	PN(M) Do	sing
4. Operation Mode		Re	ecircula	tion
5.Ball Cleaning		Once	per 8 h	ours
6. Top Brine Temperature		<i>.</i> ' .	1	12℃
7. Flow Rate				
-Make Up Seawater		•	3.6	m³/h
-Recirculation			6.5	m³/h
-Product Water		• .	0.70	m³/h
-Blow Brine			2.9	m³/h
8. Chenical Consituents of Bri	ne	. *		
-pH at 25℃				8.43
-M-Alkalinity as CaCO ₃			144	mg/L
-Chloride ion			25,600	mg/L
-Concentration factor as C1 ⁻				1.12
9. Dosing Rate of Chemicals				1,
-Scale Inhibior = PPN(M)			2	mg/L
-Acid = 98% H ₂ SO ₄				

Date: July 25, 94

Run No. 3

Time: 20:00

Flowrate (kg/h) 6450 6450 6450 6450 Specific Heat (kJ/kg/l\0) 3.989 3.970 3.956 Inlet Temp. (deg. C) 92 79 66 Outlet Temp. (deg. C) 112 92 79 Temp. Rise (deg. C) 20 13 13 Heat Transfer Rate (kJ/s) 142.955 92.468 92.144 Heat Transfer Area (Sq.m) 4.6723 1.937 1.937 L.M.T.D. (deg. K) 9.819 6.452 4.926 U (KW/Sq.m/k) 3.116 7.399 9.657						
6450 6450 3.989 3.970 92 79 112 92 20 13 20 13 (5) 142.955 92.468 9.819 6.452 3.116 7.399		2	#3	*	• • • • • • • • • • • • • • • • • • •	40
3.989 3.970 92 79 112 92 20 13 C) 115 94 /S) 142.955 92.468 q.m) 4.6723 1.937 9.819 6.452 3.116 7.399	6450	6450	6450	6450	18100	18100
92 79 112 92 20 13 115 94 (S) 142.955 92.468 q.m) 4.6723 1.937 9.819 6.452 3.116 7.399	i s	3.956	3.943	3.933	3.969	3.967
112 92 20 13 115 94 75) 142.955 92.468 9.819 6.452 3.116 7.399	79	99	126	42	34	32
eg. C) 20 13 2. (deg. C) 115 94 Rate (k/S) 142.955 92.468 Area (Sq.m) 4.6723 1.937 K) 9.819 6.452 K) 3.116 7.399	26	79	99	53	39	34
Area (Sq.m) 115 94 92.468 4.6723 1.937 6.452 6.452 0.7399	13	13	13	7	vo	. *~
Rate (kJ/S) 142.955 92.468 Area (Sq.m) 4.6723 1.937 K) 9.819 6.452 K) 3.116 7.399	94	89	69	9	43	₹.
Area (Sq.m) 4.6723 1.937 K) 9.819 6.452 3.116 7.399		2.144	91.850	77.512	99.773	39.888
io 9.819 6.452 3.116 7.399		1.937	1.937	1.937	4.9556	4.9556
3.116 7.399		4.926	7.766	11.647	6.166	7.958
		9.657	6.106	3.436	3.265	1.011
Clean-U Value (KW/sq.m/f0 3.9 6.6 5.1	6.6	5.1	5.7	5.1	27	5.1
F (sq. m KJKM) 0.0845 -0.0184 -0.0925		.0925	-0.0323	0.0950	0.1102	0.7926

	CALCULATIONS OF OVERALL HEAT TRANSFE	(ERALL HEAT TRANS	SFER COEFFICIENT	IR COEFFICIENT AND FOULING FACTOR	ACTOR			
	Run No. 3	Date: July 26, 94		Time: 00:00		Total Operation Time: 12 hr.	n Time: 12 hr.	
	Variables	Brine Heater			Evaporator Stages			
			*	#5	£ ##	**	#2	9#
	Flowrate (kg/h)	6450	6450	6450	6450	6450	18000	18000
	Specific Heat (kj/kg/K)	3,989	3.970	3.956	3.943	3.933	3.969	3.966
	Inlet Temp. (deg. C)	92	79	99	53	41	33	32
	Outlet Temp. (deg. C)	112	92	79	99	23	33	33
	Temp. Rise (deg. C)	20	13	W.	13	12	G	
	Flashing Temp. (deg. C)	114	94	83	70	23	43	40
	Heat Transfer Rate (kJ/S)	142.955	92.468	92.144	91.850	84.549	119.057	19.832
	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
3	L.M.T.D. (deg. K)	8.341	6.452	7.766	8.985	10.923	6.548	7.489
	U (KW/sq.m/K)	3.668	7.399	6.126	5.278	3.996	3.669	0.534
	Clean-U Value (kW/sq.m/k)	6.	9.9	7.	5.3	5.7	1.8	r.c
	f (sq.m K/kW)	0.0162	-0.0164	-0.0328	-0.0066	0.0542	0.0765	1.6752

Neil No. 5	Date: July 26, 94		Time: 04:00		locat Operation Time: 16 mr.	1 FIME: 16 AF.	
Variables	Brine Heater			Evaporator Stages			
		#1	#5	⇔	*	10, 10	
Flowrate (kg/h)	6450	6450	6450	6450	6450	18000	18000
Specific Heat (KJ/Kg/10	3.989	3.969	3.956	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	92	78	99	23	40	33	32
Outlet Temp. (deg. C)	112	92	78	99	23	33	8
Temp. Rise (deg. C)	20	4	2	%	13	9	, 5
Flashing Temp. (deg. C)	114	96	82	02	59	43	₽
Heat Transfer Rate (kj/S)	142.955	99.567	85.045	91.850	91.586	119.057	19.832
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.957	1.937	4.9556	4.9556
L.M.T.D. (deg. K)	8.341	6.733	8.656	8.985	11.278	6.548	7.489
u (kw/sq.m/k)	3.668	7.635	5.072	5.278	4.192	3.669	0.534
Clean-U Value (kW/sq.m/k)	3.9	9.9	r.	5.1	7.5	7.	F.3.
f isq.m K/kW)	0.0162	-0.0205	0.0011	-0.0066	0.0424	0.0765	1.6752

Run No. 3	Date: July 26, 94		Time: 08:00		Total Operation Time: 20 hr.	Time: 20 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	#3	6	7	\$ *	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18400	18400
Specific Heat (kj/kg/N	3.989	3.970	3.956	3.943	3.933	3.969	3.966
inlet Temp. (deg. C	91.5	79	99	23	41	333	
Outlet Temp. (deg. C)	112	91.5	79	99	23	39	
Temp. Rise (deg. C	20.5	12.5	13	13	12	9	
Flashing Temp. (deg. C)	114	94	83	2	82	42	-
Heat Transfer Rate (KJ/S)	146.517	88.905	92.144	91.850	84.549	121.703	20.273
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)	8.470	6.976	7.766	8.985	9.806	5.461	7.489
U (kw/sq.m/lo	3.702	6.579	6.126	5.278	4.451	4.497	0,546
Clean-U Value (kW/sq.m/l0	6 K	9.9	5.1	5.1	r.	5.7	
+ (co m V/kW)	73000	2000	8000	99000	30000	£9000	A GRAC

Date: July 26, 94

Run No. 3

Time: 12:00

Veriables	Brine Heater			Evaporator Stages			
		**	*	**	*	10 #	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kj/kg/K)	3.989	3.969	3,955	3.943	3.933	3.969	3.967
Inlet Temp. (deg. C)	91.5	78	9	53	41.5	34	E
Outlet Temp. (deg. C)	112	91.5	78	65	22	39.5	3
Temp. Rise (deg. O	20.5	13.5	13	12	11.5	5.5	
Flashing Temp. (deg. C)	115	26	98	72	9	43	4
Heat Transfer Rate (KJ/S)	146.517	96.004	92.121	84.775	81.031		20.386
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)	9.959	10.890	13.470	12.018	11.833	5.823	7.489
U (KW/sq.m/)O	3.149	4.551	3.531	3.642	3.535	3.887	0.549
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.3	7.	5.7	5.1	5.7
f (sq.m K/kW)	0.0612	0.0682	0.0872	0.0785	0.0868	0.0612	1.6244

Run No. 3	Date: July 26, 94		Time: 16:00		Total Operation Time: 28 hr.	n Time: 28 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	# 2	er **	*	10 #	*
Flowrate (kg/h)	6450	6450	6450	6,450	6450	18000	18000
Specific Heat (kj/kg/k)	3.989	3.969	3.956	3.943	3.933	3.969	3.967
Inlet Temp. (deg. C)	92	78	99	23	42	35	33
Outlet Temp. (deg. C)	112	92	78	99	53	94	34
Temp. Rise (deg. C)	20	14	12	6	\F	9	. .
Flashing Temp. (deg. C)	114	96	98	72	09	44	.41
Heat Transfer Rate (kl/S)	142.955	99.567	85.045	91.850	77.512	119.075	19.835
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. Ko	8.341	9.308	13.096	11.278	11.647	6.548	7.489
U (kW/sq.m/k)	3.668	5.522	3.353	4.205	3.436	3.670	0.534
Clean-U Value (kW/sq.m/lo	3.9	9.9	r.	်က	5.1	5.1	: · : .
f tsq.m K/kW)	0.0162	0.0296	0.1022	0.0418	0.0950	0.0764	1.6749

Date: July 26, 94

Run No. 3

Time: 20:00

	Brine Heafer			Evaporator Stages			
National Authorities and Autho		#	**	#3	*	lo *k	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (kJ/kg/l0	3.989	3.969	3.956	3.944	3.933	3.969	3.967
Inlet Temp. (deg. C)	92	78	99	A.	4	34.5	33
Outlet Temp. (deg. C)	112	92	78	99	28	40	34.5
Temp. Rise (deg. C)	50	14	12	12	1 0	5.5	7.5
Flashing Temp. (deg. Cl	114	96	88	71.5	59.5	43.5	40.5
Heat Transfer Rate (KJ/S)	141.847	98.795	84.386	84.137	90.895	109.157	29.754
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	8.341	9.308	13.096	10.368	10.717	5.823	6.722
U GKW/sq.m/Ko	3.640	5.480	3.327	4.190	4.379	3.782	0.893
Clean-U Value (kW/sq.m/k)	9.0	6.6	Sign of the second seco	r, in	5.1	2.3	. S.
f (sq.m K/KW)	0.0183	0.0310	0.1045	0.0426	0.0323	0.0683	0.9235

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR	RALL HEAT TRANSEE	R COEFFICIENT	AND FOULING E	ACTOR			
Run No. 3	Date: July 27, 94		Time: 00:00		Total Operation Time: 36 hr.	me: 36 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 2	m **	7#	М	*
Flowrate (Kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (k)/kg/K)	3.989	3.969	3.955	3.944	3.933	3.969	3.967
Inlet Temp. (deg. C)	35	77	99	52	4	34	
Outlet Temp. (deg. C)	112	. 92	72	99	24	40	
Temp. Rise (deg. C)	20	15	÷	12	13	9	:
Flashing Temp. (deg. C)	115	96	98	72	09	43	
Heat Transfer Rate (kj/S)	141.847	105.837	77.344	84.137	90.895	119.075	19.835
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	9.819	9.627	13.776	10.923	11.278	5.461	6.487
U (KW/sq.m/K)	3.092	5.676	2.899	3.977	4.161	4.400	0.617
Clean-U Value (kW/sq.m/K)	6.8	9.9	5.7	5.1	5.1	5.1	. 23
f ten m K/kw	0.0670	0.0247	0 1489	0.0554	0.0443	0.0342	1.4247

Run No. 3	Date: July 27, 94		Time: 04:00		Total Operation Time: 40 hr.	Time: 40 hr.	
Variables	Brine Heater			Evaporator Stages			
:		*	# 5	m #	*	15 18	9#
Flowrate (kg/h)	6400	6400	6400	6400	6400	18000	18000
Specific Heat (kJ/kg/k)	3.989	3.969	3.955	3.943	5.932	3.969	3.967
Inlet Temp. (deg. C)	35	77	99	53	40	34	32
Outlet Temp. (deg. C)	112	26	7	99	53	39	3 2
Temp. Rise (deg. C)	20	15	7	13	13	ن	N
Flashing Temp. (deg. C)	114	96	98	٦,	09	43	9
Heat Transfer Rate (kj/S)	141.847	105.837	77.344	91.138	90.876	99.222	29.668
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)	8.341	9.627	13.776	10.149	12.383	6.166	6.952
U (kW/sq.m/ko	3.640	5.676	2.899	4.636	3.789	3.247	<u>ह</u>
Clean-U Value (kW/sq.m/K)	3.9	9.9	7.	7.	2.5	5.7	. <u>₹</u>
f (sq.m K/k/W)	0.0183	0.0247	0.1489	0.0196	0.0679	0.1119	0.6724

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: July 27, 94		Time: 08:00		Total Operation Time: 44 hr.	Time: 44 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	£ **	**	£ 45	to #
Flowrate (kg/h)	6400	6400	6400	6400	6400	18400	18400
Specific Heat (KJ/kg/10	3.989	3.969	3.954	3.943	3.932	3.969	3.967
Inlet Temp. (deg. Cl		76.5	65	53	40	33.5	32
Outlet Temp. (deg. C)	112	92	76.5	9	23	39	33.5
Temp. Rise (deg. C)	20	15.5	11.5	12	13	5.5	1.5
Flashing Temp. (deg. C)	114	96	88	70	59	42.5	39.5
Heat Transfer Rate (Kj/S)	141.847	109.357	80.844	84.118	90.876	111.565	30.411
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	8.341	7.146	11.290	908.6	11.278	5.823	6.722
U (kW/sq.m/lo	3.640	7.901	3.697	4.429	4.160	3.866	0.913
Clean-U Value (kW/sq.m/K)	3.9	9.9	5.1	5.1	5.3	5.3	5.1
f (sq.m K/kW)	0.0183	-0.0249	0.0744	0.0297	0.0443	0.0626	0.8993

Date: July 27, 94

Run No. 3

Total Operation Time: 48 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages	7 A		
		# 7	#2	67 **	*	\$°	9
Flowrate (kg/h)	6400	6400	6400	6400	6400	18400	18400
Specific Heat (kj/kg/lo	3.989	3.969	3.955	3.943	3.933	3.969	3.967
Inlet Temp. (deg. C)	35	78	. 29	23	4	34	32
Outlet Temp. (deg. C)	112	92	78	92	1 20	39.5	34
Temp. Rise (deg. C)	20	14	13	12	12	5.5	2
Flashing Temp. (deg. C)	114	94	82	. 2	59.5	43.5	8
Heat Transfer Rate (KJ/S)	141.847	98.795	91.406	84.118	83.894	111.574	40.549
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)	8.341	6.733	12.383	908.6	11.473	6.358	6.952
U (KW/sq.m/k)	3.640	7.576	3.811	4.429	3.775	3.541	1,177
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	25	5.1	, v	
f (sq.m K/kW)	0.0183	-0.0195	0.0663	0.0297	0.0688	0.0863	0.6536

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: July 27, 94		Time: 16:00		Total Operation Time: 52 hr.	Time: 52 hr.	
Variables	Brine Heater			Evaporator Stages			
		#	#3	100 TH	*	\$5	*
Flowrate (kg/h)	9200	9200	9200	6500	6500	18300	18300
Specific Heat (Kj/Kg/K)	3.989	3.969	3.955	3.943	3.933	3.969	3.966
Inlet Temp. (deg. C)	91.5	77	65	18	14	33	32
Outlet Temp. (deg. C)	112	91.5	77	. 65		. 62	33
Temp. Rise (deg. C)	20.5	14.5	12	12	12	9	•
Flashing Temp. (deg. C)	117	96	86	Z	9	43	₽
Heat Transfer Rate (kJ/S)	147.653	103.900	85.683	85.432	85.205	121.041	20.163
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)	12.583	10.067	14.163	10.923	12.018	6.548	7.489
U (KW/sq.m/K)	2.512	5.328	3.123	4.038	3.660	3.730	0.543
Clean-U Value (kW/sq.m/k)	6,8	9.9	5.1	5.1	5.1	. R.	5.1
f (sq.m K/kW)	0.1417	0.0362	0.1241	0.0516	0.0771	0.0720	1.6445

Run No. 3	Date: July 27, 94		Time: 20:00		Total Operation Time: 56 hr.	me: 56 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	£	**	9	10
Flowrate (kg/h)	0059	0059	,0029	6500	6500	18300	18300
Specific Heat (Kj/kg/K)	3.989	3.968	3.955	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	8	77	65	52	41	33	32
Outlet Temp. (deg. C)	112	91	11	65	52	39	33
Temp. Rise (deg. C	2	41	12	£	*	6	∵ ,
Flashing Temp. (deg. C)	116	94	78	8	Ø,	43	₽
Heat Transfer Rate (K)/5)	151.243	100.310	85.683	92.541	78.096	121.041	20.163
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. K)	11.459	8.071	12.018	10.149	11.647	6.548	7.489
U (KW/sq.m/l0	2.825	6.416	3.681	4.707	3.462	3.730	0.543
Clean-U Value (kW/sq.m/l0	б	6.6	r.	5.7	5.1	5.7	5.7
f (sq.m K/kW)	9260.0	0.0043	0.0756	0.0164	0.0928	0.0720	1.6445

Run No. 3	Date: July 28, 94		Time: 00:00		Total Operation Time: 60 hr.	Time: 60 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#5	£ #	**	\$G	9#
Flowrate (kg/h)	6480	6480	6480	6480	6480	18200	18200
Specific Heat (KJ/kg/K)	3.989	3.968	3.955	3.943	3.933	3.969	3.966
inlet Temp. (deg. C)	20		65	22	41	80 80	32
Outlet Temp. (deg. C)	112	. 84	L	92	E S .	39	33
Temp. Rise (deg. C)	21	14	12	12	12	Ø	•
Flashing Temp. (deg. C)	116	9 6	84	8	26	43	40
Heat Transfer Rate (kj/S)	150.777	100.002	85.419	85.169	84.943	120.380	20.053
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)	11.459	8.071	12.018	908.6	10.923	6.548	7.489
U (KW/sq.m/K)	2.816	6.397	3.669	4.484	4.015	3.710	0.540
Clean-U Value (KW/sq.m/K)	3.9	99	5.1	5.1	5.1	5.1	5.1
fish m K/kW)	0.0987	0.0048	0.0764	0.0269	0.0530	0.0735	1.6546

Date: July 28, 94

Run No. 3

Total Operation Time: 64 hr.

Variables	Brine Heater			Evaporator Stages	sed		
		*	# 5	*	**	ing	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18200	18200
Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	77	64	52	40	32.5	31.5
Outlet Temp. (deg. C)	112	5	" "	2	52	38	32.5
Temp. Rise (deg. C)	57		W.	12	12	ស	
Flashing Temp. (deg. C)	116	94	28	70	82	42	8
Heat Transfer Rate (kj/S)	148.916	98.767	91.383	84.098	83.876	110.335	20.051
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	11.459	8.071	12.383	10.923	10.923	6.358	6.988
U (kW/sq.m/k)	2.781	6.318	3.810	3.975	3.964	3.502	0.579
Clean-U Value (kW/sq.m/k)	6 K	6.6	5.7	5.1	5.3	rų L	Ř.
f (sq.m K/kw)	0.1031	0.0068	0.0664	0.0555	0.0562	0.0895	1.5310

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Kull NO. 3	Deter and to, es		200				
Variables	Brine Heater			Evaporator Stages	Ses		
		**	#2	#3	*	in #	
Flowrate (kg/h)	6420	6420	6420	6420	6420	18400	
Specific Heat (KJ/Kg/K)	3.989	3.969	3.955	3.943	3.932	3.969	
Inlet Temp. (deg. C)	6	78	65	52	40.5	83	
Outlet Temp. (deg. C)	112	9	78	65	25	33	
Temp. Rise (deg. C)	. .	73	13	13	11.5		
Flashing Temp. (deg. C)	115	93.5	84	69.5	88	42	
Heat Transfer Rate (K)/S)	149.381	92.012	91.692	91.402	80.637	121.703	
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	
L.M.T.D. (deg. K)	10.099	7.125	11.278	9.572	10.743	5.461	
U (KW/sq.m/K)	3.166	6.667	4.197	4.930	3.875	4.497	
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.7	ξ	7.	5.1	
f Ga.m K/kw)	0.0595	-0.0015	0.0422	0.0068	0.0620	0.0263	

Run No. 3	Date: July 28, 94		Time: 12:00			Total Operation Time: 72 hr.	ion Time	. 72 hr.		
Variables	Brine Heater			Evaporator Stages	seder					
		*	#2	#3		*		No.		•
Flowrate (kg/h)	0009	0009	.0009	0009		0009		18400		18400
Specific Heat (KJ/Kg/K)	3.988	3.967	3.953	3.942		3.932		3.969		3.966
Inlet Temp. (deg. C)	6	76	63.5	51.5		40		33		32
Outlet Temp. (deg. C.	112	06	92	63.5		51.5		33		33
Temp. Rise (deg. C)	23	4	12.5	12		41.5	1. :	φ		
Flashing Temp. (deg. C)	113	94	8	69	:	28		42		39.5
Heat Transfer Rate (kj/S)	146.234	92.569	82.361	78.833	. :	75.354		121.703		20.273
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	7.016	9.308	13.284	10.368		11.290		5.461	. ,	886.9
U (KW/sq.m/K)	4.461	5.134	3.201	3.926		3.446		4.497		0.585
Clean-U Value (KW/sq.m/lo	6; K	9.9	5.7	5.1	* * *	5.7		5.1		۲. ۲.
f (sq.m K/kW)	-0.0322	0.0433	0.1163	0.0587		0.0941		0.0263		1.5121

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: July 28, 94		Time: 16:00		Total Operation Time: 76 hr.	rime: 76 hr.	
Variables	Brine Heater			Evaporator Stages	9		
		#1	#2	6 未	*	ic #	10 78
Flowrate (kg/h)	0009	0009	.0009	0009	0009	18500	18500
Specific Heat (k)/kg/k0	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	91	11	64.5	52	40	33	31.5
Outlet Temp. (deg. C)	112	6	7.7	64.5	22	38	K
Temp. Rise (deg. C)	2	4	12.5	12.5	12	IO	1.5
Flashing Temp. (deg. C)	116	95	85	69	28	14	6E
Heat Transfer Rate (KJ/S)	139.609	92.594	82.382	82.132	78.634	101.962	30.574
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)	11.459	9.308	13.284	9.405	10.923	5.098	6.722
U (KW/sq.m/l0	2.608	5.136	3.202	4.509	3.717	4.036	0.918
Clean-U Value (kW/sq.m/l0	6.E	6.6	5.1	5.1	5.1	7.5	5.1
f (sq.m K/kW)	0.1271	0.0432	0.1163	0.0257	0.0730	0.0517	0.8935

Total Operation Time: 80 hr.

Time: 20:00

Date: July 28, 94

Run No. 3

Variables	Brine Heater			Eveporator Stayes	•		
		# 1	#2	£#	*	10 **	*
Flowrate (kg/h)	0009	0009	0009	0009	0009	18500	18500
Specific Heat (kj/kg/k)	3.989	3.970	3.957	3.943	3.932	3.968	3.966
inlet Temp. (deg. C)	8	80	99	15	40	33	3
Outlet Temp. (deg. C	112	6	80	99	83	38	83
Temp. Rise (deg. C)	7	7	4	2	£		7
Flashing Temp. (deg. C)	116	95	85	70	85	42	39.5
Heat Transfer Rate (kj/5)	139.609	72.783	92.321	85.442	85.196	101.962	40.764
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)	11.459	8.322	10.487	8.985	10.149	6.166	7.455
U (KW/sq.m/K)	2.608	4.515	4.545	4.910	4.334	3.337	1.103
Clean-U Value (kW/sq.m/k)	6. K	6.6	5.1	5.1	5.1	5.1	r.
f (sq.m K/kW)	0.1271	0.0700	0.0239	0.0076	0.0347	0.1036	0.7103

Run No. 3	Date: July 29, 94		Time: 00:00		Total Operation Time: 84 hr.	n Time: 84 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	₩ ₩	*	16 **	*
Flowrate (kg/h)	6200	9029	6200	6200	6200	18000	18000
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
inlet Temp. (deg. C)	9	78	65	52	40	· · K	31
Outlet Temp. (deg. C)	112	8	78	65	25	38	88
Temp. Rise (deg. C)	5	13	13	13	12	LÓ	8
Flashing Temp. (deg. C)	116	86	87	88	57	42	39.5
Heat Transfer Rate (KJ/S)	144.262	88.829	88.550	88.270	81.255	99.206	39.662
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)	11,459	6.452	8.985	7.766	9.806	6.166	7.455
U (kW/sq.m/k)	2.694	7.110	5.088	5.868	4.278	3.247	1.074
Clean-U Value (kW/sq.m/f0	3.9	6.6	22.	ે. દેર	5.1	5.7	5.1
f (sq.m K/kW)	0.1147	-0.0109	0.0005	-0.0257	0.0377	0.1119	0.7354

Date: July 29, 94

Run No. 3

Total Operation Time: 88 hr.

Variables	Brine Heater			Evaporator Stages			
		#	#.5	O W	*	15 18	*
Flowrate (kg/h)	6200	6200	6200	6200	6200	18000	18000
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	6	77.5	64.5	52	39.5	32	31.5
Outlet Temp. (deg. C)	112	٤	77.5	64.5	25	37	32
Temp. Rise (deg. C)	24	13.5	13	12.5	12.5	ю	0.5
Flashing Temp. (deg. C)	116	35	83	88	88	41.5	38.5
Heat Transfer Rate (K)/S)	144.262	92.270	88.539	84.870	84.636	99.191	9.915
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)	11.459	5.048	10.717	8.225	11.10	6.692	6.747
u (kw/sq.m/k)	2.694	9.436	4.265	5.327	3.936	2.991	0.297
Clean-U Value (kW/sq.m/K)	6. K	6.6	5.1	ភ	5.1	5.1	2
f (sq.m K/kW)	0.1147	-0.0455	0.0384	-0.0084	0.0580	0.1382	3.1761

Run No. 3	CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR Run No. 5 Time: 08:00	CORFEICIENT A	IND FOULING FA	CTOR	Total Operation Time: 92 hr.	n Time: 92 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 5	0	7	in W	9#
Flowrate (kg/h)	6200	6200	6200	6200	9200	18400	18400
Specific Heat (K)/Kg/K)	3,989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	78	65.5	52	40	33	
Outlet Temp. (deg. C)	112	8	78	65.5	52	38	٠
Temp. Rise (deg. C)	21	13	12.5	13.5	12	IO	
Flashing Temp. (deg. C)	117	56	83.5	69	28	42	.*
Heat Transfer Rate (kj/S)	144.262	88.859	85.150	91.670	81.255	101,411	20.273
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)	12.738	6.452	10.543	8.542	10.923	6.166	6.487
U (KW/sq.m/l0	2.424	7.110	4.170	5.540	3.840	3.319	0.631
Clean-U Value (KW/sq.m/K)	3.9	9.9	т. 1	5.7	5.1	5.1	5.1
	, , , , , , , , , , , , , , , , , , , ,						٠

Date: July 29, 94

Run No. 3

Total Operation Time: 96 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		*	#	£.	*	19	•
Flowrate (kg/h)	6500	0059	9200	9200	0059	18500	18500
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.969	3.966
inlet Temp, (deg. C)	90.5	77	64	52	40.5	33	32
Outlet Temp. (deg. C)	112	90.5	72	3	52	36	33
Temp. Rise (deg. C)	21.5	13.5	13	12	11.5	9	· - -
Flashing Temp. (deg. C)	116	96	98	202	53	43	40
Heat Transfer Rate (kj/S)	154.832	96.721	92.811	85.412	81.642	122.364	20.383
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)	11.607	10.890	14.544	10.923	11.833	6.548	7.489
U (kw/sq.m/k)	2.855	4.585	3.294	4.037	3.562	3.771	0.549
Clean-U Value (kW/sq.m/k)	6 K	9.9	5.1	5.1		5.1	ŗ,
f (sq.m K/KW)	0.0938	0.0666	0.1075	0.0516	0.0847	0.0691	1.6246

Run No. 3	Date: July 29, 94		Time: 16:00		Total Operation	Total Operation Time: 100 hr.	:
Variables	Brine Heater			Evaporator Stages			
		*	# 5	O #	*	₩	*
Flowrate (kg/h)	6500	6500	029	6500	6500	18500	18500
Specific Heat (Kj/kg/N)	3.989	3.968	3.954	3.942	5.932	3.969	3.966
Inlet Temp. (deg. C)	9.	77	64.5	52	14	33	31.5
Outlet Temp. (deg. C)	112	6	77	64.5	25	39	33
Temp. Rise (deg. C)	23	14	12.5	12.5	17	6	1.5
Flashing Temp. (deg. C)	117	96	98	70	5.9	43	
Heat Transfer Rate (kJ/S)	151.243	100.310	89.247	88.976	78.096	122.364	30.574
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)	12.738	10.487	14.354	10.543	11.647	6.548	7.726
U (KW/sq.m/k)	2.541	4.938	3.210	4.357	3.462	3.771	0.799
Clean-U Value (kW/sq.m/k)	3.9	9.9	r.	5.1	5.7	5.1	5.1
f (sq.m k/kw)	0.1371	0.0510	0.1155	0.0334	0.0928	0.0691	1.0562

Date: July 29, 94

Run No. 3

Total Operation Time: 104 hr.

Time: 20:00

Variables	Brine Heater			Evaporator Stages	***		
		*	# 2	£ #	*	物	6 0
Flowrate (kg/h)	6500	9200	6500	0059	6500	18500	18500
Specific Heat (kj/kg/l0	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	78	99	52	4	32.5	3.
Outlet Temp. (deg. C)	112	<u>و</u>	78	65	52	38	32.5
Temp. Rise (deg. C)	2	13	£	13	+	L	1.5
Flashing Temp. (deg. C)	116	96	85	20	82	42	39
Heat Transfer Rate (KJ/S)	151.243	93.158	92.835	92.541	78.096	112.154	30.572
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. f0	11.459	10.149	12.383	10.149	11.647	6.358	7.224
U (KW/sq.m/ld	2.825	4.739	5.870	4.707	3.462	3.559	0.854
Clean-U Value (kW/sq.m/K)	9 K	6.6	5.7	5.7	2	5.7	ν.
f (sq.m K/kW)	0.0976	0.0595	0.0623	0.0164	0.0928	0.0849	0.9749

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: July 30, 94		Time: 00:00		Total Operation	iotal operation Time: 108 nr.	
Variables	Brine Heater			Evaporator Stages			
		#	# 2	£ 3	*	₩ ₩	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18200	18200
Specific Heat (kg/kg/K)	3.989	3.969	3.956	3,943	3.933	3.968	3.966
inlet Temp. (deg. C)	8	79	99	23	44	32.5	33
Outlet Temp. (deg. C)	112	6	79	99	23	38	32.5
Temp. Rise (deg. C)	2	12	13	13	12	5.5	1.5
Flashing Temp. (deg. C)	117	94	84	69	88	42	39
Heat Transfer Rate (KJ/S)	148.916	84.681	91.430	91.138	83.894	110.335	30.076
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)	12.738	7.456	10.149	7.766	9.806	6.358	7.224
U (kW/sq.m/K)	2.502	5.863	4.651	6.059	4.417	3.502	0.840
Clean-U Value (kW/sq.m/k)	9.5	6.6	7.3	5.1	5.7	5.7	5.1
f (sq.m K/KM)	0.1432	0.0190	0.0189	(0.0310	0.0303	0.0895	0.9942
						-	

Date: July 30, 94

Run No. 3

Total Operation Time: 112 hr.

Variables	Brine Heater			Evaporator Stages			
		**	#3	6 雅	**	\$ \$	9
Flowrate (kg/h)	6400	6400	6400	6400	6400	18100	18100
Specific Heat (kj/kg/10	3.989	3.969	3.955	3.943	3.933	3.968	3.966
Inlet Temp. (deg. C)	99	78	92	52.5	42	32	30.5
Outlet Temp. (deg. C)	112	9	78	65	52.5	38	33
Temp. Rise (deg. C)	23	£	13	12.5	10.5	# 1	1.5
Flashing Temp. (deg. C)	116	92	83	89	57	42	88
Heat Transfer Rate (K)/S)	148.916	91.725	91.406	87.618	73.411	119.700	29.908
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)	11,459	4.926	10.149	7.612	8.721	6.548	6.722
U (kW/sq.m/to	2.781	9.613	4.650	5.943	4.346	3.689	0.898
Clean-U Value (kW/sq.m/x)	9.9	6.6	5.1	5.1	'n	<u>.</u>	5.1
f (sq.m K/kW)	0.1031	-0.0475	0.0190	-0.0278	0.0340	0.0750	0.9177

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: July 30, 94		Time: 08:00		Total Operation Time: 116 hr.	ı Time: 116 hr.	
Variables	Brine Heater			Evaporator Stages	u 5		
		# *	#2	m *	*	**	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18500	18500
Specific Heat (Kj/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	હ	11	64	52	40	33	32
Outlet Temp. (deg. C)	112	8	11	64	52	38	33
Temp. Rise (deg. C)	24	14	13	12	12	מו	
Flashing Temp. (deg. C)	116	93	84	69	: 8 8	42	36
Heat Transfer Rate (kJ/S)	148.916	28.767	91.383	84.098	83.876	101.962	20.383
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	11.459	6.733	12.383	9.806	10.923	6.166	6.487
U (KW/sq.m/K)	2.781	7.574	3.810	4.428	3.964	3.337	0.634
Clean-U Value (kW/sq.m/l0	3.9	9.9	5.1	5.1	5.1	5.1	5.1
f (sq.m K/kW)	0.1031	-0.0195	0.0664	0.0298	0.0562	0.1036	1.3811

Date: July 30, 94

Run No. 3

Total Operation Time: 120 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		# 1	#2	69 Wa	*	10 16	8
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	
Specific Heat (KJ/kg/K)	3.989	3.969	3.955	3.943	3.933	3.969	3.967
Inlet Temp. (deg. C)	9	78	65	23	4	X	
Outlet Temp. (deg. C)	112	9	78	92	53	39	9 34
Temp. Rise (deg. C)	27	13	, L	12	72		
Flashing Temp. (deg. C)	116	94	84	20	59		3
Heat Transfer Rate (kj/S)	150.079	92.442	92.121	84.775	84.549	4	8 40.770
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937		6 4.9556
L.M.T.D. (deg. 10	11.459	7.766	11.278	908.6	10.923	6.166	
U (KW/sq.m/K)	2.803	6.145	4.217	4.463	3.996		1.183
Clean-U Value (KW/sq.m/k)	6.8	6.6	5.7	51	5.1	S. T.	
f (sq.m K/kW)	0.1003	0.0112	0.0411	0.0280	0.0542	0.1035	5 0.6490

Variables #1 #2 #3 #4 #5 #6 Flowrate (kg/m) 6450 6450 6450 6450 6450 6450 6450 18100 18100 18100 Specific Heart (kJ/kg/n) 3.989 3.968 3.955 3.943 3.932 3.969 3.966 <td< th=""><th>Run No. 3</th><th>Date: July 30, 94</th><th></th><th>Time: 16:00</th><th></th><th>Total Operation Time: 124 hr.</th><th>n Time: 124 hr.</th><th></th></td<>	Run No. 3	Date: July 30, 94		Time: 16:00		Total Operation Time: 124 hr.	n Time: 124 hr.	
44 #3 #3 #4 #5<	Viriables	Brine Heater			Evaporator Stages			
6450 6450 6450 6450 6450 6450 18100			£#	#	#3	**	*	# 6
3.968 3.968 3.968 3.968 3.969 3.979 <td< td=""><td>Flowrate (kg/h)</td><td>6450</td><td>6450</td><td>6450</td><td>6450</td><td>6450</td><td>18100</td><td>18100</td></td<>	Flowrate (kg/h)	6450	6450	6450	6450	6450	18100	18100
Leg. Ch 91 77 65 52 40 33 8 (deg. Ch 21 12 13 12 6 6 (eg. Ch 21 14 12 13 12 6 p. (deg. Ch 11 95 86 70 59 43 59 p. (deg. Ch 1150.079 99.539 85.024 91.829 84.532 119.718 29 r Area (sq. m) 4.6723 1.937 1.937 1.937 4.9556 4.9 k) 2.522 5.521 3.099 4.671 5.63 5.689 0. kW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 kW/sq.m/k) 3.9 6.6 5.1	Specific Heat (kj/kg/l0	3.989	3.968	3.955	3.943	3.932	3.969	3.966
(deg. C) 112 91 77 65 52 39 leg. C) 21 12 13 12 6 p. ldeg. C) 117 95 86 70 59 43 p. ldeg. C) 117 95.5 85.024 91.829 84.532 1197.18 29. r Area (5q.m) 4.6723 1.937 1.937 1.937 4.9556 4.9 k) 12.738 9.308 14.163 10.149 12.018 6.548 6. k) 2.522 5.521 3.099 4.671 3.637 3.689 0. k) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 k(WW/sq.m/N) 3.9 6.6 5.1 5.1 5.1 5.1 5.1	inlet Temp. (deg. C)	93	77	65	52	40	22	31.5
Feg. Cl 21 12 13 12 6 p. (deg. Cl 117 95 86 70 59 43 r Rate (kl/s) 150.079 99.539 85.024 91.829 84.532 119.718 29 r Area (sq.m) 4.6723 1.937 1.937 1.937 4.9556 4.9 r Area (sq.m) 12.738 9.308 14.163 10.149 12.018 6.548 6. r Area (sq.m) 2.522 5.521 3.099 4.671 3.631 3.689 0. r (ww/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 r (ww/sq.m/k) 3.9 6.6 6.0 6.0180 0.0793 0.0750 0.99	Outlet Temp. (deg. C)	112	91	77	65	52	36	33
p. (deg. C) 117 95 86 70 59 43 r Rate (k//5) 150.079 99.539 85.024 91.829 84.532 119.718 29. r Area (Sq. m) 4.6723 1.937 1.937 1.937 4.9556 4.9 k) 12.738 9.308 14.163 10.149 12.018 6.548 6. k) 2.522 5.521 3.099 4.671 3.631 3.689 0. k(W//sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 cut/w/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 5.1	Temp. Rise (deg. C)	24	14	12	13	12	ဖ	1.5
r Rate (kj/s) 150.079 99.539 85.024 91.829 84.532 119.718 r Area (Sq.m) 4.6723 1.937 1.937 4.9556 4.9556 k0 12.738 9.308 14.163 10.149 12.018 6.548) 2.522 5.521 3.099 4.671 3.631 3.689 (kw/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 0.1266 0.0180 0.0793 0.0750	Flashing Temp. (deg. C)	117	38	98	02	20	43	· 62
r Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 RO 12.738 9.308 14.163 10.149 12.018 6.548 I Area (Sq.m) 2.522 5.521 3.099 4.671 3.631 3.689 I (MW/Sq.m/N) 3.9 6.6 5.1 5.1 5.1 5.1 0.1401 0.0296 0.1266 0.0180 0.0793 0.0750	Heat Transfer Rate (k)/5)	150.079	99,539	85.024	91.829	84.532	119.718	29.913
k0 12.738 9.308 14.163 10.149 12.018 6.548) 2.522 5.521 3.099 4.671 3.631 3.689 (kW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 0.1401 0.0296 0.1266 0.0180 0.0793 0.0750 0	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1,937	4.9556	4.9556
3.521 3.099 4.671 3.689 idvW/sq.m/kg 3.9 6.6 5.1 5.1 0.1401 0.0296 0.1266 0.0180 0.0793 0.0750	L.M.T.D. (deg. K)	12.738	9.308	14.163	10.149	12.018	6.548	6.722
(kW/sq.m/l0 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1	U (kW/sq.m/k)	2.522	5.521	3.099	4.671	3.631	3.689	0.898
0.1401 0.0296 0.1266 0.0180 0.0793 0.0750	Clean-U Value (kW/sq.m/K)	6. K	6.6	5.7	τ., 1-,	5.7	5.5	5.1
	f (sq.m K/KW)	0.1401	0.0296	0.1266	0.0180	0.0793	0.0750	0.9176

Evaporator Stages Ry Ine Heater <th## #="" #<="" th=""><th>Run No. 3</th><th>Date: July 30, 94</th><th></th><th>Time: 20:00</th><th></th><th>Total Operation Time: 128 hr.</th><th>me: 128 hr.</th><th></th></th##>	Run No. 3	Date: July 30, 94		Time: 20:00		Total Operation Time: 128 hr.	me: 128 hr.	
6450 652 53 40 73 40 73 40 73 40 73 </th <th>Variables</th> <th>Brine Heater</th> <th></th> <th></th> <th>Evaporator Stages</th> <th></th> <th></th> <th></th>	Variables	Brine Heater			Evaporator Stages			
6450 6450 <th< th=""><th></th><th></th><th>**</th><th># 2</th><th>#3</th><th>*</th><th>1</th><th>9#</th></th<>			**	# 2	#3	*	1	9#
3.989 3.969 3.956 3.943 3.952 91 79 66 53 40 112 91 79 66 53 40 112 12 13 13 13 13 13 13 13 13 13 143 143 143 143 143 143 1937 11,937 1	Flowrate (kg/h)	6450	6450	6450	6450	6450	18100	18100
91 79 66 53 40 112 91 79 66 53 21 12 13 13 13 17 94 84.5 69 58 150.079 85.343 92.144 91.850 91.586 1.937 1.937 1.937 1.937 1.937 12.738 7.456 10.717 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Specific Heat (K)/kg/K)	3.989	3.969	3.956	3.943	5.932	3.969	3.966
21 12 13 66 53 21 12 13 13 13 117 94 84.5 69 58 150.079 85.343 92.144 91.850 91.856 4.6723 1.937 1.937 1.937 1.937 12.738 7.456 10.717 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	inlet Temp. (deg. C)	9	62	99	1 5	40	33	31.5
21 12 13 13 117 94 84.5 69 58 150.079 85.343 92.144 91.850 91.586 4.6723 1.937 1.937 1.937 1.937 12.738 7.456 10.717 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Outlet Temp. (deg. C)	112	91	79	99	133	39	33
117 94 84.5 69 58 150.079 85.343 92.144 91.850 91.586 4.6723 1.937 1.937 1.937 1.937 12.738 7.456 10.717 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Temp. Rise (deg. C)	23	12	13	13	13	g	1.5
150.079 85.343 92.144 91.850 91.586 4.6723 1.937 1.937 1.937 1.937 12.738 7.456 10.717 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Flashing Temp. (deg. C)	117	94	84.5	69	8	42	39
4.6723 1.937 1.937 1.937 1.937 12.738 7.456 10.747 7.766 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Heat Transfer Rate (kj/S)	150.079	85.343	92.144	91.850	91.586	119.718	29.913
12.738 7.456 10.149 2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.522 5.909 4.439 6.106 4.659 3.9 6.6 5.1 5.1 0.1401 0.0177 0.0292 -0.0323 0.0186	L.M.T.D. (deg. K)	12.738	7.456	10.717	7.766	10.149	5.461	6.722
3.9 6.6 5.1 5.1 5.1 0.0486 0.1401 0.0177 0.0292 0.0323 0.0186	U (KW/sq.m/K)	2.522	5.909	4.439	6.106	4.659	4.423	0.898
0.1401 0.0177 0.0292 -0.0323 0.0186	Clean-U Value (kW/sq.m/K)	3.9	9.9	5.7	5.7	5.1		. . .
	f (sq.m K/kW)	0.1401	0.0177	0.0292	-0.0323	0.0186	0.0300	0.9176

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR Run No. 3 Date: July 31, 94 Time: 00:00

Run No. 3	Date: July 31, 94		Time: 00:00	Q	Total Operation Time: 132 hr.	Time: 132 hr.	
Variables	Brine Heater			Evaporator Stages	***************************************		
		*	# 2	6.4	*	10 #k	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18300	18300
Specific Heat (KJ/Kg/K)	3.989	3,969	3.955	3,943	3.932	3.968	3.966
Inlet Temp. (deg. C)	Σ.	78	65	52	40	33	₩
Outlet Temp. (deg. C)	112	9	78	65	22	38	33
Temp. Rise (deg. C	2		13	13	12	IO	* (%)
Flashing Temp. (deg. C)	116	94	84	69	8	42	68
Heat Transfer Rate (kj/S)	150.079	92.442	92.121	91.829	84.532	100.860	40.323
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)	11.459	7.766	11.278	8.985	10.923	6.166	6.952
U (kW/sq.m/K)	2.803	6.145	4.217	5.277	3.995	3.301	1.170
Clean-U Value (kW/sq.m/K)	3.9	6.6	5.3	់ ខ	5.7	5.7	5.1
f (sq.m K/kW)	0.1003	0.0112	0.0411	9900.0-	0.0542	0.1069	0.6583
							VIII.

Date: July 31, 94

Run No. 3

Veriables	Brine Heater			Evaporator Stages	52.		
		**	#5	£#	**	40 **:	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18400	18400
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	91	78	92	52	39.5	32	25
Outlet Temp. (deg. C)	112	91	78	65	52	37.5	32
Temp. Rise (deg. C)	23	13	13	£	12.5	5.5	•
Flashing Temp. (deg. C)	. 116	83	83	29	25	4	. 88
Heat Transfer Rate (K)/S)	150.079	92.442	92.121	91.829	88.049	111.539	20.270
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	11.459	6.452	8.985	6.452	9.978	5.823	6.487
U (KW/sq.m/lo	2.803	7.397	5.293	7.348	4.556	3.865	0.631
Clean-U Value (kW/sq.m/k)	6. 8.	9.9	5.7	5.1	5.1	5.1	ું છ ે.
f (sq.m K/kW)	0.1003	-0.0163	-0.0072	0.0600	0.0234	0.0627	1.3899

Run No. 3	Date: July 31, 94		Time: 08:00		Total Operation Time: 140 hr.	1 Time: 140 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	£#3	产推	6	9#
Flowrate (kg/h)	0059	6500	6500	6500	0059	18300	18300
Specific Heat (KJ/Kg/K)	3.989	3.969	3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	ይ	78	99	22	40.5	33.5	32
Outlet Temp. (deg. C)	112	93	78	92	53	33	33.5
Temp. Rise (deg. C)	3	13	13	15	12.5	5.5	1.5
Flashing Temp. (deg. C)	117	94	84	69	28	42	39
Heat Transfer Rate (Kj/S)	151.243	93.158	92.835	85.432	88.750	110.959	30.245
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	12.738	7.766	11.278	8.656	9.978	5.281	6.220
U (KW/sq.m/K)	2.541	6.193	4.250	5.095	4.592	4.240	0.981
Clean-U Value (kW/sq.m/lo	3,9	6.6	5.1	5.1	5.1	1.3	5.1
f (sq.m K/kW)	0.1371	0.0100	0.0392	0.0002	0.0217	0.0398	0.8230

Total Operation Time: 144 hr.

Time: 12:00

Date: July 31, 94

Run No. 3

Variables	Brine Heater			Evaporator Stages				
		**	# 3	*	**		*O	5
Flowrate (kg/h)	6450	6450	6450	6450	6450		18400	18400
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.943	3.933		3.969	3.967
Inlet Temp. (deg. C)	91	78	65	53	41		34	32
Outlet Temp. (deg. C)	112	9	78	65	25		39	34
Temp. Rise (deg. C)	. 21		13	12	12		ĸ	7
Flashing Temp. (deg. C)	118	96	98	82	28	:	43	40
Heat Transfer Rate (kj/S)	150.079	92.442	92.121	84.775	84.549	. ~	101.427	40.549
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)	13.962	10.149	13.470	9.806	10.923		6.166	6.952
U (kw/sq.m/k)	2.301	4.702	3,531	4.463	3.996		3.319	1.177
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	5.1	Σ.		5.1	5.1
f (sq.m K/KW)	0.1783	0.0611	0.0872	0.0280	0.0542		0.1052	0.6536

Run No. 3	Date: July 31, 94		Time: 16:00		Total Operation Time: 148 hr.	1 Time: 148 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#5	en #	*	10 **	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kJ/kg/K)	3.989	3.968	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	77	65	52	40	33	32
Outlet Temp. (deg. C)	112	91	. 11	65	52	38.5	33
Temp. Rise (deg. C)	%	14	12	13	12	5.5	. • .
Flashing Temp. (deg. C)	116.5	96	98	70	65	43	39.5
Heat Transfer Rate (kj/S)	150.079	99.539	85.024	91.829	84.532	112.163	20.383
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	12.107	10.487	14.163	10.149	12.018	6.888	6.988
U (kw/sq.m/k)	2.653	4.900	3.099	4.671	3.631	3.286	0.589
Clean-U Value (KW/sq.m/K)	6.5	9.9	5.7	5.7	ř.	5.1	5.1
f (sq.m K/kW)	0.1205	0.0526	0.1266	0.0180	0.0793	0.1082	1.5029

Run No. 3	Date: July 31, 94		Time: 20:00		Total Operation	Total Operation Time: 152 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	#2	£ #	**	SC #	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18400	18400
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	94	78	65	52	39.5	33	31.5
Outlet Temp. (deg. C)	112	9	78	65	52	38	33
Temp. Rise (deg. C)	23	13	13	13	12.5	L O	1.5
Flashing Temp. (deg. C)	117	96	86	70.5	58.5	4	39
Heat Transfer Rate (KJ/S)	150.079	92.442	92.121	91.829	88.049	101.411	30.409
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)	12.738	10.149	13.470	10.717	11.654	6.166	6.722
U (KW/sq.m/K)	2.522	4.702	3.531	4.424	3.901	3.319	0.913
Clean-U Value (KW/sq.m/K)	<u>ග</u> ස	9.9	5.7	5.7	ស	r.	2.7
f (sq.m K/KW)	0.1401	0.0611	0.0872	0.0300	0.0603	0.1052	0.8994

Run No. 3	Date: August 01, 94		Time: 00:00		Total Operation Time: 156 hr.	1 Tlme: 156 hr.	
Variables	Brine Hester			Evaporator Stages			
		*	# 2	E #	*	\$#	
Flowrate (kg/h)	6450	6450	6450	6450	6450	18600	
Specific Heat (kJ/kg/l0	3.989	3.969	3.955	3.943	3.932	3.968	
Inlet Temp. (deg. a	5	78	65	52	40	32	
Outiet Temp. (deg. C)	112	6	78	65	52	37.5	
Temp. Rise (deg. C)	23	13		- 13	12	5.5	
Flashing Temp. (deg. C)	116	94	83	89	57.5	41	
Heat Transfer Rate (kj/S)	150.079	92.442	92.121	91.829	84.532	112.752	
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	
L.M.T.D. (deg. K)	11.459	7.766	10.149	7.766	10.368	5.823	
U (kW/sq.m/lo	2.803	6.145	4.686	6.105	4.209	3.907	
Clean-U Value (KW/sq.m/K)	ත හ	6.6	5.1	7.	5.1	5.7	
6 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	7	VI. 100 0	2020	1770	. 60	

Date: August 01, 94

Run Mo. 3

Time: 04:00

Variables	Brine Heater			Evaporator Stages	-			
		*	## 21	m **	*	10 %		
Flowrate (kg/h)	6450	6450	6450	6450	6450	18600	0	18600
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	œ	3.966
Inlet Temp. (deg. C)	2	78	92	52	39.5	m	ø	ĸ
Outlet Temp. (deg. C)	112	8	78	65	52	37	7	32
Temp. Rise (deg. C)	2	13	×	13	12.5			
Flashing Temp. (deg. C)	116	6	83	67.5	27	14	·-	38
Heat Transfer Rate (K)/S)	150.079	92.442	92.121	91.829	88.049	102.498	i .	20.490
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556		4.9556
LM.T.D. (deg. K)	11.459	6.452	8.985	7.125	9.978	6.16	ထ္	6.487
U (kW/sq.m/10	2.803	7.397	5.293	6.654	4.556	3.355	īδ	0.637
Clean-U Value (kW/sq.m/K)	9.E	6.6	5.1	5.7	5.7	wi		5.
f (sq.m K/KW)	0.1003	-0.0163	-0.0072	-0.0458	0.0234	0.1020	0	1.3728

Run No. 3	Date: August 01, 94		Time: 08:00		Total Operation Time: 164 hr.	rime: 164 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 2	E7 ##	*	\G ₩	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18000	18000
Specific Heat (kj/kg/K)	3.989	3.969	3.956	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	. 46	78	99	53	04	33	
Outlet Temp. (deg. C)	112	9	78	99	53	62	
Temp. Rise (deg. C)	2	13	12	13	13	6	
Flashing Temp. (deg. C)	117.	63	84	69	88	42	
Heat Transfer Rate (kj/S)	150.079	92.442	85.045	91.850	91.586	119.057	19.832
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)	12.738	6.452	10.923	7.766	10.149	5.461	6.487
U (kW/sq.m/k)	2.522	7.397	4.020	6.106	4.659	4.399	0.617
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	5.1	Si		
f (so to K/koa)	70870	2000	1000	2020			4040

Date: August 01, 94

Run No. 3

Time: 12:00

Variables	Brine Heater		ŧ	Evaporator Stages			
:		#	# 5	67 78	*	*	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	17900	17900
Specific Heat (KJ/kg/10	3.989	3.968	3.955	3.943	5.932	3.969	3.966
Inlet Temp. (deg. C)		77	65	52.5	94	33	32
Outlet Temp. (deg. C)	112	9	π	92	52.5	39	33
Temp. Rise (deg. C)	23	4	12	12.5	12.5	(9	
Flashing Temp. (deg. C)	116	96	86	70	25	43	07
Heat Transfer Rate (kJ/S)	149.381	99.076	84.628	87.891	87.649	118.395	19.722
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)	11,459	10.487	14.163	9.978	11.654	6.548	7.489
U (KW/sq.m/k)	2.790	4.877	3.085	4.548	3.883	3.649	0.531
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	<u>7.3</u>	7. 7.	5.7	5.7
f (sq.m K/kW)	0.1020	0.0535	0.1281	0.0238	0.0615	0.0780	1.6857

Run No. 3	Date: August 01, 94		Time: 16:00		Total Operatio	Total Operation Time: 172 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	**	(Y) 雅	*	\$C	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18500	18500
Specific Heat (KJ/Kg/K)	3.989	3.968	3.955	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	94	77	65	22	40	33	
Outlet Temp. (deg. C)	112	94	11	65	52	39	
Temp. Rise (deg. C)	23	4	12	13	12	9	-
Flashing Temp. (deg. C)	116	96	98	02	59	43	
Heat Transfer Rate (kj/S)	149.381	92.076	84.628	91.402	84.138	122.364	20.383
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	11,459	10.487	14.163	10.149	12.018	6.548	6.487
U (KW/sq.m/l0	2.790	4.877	3.085	4.650	3.614	3.77.1	0.634
Clean-U Value (kW/sq.m/l0	5.7	6.3	4.9	5.3	5.3	5.3	
₹ (sq.m K/kW)	0.0881	0.0463	0.1204	0.0264	0880.0	0.0765	1 2005

Date: August 01, 94

Run No. 3

Time: 20:00

Variables	Brine Heater			Evaporator Stages	9		
		*	#	en W	*	¥5	*
Fiowrate (kg/h)	6420	6420	6420	6420	6420	18500	18500
Specific Heat (Kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	78	65	52	40	33	32
Outlet Temp. (deg. C)	112	9	78	65	52	38	33
Temp. Rise (deg. C)	&	13	<u>K</u>	13	12	6	
Flashing Temp. (deg. C)	116	96 :	98	70.5	59	42.5	33
Heat Transfer Rate (kj/S)	149.381	92.012	91.692	91.402	84.138	101.962	20.383
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	11.459	10.149	13.470	10.717	12.018	6.692	6.487
U (kW/sq.m/10	2.790	4.681	3.514	4.403	3.614	3.075	0.634
Clean-U Value (KW/sq.m/K)	6. K	9.9	5.1	۲ ۷	ं ए अ र् अ	r.	5.1
f (sq.m K/kW)	0.1020	0.0621	0.0885	0.0310	0.0806	0.1291	1.3811

Run No. 3	Date: August 02, 94		Time: 00:00		Total Operation Time: 180 hr.	1 Time: 180 hr.	
Variables	Brine Heater			Evaporator Stages			
		**	# 5	#3	*	#2	4 0
Flowrate (kg/h)	6420	6420	6420	6420	6420	18800	18800
Specific Heat (kj/kg/k)	3.989	3.969	3.956	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	. 6	78.5	65.5	52	39.5	32.5	31.5
Outlet Temp. (deg. C)	112	ક્ર	78.5	65.5	52	88	32.5
Temp. Rise (deg. C)	2.7	12.5	13	13.5	12.5	5.5	•
Flashing Temp. (deg. C)	116.5	94	83	69	58.5	42	38
Heat Transfer Rate (kJ/S)	149.381	88.479	91.704	94.923	87.640	113.973	20.712
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	12.107	7.612	9.572	8.542	11.654	6.358	5.986
U (kW/sq.m/k)	2.641	6.001	4.946	5.737	3.883	3.617	0.698
Clean-U Value (KW/sq.m/K)	9.5	6.6	5.1	5.1	5.7	5.7	5.1
f (sq.m K/KW)	0.1223	0.0151	0.0061	-0.0218	0.0615	0.0804	1.2361

Date: August 02, 94

Run No. 3

Total Operation Time: 184 hr.

Time: 04:00

	#1 6420 3.969 78 91	#2 6420 3.955 65 78	#3 6420 3.943 52 52 65	3 6420 5.943 5.2	# 4 6420 3.932	10 14	*
7	6420 3.969 78 91	6420 3.955 65 78	3.9	20 43 52	6420 3.932		
	3.969 78 91 13	3.955 65 78	69 16	43 52	3.932	18600	18600
	9 7 8 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1	78 78		52		3.968	3.966
4 <u>t</u>	20 £	78			39.5	32	31.5
	₩.	***		ço	22	80	32
		2		13	12.5	6	0.5
• • • • • • • • • • • • • • • • • • •	92.5	833		69	22	42	38
	92.012	91.692	91.402	0 2	87.640	123.007	10.246
Heat Iranster Area tod.m)	1.937	1.937	1.937	37	1.937	4.9556	4.9556
L.M.T.D. (deg. to	5.730	10.149	7.766	. 99	9.978	6.548	6.247
U (KW/sq.m/l0	8.290	4.664	6.076	76	4.535	3.791	0.331
Clean-U Value (kw/sq.m//0	9.9	5.1		5.1	5.1	5.7	5.7
f (sq.m K/kW) 0.1420	-0.0309	0.0183	-0.0315	15	0.0245	0.0677	2.8253

Variables Evaporator Stages # # # # # # # # # # # # # # # # # # #	Run No. 3	Date: August 02, 94		Time: 08:00		Total Operation Time: 188 hr.	Time: 188 hr.	
6500 6500 6500 6500 6500 7840 46 46 46 46 46 46 46 46 46 46 46 46 46	Veriables	Brine Heater			Evaporator Stages			
6500 6500 6500 6500 6500 77 65 3.948 3.952 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.969 3.319 2.541 4.026 3.319 2.541 4.026 3.319 2.541 2.541 2.541 2.541 2.542 2.541 2.542 2.542 2.543			**	# 5	en #	*	10 7h	*
3.988 3.968 3.955 5.943 3.952 3.968 41 77 65 52 40 33 11 91 77 65 52 38 12 14 12 12 5 1 147 93 84 69 58 42 1 151.243 10.0310 85.683 92.541 85.7187 101.411 2 1 4.6723 1.937 1.937 4.9556 4 1 2.541 7.692 3.681 5.317 4.026 3.319 10 3.9 5.1 5.1 5.1 5.1 5.1 5.1 10 3.9 5.3 5.3 5.1 5.1 5.1 5.1 10 3.9 6.6 5.1 5.1 5.1 5.1 5.1 10 5.1 5.1 5.1 5.1 5.1 5.1 10 5.1 5.1	Flowrate (kg/h)	0059	6500	6500	0099	6500	18400	18400
41 51 65 52 40 33 71 65 52 38 38 21 12 5 5 38 71 13 12 5 5 1 14 12 5 42 5 1 151.243 100.310 85.683 92.541 85.187 101.411 20.2 10 4.6723 1.937 1.937 1.937 4.9556 4.99 10 4.6728 6.769 3.681 5.31 4.026 3.319 0.06 10 3.54 5.1 5.1 5.1 5.1 5.1 5.1 10 3.59 5.1 5.1 5.1 5.1 5.1 5.1 10 1.337 0.0053 0.0053 0.01052 0.135 1.33	Specific Heat (kj/kg/K)	3.989	3.968	3.955	3.943	3.932	3.968	3.966
112 91 77 65 52 38 21 14 12 13 5 5 117 93 84 69 58 42 11 151.243 100.310 85.683 92.541 85.187 101.411 11 1,937 1,937 1,937 4,9556 12 12,758 6.168 8.985 10.923 6.166 10 2,541 7,692 3,319 6.166 3,319 10 3.9 6.6 5.1 5.1 5.1 5.1 10 3.3 6.0523 0,0523 0,1052 0,1052	Inlet Temp. (deg. C)	ዎ	11	65	22	40	£	32
21 14 12 13 14 5 42 </td <td>Outlet Temp. (deg. C)</td> <td>112</td> <td>6</td> <td>77</td> <td>92</td> <td>52</td> <td>38</td> <td>33</td>	Outlet Temp. (deg. C)	112	6	77	92	52	38	33
1 151.243 93 84 69 58 42 1 151.243 100.310 85.683 92.541 85.187 101.411 1 4.6723 1.937 1.937 4.9556 4.9556 1 2.541 7.692 3.681 5.317 4.026 3.319 10 3.9 6.6 5.1 5.1 5.1 5.1 10 1377 0.0215 0.0756 0.0080 0.00523 0.1052	Temp. Rise (deg. C)	23	14	12	20	12	'n	: :
Rate (k/S) 151.243 100.310 85.683 92.541 85.187 101.411 Area (5q.m) 4.6723 1.937 1.937 4.956 0 12.738 6.733 12.018 8.985 10.923 6.166 0 2.541 7.692 3.681 5.317 4.026 3.319 kkW/sq.m/lo 3.9 6.6 5.1 5.1 5.1 0.1371 -0.0215 0.0756 -0.0080 0.0523 0.1052	Flashing Temp. (deg. C)	117	93	84	69	58	42	39
Area (Sq.m) 4,6723 1.937 1.937 1.937 4,9556 0 12.738 6.733 12.018 8.985 10.923 6.166 0 2.541 7.692 3.681 5.317 4.026 3.319 ikW/sq.m/k0 3.9 6.6 5.1 5.1 5.1 5.1 0.1371 -0.0215 0.0756 -0.0080 0.0523 0.1052	Heat Transfer Rate (kj/S)	151.243	100.310	85.683	92.541	85.187	101.411	20.273
0 12.738 6.733 12.018 8.985 10.923 6.166 2.541 7.692 3.681 5.317 4.026 3.319 IKW/sq.m/No 3.9 6.6 5.1 5.1 5.1 0.1371 -0.0215 0.0756 -0.0080 0.0523 0.1052	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.541 7.692 3.681 5.317 4.026 3.319 0.0 0.01050 3.319 0.0 0.01052 0.1052 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	L.M.T.D. (deg. 10	12.738	6.733	12.018	8.985	10.923	6.166	6.487
sq.m/k0 3.9 6.6 5.1 5.1 5.1 5.1 1.3 1.1 3.1 1.3 1.1 3.1 1.3 1.1 3.1 1.3 1.3	U (KW/sq.m/K)	2.541	7.692	3.681	5.317	4.026	3.319	0.631
0.1371 -0.0215 0.0756 -0.0080 0.0523 0.1052	Clean-U Value (kW/sq.m/l0	3.9	9.9	5.1	5.7	5.1	5.7	5.7
	f (sq.m K/kW)	0.1371	-0.0215	0.0756	-0.0080	0.0523	0.1052	1.3897

Date: August 02,94

Run No. 3

Total Operation Time: 192 hr.

Time: 12:00

Figurate (right) 6450 6450 6450 6450 6450 6450 18500	Variables	Brine Heater			Evaporator Stages	•		
(450) 6450 6450 6450 18500 KI/Kg/No 3.989 3.968 3.954 3.942 3.922 3.968 8c. Cl 91 77 64 52 40 33 deg. Cl 21 14 17 64 52 3.868 i.deg. Cl 21 14 17 64 52 3.8 i.deg. Cl 21 14 13 70 59 43 i.deg. Cl 117 94 85 70 59 43 Area (si,ri) 150.079 99.539 92.097 84.755 84.532 101.962 Area (si,rii) 4.6723 1.937 1.937 1.937 1.937 2.213 cl 2.522 6.367 3.530 4.006 3.631 2.852 kwiysq.miyo 3.9 5.1 5.1 5.1 5.1 cl 6.6 5.1 5.1 5.1 5.1 cl 6			#	#2	*3	#	9#	•
KI/Kg/Ko 3.968 3.968 3.954 3.942 3.942 3.968 3.968 eg. Cl 91 77 64 52 40 33 deg. Cl 112 91 77 64 52 38 g. Cl 21 14 13 12 5 38 g. Cl 177 94 85 70 59 43 Area (kJS) 150.079 99.539 92.097 84.755 101.962 101.962 Area (kJS) 1.937 1.937 1.937 1.937 4.9556 Area (kJS) 8.071 13.470 10.923 12.018 7.213 kW/sq.m/lo 3.53 6.6 5.1 5.1 5.1 5.1 kW/sq.m/lo 3.5 6.6 5.1 5.1 5.1 5.1 co.0795 0.0455 0.0536 0.0536 0.0793 0.1545	Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
eg. Cl 91 77 64 52 40 33 deg. Cl 112 91 77 64 52 38 ig. Cl 21 14 13 12 5 38 i. Geg. Cl 117 94 85 70 59 43 Rate (kJ/S) 150.079 99.539 92.097 84.755 84.532 101.962 Area (Sq.m) 4.6723 1.937 1.937 1.937 1.937 4.9556 o 12.738 8.071 13.470 10.923 12.018 7.213 kW/sq.m/kl 3.9 6.6 5.1 5.1 5.1 5.1 kW/sq.m/kl 3.9 6.6 5.1 5.1 5.1 5.1 c. 6.367 3.637 0.0955 0.0836 0.0793 0.0793 0.0793 0.0793	Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Geg. Cl 21 14 77 64 52 38 ig. Cl 21 14 13 12 12 5 i. deg. Cl 117 94 85 70 59 43 i. deg. Cl 150.079 99.539 92.097 84.755 84.532 101.962 Area (ig/is) 1.60.73 1.937 1.937 1.937 4.9556 Area (ig/is) 12.738 8.071 13.470 10.923 12.018 7.213 o 2.522 6.367 3.530 4.006 3.631 2.852 kWisq.m/io 3:9 6.6 5.1 5.1 5.1 5.1 o.1401 0.0055 0.0872 0.0536 0.0793 0.1545	Inlet Temp. (deg. C)	91	77	99	22	40	82	32
g. Cl 21 14 13 12 12 12 5 1. (deg. Cl) 117 94 85 70 59 43 Rate (kj/S) 150.079 99.539 92.097 84.755 84.532 101.962 Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 0 12.738 8.071 13.470 10.923 12.018 7.213 0 2.522 6.367 3.530 4.006 3.631 2.852 kW/sq.m/k0 3.9 6.6 5.1 5.1 5.1 5.1 5.1 0.04401 0.0055 0.0872 0.0536 0.0793 0.1545	Outlet Temp. (deg. C)	112	9	7	64	52	38	33
Rate (k/S) 150.079 94 85 70 59 43 Rate (k/S) 150.079 99.539 92.097 84.755 84.532 101.962 Area Sq.m) 4.6723 1.937 1.937 1.937 4.9556 Area Sq.m) 12.738 8.071 13.470 10.923 12.018 7.213 Area Sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 Arw/sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 Arw/sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 Arw/sq.m/N 3.9 0.0872 0.0836 0.0793 0.1545	Temp. Rise (deg. C)	24	14		12	12	in	
Rate (kj/S) 150.079 99.539 92.097 84.755 84.532 101.962 Area Sq.m) 4.6723 1.937 1.937 1.937 4.9556 0 12.738 8.071 13.470 10.923 12.018 7.213 0 2.522 6.367 3.530 4.006 3.631 2.852 kW/sq.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 0.1401 0.0055 0.0872 0.0536 0.0793 0.1545	Flashing Temp. (deg. C)	117	94	10 10 10 10 10 10 10 10 10 10 10 10 10 1	20	20	43	æ
Area Sq.m) 4.6723 1.937 1.937 1.937 4.9556 0 12.738 8.071 13.470 10.923 12.018 7.213 2.522 6.367 3.530 4.006 3.631 2.852 kW/sq.m/lo 3.9 6.6 5.1 5.1 5.1 0.1401 0.0055 0.0872 0.0536 0.0793 0.1545	Heat Transfer Rate (kj/S)	150.079	99.539	92.097	84.755	84.532	101.962	20.383
0 12.738 8.071 13.470 10.923 12.018 7.213 7.213 (2.522 6.367 3.530 4.006 3.631 2.852 (2.522 6.367 5.1 5.1 5.1 5.1 5.1 5.1 0.0055 0.0872 0.0536 0.0793 0.1545	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
kW/sq.m/lo 3.522 6.5 5.1 5.1 5.1 5.1 5.1 0.1401 0.0055 0.0872 0.0536 0.0793 0.1545	L.M.T.D. (deg. 10	12.738	8.071	13.470	10.923	12.018	7.213	6.487
ikw/sq.m/l0 3:9 6.6 5:1 5.1 5:1 5.1 5.1 5.1 5.1	U (KW/sq.m/Kd	2.522	6.367	3.530	4.006	3.631	2.852	0.634
0.1401 0.0055 0.0872 0.0536 0.0793 0.1545	Clean-U Value (kW/sq.m/lo	9.5	6.6	5.1	5.1	5.7	5.1	r.
	f Gq.m K/KW	0.1401	0.0055	0.0872	0.0536	0.0793	0.1545	1.3811

#1 #2 #1 #2 #1 #2 #1 #2 #2 #1 #2 #2 #1 #2 #2 #1 #2 #2 #1 #2 #2 #2 #2 #3 #3 #3 #4 #2 #4 #4 #4 #4 #4 #4 #4 #4	Run No. 3	Date: August 02, 94		Time: 16:00		Total Operation Time: 196 hr.	Time: 196 hr.	
6430 6430 6430 6430 6430 83.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.968 3.96 6.6	Variables	Brine Heater			Evaporator Stages			
6430 6430 6430 6430 91 77 91 77 21 14 1. C 117 94 IK/S) 149.614 99.230 (Sq.m) 4.6723 1.937 2.514 6.347 1.1738 8.071 2.514 6.56			#1	#3	E #	*	10	*
60 3.989 3.968 91 77 77 77 77 77 77 77 77 77 77 77 91 14 14 99.230 12.738 8.071 7.738 7.738 8.071 7.73	Flowrate (kg/h)	6430	6430	6430	6430	6430	18400	18400
91 77 91 21 14 1. C 117 94 1. C 117 94 1. C 149.614 99.230 1. G 94 1. C 147 2.514 6.347 1. C 1414 0.0060	Specific Heat (kj/kg/l0	3.989	3.968	3.954	3.942	3.932	3.969	3.966
7.1	inlet Temp. (deg. C)	8	77	64	52	40	33	32
21 14 117 94 149.614 99.230 4.6723 1.937 12.738 8.071 2.514 6.347 3.9 6.6	Outlet Temp. (deg. C)	112	94	11	99	52	39	33
117 94 149.614 99.230 4.6723 1.937 12.738 8.071 2.514 6.347 3.9 6.6	Temp. Rise (deg. C)	2	14	73	12	12	G	•
149.614 99.230 4.6723 1.937 12.738 8.071 2.514 6.347 3.9 6.6 0.1414 0.0060	Flashing Temp. (deg. C)	117	7 6	98	20	85	43	- 6 2
4.6723 1.937 12.738 8.071 2.514 6.347 3.9 6.6 0.1414 0.0060	Heat Transfer Rate (KJ/S)	149.614	99.230	91.812	84.492	84.270	121.703	20.273
0 12.738 8.071 2.514 6.347 (kW/sq.m/l) 3.9 6.6 0.1414 0.0060	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.514 6.347 (KW/sq.m/N 3.9 6.6 0.1414 0.0060	L.M.T.D. (deg. K)	12.738	8.071	14.544	10.923	12.018	6.548	6.487
3.9 6.6 0.1414 0.0060	U (kW/sq.m/K)	2.514	6.347	3.259	3.993	3.620	3.750	0.631
0.1414 0.0060	Clean-U Value (kW/sq.m/k)	3.9	9.9	5.7	. E	1.3	5.3	5.1
	f (sq.m K/KW)	0.1414	0,0060	0.1108	0.0543	0.0802	0.0706	1.3897

Total Operation Time: 200 hr.

Time: 20:00

Date: August 02, 94

Run No. 3

Variables	Brine Heater			Evaporator Stages	59		
		#	#2	£#	*#	\$0 #k	6
Flowrate (kg/h)	6420	6420	6420	6420	6420	18500	18500
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.969	3.966
Inlet Temp. (deg. C)	91	77	2	25	04	33	32
Outlet Temp. (deg. C)	112	6	77	64	52	39	33
Temp. Rise (deg. C)	2	14	13	12	12	G	•
Flashing Temp. (deg. C)	117	94	98	ዩ	26	43	94
Heat Transfer Rate (kj/S)	149.381	99.076	91.669	84.361	84.138	122.364	20.383
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	12.738	8.071	14.544	10.923	12.018	6.548	7.489
U (KW/sq.m/K)	2.510	6.337	3.254	3.987	3.614	3.771	0.549
Clean-U Value (kW/sq.m/k)	6 6	9.9	R)	5.3	5.7	<u>بر</u>	5.7
f (sq.m K/kW)	0.1420	0.0063	0.1112	0.0547	0.0806	0.0691	1.6246

Run No. 3	Date: August 03, 94		Time: 00:00		Total Operation Time: 204 hr.	Time: 204 hr.	
Variebles	Brine Heater			Evaporator Stages			
		*	*	m #	7#	₩.	*
Flowrate (kg/h)	6430	6430	6430	6430	6430	18500	18500
Specific Heat (KJ/Kg/K)	3.989	3.969	3.955	5.943	3.932	3.968	3.966
inlet Temp. (deg. O	99	78	65	52	39.5	32.5	3
Outlet Temp. (deg. C)	112	ઠ	78	65	52	38	32.5
Temp. Rise (deg. C)	2	F.	13	K	12.5	5.5	5.7
Flashing Temp. (deg. C.	117	94	83	89	57.5	4	38
Heat Transfer Rate (KJ/S)	149.614	92.155	91.835	91.544	87.776	112.154	30.572
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)	12.738	7.766	10.149	7.766	10.543	5.281	6.220
U (KW/sq.m/K)	2.514	6.126	4.672	6.086	4.298	4.285	0.992
Clean-U Value (KW/sq.m/K)	о; 6	9.6	5.1	5.1	5.1	5.1	5.1
f (co m K/MM)	0.1414	0.0117	0.000	87X0 G	OUZER	27200	0.8122

Run No. 3	Date: August 03, 94		Time: 04:00		-	lotal operati	Total Operation Time: 208 hr.		
Variables	Brine Heater			Evaporator Stages	(lages				
		#1	*2	9		*	10		
Flowrate (kg/h)	6420	6420	6420	6420		6420	18600		18600
Specific Heat (Kj/Kg/K)	3.989	3.968	3.955	3.942		3.931	3.968		3.966
Inlet Temp. (deg. O	90.5	77	65	51.5		£	32		ξ.
Outlet Temp. (deg. C)	112	90.5	77	. 59		51.5	£	+ 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1	32
Temp. Rise (deg. C)	21.5	13.5	12	13.5		12.5	LC)		} -
Flashing Temp. (deg. C)	117	8	82	88		27	14		ec M
Heat Transfer Rate (KJ/S)	152.926	95.531	84.628	94.912	•	87.631	102.498		20.490
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	12.892	5.863	9.806	7.919		10.543	6.166		6.487
U (KW/sq.m/k)	2.539	8.412	4.456	6.188		4.291	3.355		0.637
Clean-U Value (kW/sq.m/l0	3.9	9.9	5.1	5.1		5.4	5.7		5.1
f (sq.m K/kw)	0.1375	-0.0326	0.0284	-0.0345		0.0370	0.1020		1.3728
						:			

Run No. 3	Date: August 03, 94		Time: 08:00		Total Operation Time: 212 hr.	ı Time: 212 hr.	
Variables	Brine Heater			Evaporator Stages	Sec		
		#1	# 5	の	*	NO Tek	60
Flowrate (kg/h)	6500	6500	6500	9200	0059	18400	18400
Specific Heat (kj/kg/l0	3.989	3.968	3,954	3.942	3.931	3.968	3.966
inlet Temp. (deg. C)	90.5	72	64	52	39	32	Σ
Outlet Temp. (deg. C)	112	90.5	77	64	23	38	32
Temp. Rise (deg. C)	21.5	13.5	7	12	13	6	***
Flashing Temp. (deg. C)	118	93	84	69	85	42	38
Heat Transfer Rate (kj/S)	154.832	96.721	92.811	85.412	92.276	121.684	20.270
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	14.122	7.273	12.383	9.806	11.278	6.548	6.487
U (kW/sq.m/k)	2.347	6.866	3.869	4.497	4.224	3.750	0.631
Clean-U Value (kW/sq.m/k)	3.9	6.6	7.	5.7.	5.1	5.7	5.1
f (sq.m K/kw)	0.1697	-0.0059	0.0624	0.0263	0.0407	0.0706	1.3899

Run No. 3	Date: August 03, 94		Time: 16:00			Total Operation Time: 220 hr.	Ilme: 220 hr.		
Variables	Brine Heater		-	Evaporator Stages	***				
		*	#5	6		*	₩ #		•
Flowrate (kg/h)	6400	6400	6400	6400		6400	18500		18500
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942		3.932	3.968		3.966
Inlet Temp. (deg. C)	90.5	77	26	52.5		94	33		Æ
Outlet Temp. (deg. C)	112	90.5	11	64		52.5	88		33
Temp. Rise (deg. C)	21.5	13.5	Ķ	11.5	1 1 1	12.5	.		2
Flashing Temp. (deg. C)	118.5	95	82	69		28	42		33
Heat Transfer Rate (kj/S)	152.450	95.233	91.383	80.599		87.376	101.962		40.764
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)	14.722	9.738	13.470	9.632		10.543	6.166		6.952
U (KW/sq.m/lū	2.216	5.049	3.502	4.320		4.279	3.337		1.183
Clean-U Value (KW/sq.m/l0	6.6	9.6	5.1	5.1		5.1	5.1	13 1	5.
f (sq.m K/kM)	0.1948	0.0466	0.0894	0.0354		0.0376	0.1036		0.6491

Run No. 3	Date: August 03,94		Time: 20:00		Total Operation Time: 224 hr.	1 Time: 224 hr.	
Variables	Brine Heater			Evaporator Stages			
		# 7	#2	£#	*	S#	9
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kj/kg/l0	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	5	77.5	92	53	40	K K	3
Outlet Temp. (deg. C)	112	<u>&</u>	77.5	65	23	38	33
Temp. Rise (deg. C)		13.5	12.5	12	13		2
Flashing Temp. (deg. C)	118.5	96	98	20	28	42	38.5
Heat Transfer Rate (kj/S)	150.079	95.991	88.572	84.775	91.586	101.962	40.764
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)	14.559	10.318	13.820	9.806	10.149	6.166	6.448
U (KW/sq.m/K)	2.206	4.803	3.309	4.463	4.659	3.337	1,276
Clean-U Value (kW/sq.m/k)	3.9	9.9	5.1	5.7	5.1	5.7	5.7
f (sq.m K/KW)	0.1969	0.0567	0.1062	0.0280	0.0186	0.1036	0.5878

Run No. 3	Date: August 04,94		Time: 00:00		Total Operation Time: 228 hr.	ime: 228 hr.	
Variables	Brine Heater			Evaporator Stages			
		# 1	# 2	6	**	ko Wa	*
Flowrate (kg/h)	6440	6440	6440	6440	6440	18500	18500
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	ક ્	78	65	52.5	40	1 26	34
Outlet Temp. (deg. C)	112	٩	78	. 65	52.5	38	33
Temp. Rise (deg. C)	21	13	<u>w</u>	12.5	12.5	1 0	8
Flashing Temp. (deg. C)	118	76	84	69	28	42	8
Heat Transfer Rate (IQ/S)	149,847	92.299	91.978	88.165	87.922	101.962	40.764
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)	13.962	7.766	11.278	8.821	10.543	6.166	6.952
U (kw/sq.m/k)	2.297	6.136	4.210	5.160	4.305	3.337	1.183
Clean-U Value (kW/sq.m/k)	6.6	9.9	5.1	5.1	5.7	5.3	.
f (sq.m K/kW)	0.1789	0.0115	0.0414	-0.0023	0.0362	0.1036	0.6491

Run No. 3	Date: August 04, 94		Time: 04:00		Total Operation	Total Operation Time: 232 hr.
Variables	Brine Heater			Evaporator Stages		
		**	**	£	*	10 #k
Flowrate (kg/h)	6420	6420	6420	6420	6420	18500
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968
Inlet Temp. (deg. C)	9	78	65	52.5	40	32.5
Outlet Temp. (deg. C)	112	6	78	65	52.5	38
Temp. Rise (deg. C)	2	13	13	12.5	12.5	5.5
Flashing Temp. (deg. C)	117	94	84	69	28	41.5
Heat Transfer Rate (kj/S)	149.381	92.012	91.692	87.891	87.649	112.154
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556
L.M.T.D. (deg. K)	12.738	7.766	11.278	8.821	10.543	5.823
U (kw/sq.m/k)	2.510	6.117	4.197	5.144	4.292	3.886
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.1	5.1	5.1	5.
f feet my V/VAAn	07700	0	0	!		1

Run No. 3	Date: August 04, 94		Time: 12:00		Total Operati	Total Operation Time: 240 hr.	
Variables	Brine Heater			Evaporator Stages	302		
		#1	# 2	6 *	*	5	•
Flowrate (kg/h)	0290	6500	0059	0059	0059	18400	18400
Specific Heat (kj/kg/l0	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	જ	77	64	22	40	32.5	ጅ
Outlet Temp. (deg. C)	112	91	77	7 9	52	38	32.5
Temp. Rise (deg. C)	7	44	13	12	12	5.5	1.5
Flashing Temp. (deg. C)	116	96	82	20	58.5	42	39.5
Heat Transfer Rate (k]/S)	151.243	100.310	92.811	85.412	85.187	111.548	30.406
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)	11.459	8.071	13.470	10.923	11.473	6.358	7.726
U (kW/sq.m/i0	2.825	6.416	3.557	4.037	3.833	3.540	0.794
Clean-U Value (KW/sq.m/f0	6.6	9.9	5.1	5.1	r.	្រីស	<u>ج</u> .
f (sq.m K/kW)	0.0976	0.0043	0.0851	0.0516	0.0648	0.0864	1.0631

Run No. 3	Date: August 04, 94		Time: 16:00		Total Operation Time: 244 hr.	1 Time: 244 hr.	
Variables	Brine Heater			Evaporator Stages			
		**	#2	£	*4	1C 10t	**
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.943	3.932	3.968	
Inlet Temp. (deg. C)	₽.	11	64.5	52.5	40	33	
Outlet Temp. (deg. C)	112	2	77	64.5	52.5	38	
Temp. Rise (deg. C)	2	14	12.5	12	12.5	w	:
Flashing Temp. (deg. C)	116	95	84	02	58.5	42.5	
Heat Transfer Rate (kJ/S)	150.079	99.539	88.561	84.765	88.058	101.962	40.764
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	11.459	9.308	12.201	10.368	11.101	6.692	•
U (KW/sq.m/10	2.803	5.521	3.747	4.221	4.095	3.075	
Clean-U Value (kW/sq.m/l0	3.9	9.9	5.1	5.1	5.1	5.1	
# /co m ////48	0.4003		90100		2000	700	A 4 C C

Date: August 04,94

Run No. 3

Total Operation Time: 248 hr.

Time: 20:00

Verjahlas	Brine Heater				EV	Evaporator Stages	2			
		*		#2		#3	*		40 %	*
Flowrate (kg/h)	6450	Ğ	6450	6450		6450	6450		18500	18500
Specific Heat (kJ/kg/k)	3.989	Ŕ	3.969	3.955	٠.	3.943	3.932		3.968	3,966
Inlet Temp. (deg. C)	6		78	65		22	39.5		33	8
Outlet Temp. (deg. C)	112		94	78		65	52		38	33
Temp. Rise (deg. C)			13	13		13	12.5		15	7
Flashing Temp. (deg. C)	116		96	82		7	59		42	39
Heat Transfer Rate (KJ/S)	150.079	92.	92.442	92.121		91.829	88.049	5	101.962	40.764
Heat Transfer Area (Sq.m)	4.6723	7	1.937	1.937		1.937	1.937	•	4.9556	4.9556
L.M.T.D. (deg. l0	11.459	10	10.149	12.383	:	11.278	12.201	:	6.166	6.952
U (KW/sq.m/l0	2.803	4	4.702	3.841		4.204	3.726		3.337	1.183
Clean-U Value (kW/sq.m/lo	3.0		6.6	5.7		5.1	5.1		5.1	5.1
f (sq.m K/kW)	0.1003	0.0	0.0611	0.0643		0.0418	0.0723		0.1036	0.6491

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: August 05, 94		Time: 00:00		Total operation	Total Operation Time: 252 hr.	
Variables	Brine Heater			Evaporator Stages	4		
		# 1	#2	**	**	#5	9
Flowrate (kg/h)	6450	6450	6450	6450	6450	18600	18600
Specific Heat (KJ/Kg/IO	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	78	65	52.5	40	33	31
Outlet Temp. (deg. C)	112	Ծ	78	65	52.5	38	33
Temp. Rise (deg. C)	23	; m		12.5	12.5	S	
Flashing Temp. (deg. Cl	117	94	84	02	59	42	39
Heat Transfer Rate (KJ/S)	150.079	92.442	92.121	88.302	88.058	102.513	40.984
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	12.738	7.766	11.278	8.978	11.654	6.166	6.952
U (KW/sq.m/l0	2.522	6.145	4.217	4.569	3.901	3,355	1.190
Clean-U Value (kW/sq.m/k)	3.9	9.9	5.7	7.	5.7	5.1	5.1
f (sq.m K/kW)	0.1401	0.0112	0.0411	0.0228	0.0603	0.1020	0.6445

un No. 3	Date: August 05, 94		Ė	Time: 04:00			Total Operation Time: 256 hr.	ime: 256 hr.	
Variables	Brine Heater				Evaporator Stages	Stages			
· .		#1		#2	£		**	in in	*
Flowrate (kg/h)	6440	6440		6440	6440		6440	18500	18500
Specific Heat (Kj/kg/K)	3.989	3.969		3.956	3.943	-	3.932	3.968	3.966
inlet Temp. (deg. C)	હ	79		65	22		40	8 2	22
Outlet Temp. (deg. C	112	94		79	99	-	52	88	33
Temp. Rise (deg. C)	2	12		4	13		12	I O	2
Flashing Temp. (deg. C)	117	96		28	69.5		28	42	39
Heat Transfer Rate (KJ/S)	149.847	85.211		990.66	94.686	•	84.401	101.962	40.764
Heat Transfer Area (5q.m)	4.6723	1.937		1.937	1.937		1.937	4.9556	4.9556
L.M.T.D. (deg. K)	12.738	7.456	:	10.487	9.572		10.923	6.166	6.952
U (KW/sq.m/i0	2.518	5.900		4.877	4.945		3.989	3.337	1.183
clean-U Value (kW/sq.m/k)	6 6	6.6		5.7	5.		7.0	ř.	5.7
f (sq.m K/kw)	0.1408	0.0180	. :	0.0000	0.0061		0.0546	0.1036	0.6491

Run No. 3	Date: August 05, 94		Тіте: 08:00		Total Operation Time: 260 hr.	1 Time: 260 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	#2	£#	*	ir) Th	*
Flowrate (kg/h)	0200	9200	0059	6500	6500	18600	18600
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	8	77.5	65	22	40	33	<u>ب</u>
Outlet Temp. (deg. C)	112	94	77.5	65	52	38	
Temp. Rise (deg. C)	21	13.5	12.5	13	12	5	2
Flashing Temp. (deg. C)	116.5	94	84.5	69.5	28	41.5	£6
Heat Transfer Rate (kj/S)	151.243	96.735	89.258	92.541	85.187	102.513	40.984
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)	12.107	7.919	12.201	9.572	10.923	5.635	6.952
U (KW/sq.m/X)	2.674	6.306	3.777	4.991	4.026	3.671	1.190
Clean-U Value (KW/sq.m/K)	O, Kr	6.6	5.1	5.1	5.1	r.	5.7
f (sq.m K/kW)	0.1176	0.0071	0.0687	0.0043	0.0523	0.0763	0.6445
A CONTRACTOR OF THE PROPERTY O			The state of the s	AND DESCRIPTION OF THE PERSON		,	

Total Operation Time: 264 hr.

Time: 12:00

Date: August 05, 94

Run No. 3

				Eresponden Chan			
Variables	Brine Heater			EVAPO/ATO! SURPES			
		#1	#2	8#	**	# 5	9
Flowrate (kg/h)	0229	9200	9200	0059	9200	18600	18600
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	5.932	3.968	3.966
Inlet Temp. (deg. C)	6	11	64	51.5	40	32.5	31
Outlet Temp. (deg. C	112	ક	77	64	51.5	38	32.5
Temp. Rise (deg. C)	23	14	13	12.5	11.5	5.5	7.5
Flashing Temp. (deg. C)	116	94	84.5	69.5	83	42	33
Heat Transfer Rate (kJ/S)	151.243	100.310	92.811	88.966	81.633	112.760	30.737
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)	11.459	8.071	12.929	10.543	11.290	6.358	7.224
U (KW/sq.m/k)	2.825	6.416	3.706	4.356	3.733	3.579	0.859
Clean-U Value (KW/sq.m/K)	6 K	6.6	Σ	5.1	5.7	5.1	5.1
f (sq.m K/kw)	0.0976	0.0043	0.0737	0.0335	0.0718	0.0834	0.9686

Run No. 3	Date: August 05, 94		TIME: 15:00		rotal operat	lotal operation lime: 706 nr.	
Variables	Brine Heater			Evaporator Stages	99		
		*	# 5	₩.	*	松	9
Flowrate (kg/h)	6400	6400	6400	6400	6400	18500	18500
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3,966
inlet Temp. (deg. C)	<u>6</u>	. 11	25	52	40	32.5	32
Outlet Temp. (deg. C)	112	9	77	64	52	38	32.5
Temp. Rise (deg. C)	7 7 7 7 7 7 7 7 7 7	14	13	12	12	5.5	0.5
Flashing Temp. (deg. C	116	96	98	70	26	42	39.5
Heat Transfer Rate (kj/S)	148.916	98.767	91.383	84.098	83.876	112.154	10.191
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)	11.459	10.487	14.544	10.923	12.018	6.358	7.247
U (KW/sq.m/k)	2.781	4.862	3.244	3.975	3.603	3.559	0.284
Clean-U Value (kW/sq.m/k)	9.5	9.9	5.7	7.0	5.7	5.1	5.1
f (sq.m K/kW)	0.1031	0.0542	0.1122	0.0555	0.0815	0.0849	3.3279

Time: 20:00

Date: August 05, 94

Run No. 3

Variables	Brine Heater			Evaporator Stages	, e		
		#	#2	£ #	*	10	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18500	18500
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
inlet Temp. (deg. C)	ક્ર	77.5	65	52	40	32.5	32
Outlet Temp. (deg. C)	112	91	77.5	65	52	38	32.5
Temp. Rise (deg. C)	2	13.5	12.5	13	12	5.5	0.5
Flashing Temp. (deg. C)	116	96	98	70	58.5	42	39
Heat Transfer Rate (kJ/S)	148.916	95.246	87.885	91.117	83.876	112.154	10.191
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)	11.459	10.318	13.820	10.149	11,473	6.358	6.747
U (KW/sq.m/K)	2.781	4.765	3.283	4.635	3.774	3.559	0.305
Clean-U Value (kW/sq.m/K)	6.8	9.9	5.1	5.7	5.1	5.7	5.1
f (sq.m K/kW)	0.1031	0.0583	0.1085	0.0197	0.0689	0.0849	3.0847

Run No. 3	Date: August 06, 94	-	Time: 00:00		Total Operatio	Total Operation Time: 276 hr.	
Variables	Brine Heater			Evaporator Stages	16		
		*	#5	£	*	₩.	to
Flowrate (kg/h)	6400	6400	6400	6400	6400	18500	18500
Specific Heat (KJ/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	6	78	65	52	40	32	33
Outlet Temp. (deg. C)	112	2	78	. 99	52	38	32
Temp, Rise (deg. C)	5	13	13	13	12	: : : : : : : :	•
Flashing Temp. (deg. C)	116	76	88	70	58	42	33
Heat Transfer Rate (KJ/S)	148.916	91.725	91.406	91.117	83.876	122.345	20.380
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	11.459	7.766	11.278	10.149	10.923	6.548	7.489
U (kW/sq.m/k)	2.781	6.098	4.184	4.635	3.964	3.770	0.549
Clean-U Value (KW/sq.m/K)	3.9	6.6	r.	5.1	5.1	5.1	5.1
f (sq.m K/kW)	0.1031	0.0125	0.0429	0.0197	0.0562	0.0692	1.6249

Date: August 06, 94

Run No. 3

Time: 04:00

Variables	Brine Heater			Evaporator Stages			
		#	# 5	m **	**	10 *	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18600	18600
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	91	78	65	52	40	32	<u>چ</u>
Outlet Temp. (deg. C)	112	9	78	92	22	88	32
Temp. Rise (deg. C)	21	. 13	13	13	12	9	***
Flashing Temp. (deg. C)	116	94	88	69	88	42	39
Heat Transfer Rate (kj/S)	148.916	91.725	91.406	91.117	83.876	123.007	20.490
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	11.459	7.766	11.278	8.985	10.923	6.548	7.489
U (KW/sq.m/K)	2.781	6.098	4.184	5.236	3.964	3.791	0.552
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)	0.1031	0.0125	0.0429	-0.0051	0.0562	0.0677	1.6151

Run No. 3	Date: August 06, 94		Time: 08:00		Total Operat	Total Operation Time: 284 hr.	
Variables	Brine Heater			Evaporator Stages	saßi		
		**	#2	#3	#4	10	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kj/kg/k)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
inlet Temp. (deg. C)	91	7.7	64	52	40	33	31
Outlet Temp. (deg. C)	112	6	77	3	52	38	33
Тетпр. Rise (deg. C)	23	7	13	12	72	100 · · · · · · · · · · · · · · · · · ·	6
Flashing Temp. (deg. C)	116.5	94.5	88	69.5	28	42	39
Heat Transfer Rate (KJ/S)	150.079	99,539	92.097	84.755	84.532	101.962	40.764
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)	12.107	8.699	13.470	10.368	10.923	6.166	6.952
U (kw/sq.m/ko	2.653	5.908	3.530	4.220	3.995	3.337	1.183
Clean-U Value (KW/sq.m/f0	3.9	9.9	5.1	5.7	rų.	5.1	5.1
f (sq.m K/kW)	0.1205	0.0178	0.0872	0.0409	0.0542	0.1036	0.6491

Run No. 3	Date: August 06, 94		Time: 12:00		Total Operation Time: 288 hr.	me: 288 hr.	
Variables	Brine Heater	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Evaporator Stages			
		#1	#2	(F)	**	10 14	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18300	18300
Specific Heat (kj/kg/l0	3.989	3.969	3.955	3.942	3.932	3.969	3.966
inlet Temp. (deg. C)	6	78	64	25	70	33	32
Outlet Temp. (deg. C)	112	.	78	64	52	39	8
Temp. Rise (deg. C)		13	14	12	12	9	
Flashing Temp. (deg. C)	117	95.5	88	70	29	43	4
Heat Transfer Rate (K)/S)	148.916	91.725	98.425	84.098	83.876	121.041	20.163
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	12.738	9.572	12.743	10.923	12.018	6.548	7.489
U (KW/sq.m/ko	2.502	4.947	3.987	3.975	3.603	3.730	0.543
Clean-U Value (kW/sq.m/)0	3.9	9.6	5.1	5.4	2.1	5.1	
f (sq.m K/kW)	0.1432	0.0506	0.0547	0.0555	0.0815	0.0720	1.6445

un no. 3	Date: August 06, 94		Time: 16:00		Total Operation Time: 292 hr.	ime: 292 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 2	m #	*	\$0 **	9#
Flowrate (kg/h)	0059	9200	6500	6500	6500	18300	18300
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	16	77.5	92	23	40.5	33	34.5
Outlet Temp. (deg. C)	112	હ	77.5	65	52	39	88
Temp. Rise (deg. C)	2	13.5	12.5	ю,	11.5	ဖ	1.5
Flashing Temp. (deg. C)	116.5	95.5	98	70.5	53	43	39.5
Heat Transfer Rate (KJ/S)	151.243	96.735	89.258	92.541	81.642	121.041	30.243
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)	12.107	9.738	13,820	10.717	11.833	6.548	7.224
U (kw/sq.m/l0	2.674	5.128	3.334	4.458	3.562	3.730	0.845
Clean-U Vatue (kW/sq.m/K)	6.5	9.9	5.1	5.1	5.1	 5.1	23
f (sq.m K/kW)	0.1176	0.0435	0.1038	0.0282	0.0847	0.0720	0.9876

Run No. 3	Date: August 06, 94		Time: 20:00		Total Operation Time: 296 hr.	Time: 296 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 2	67 Th	**	\$ 1	9#
Flowrate (kg/h)	0059	9059	9200	6500	9200	18300	18300
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	8	78	65	52	40	12	3.7
Outlet Temp. (deg. C)	112	6	78	92	52	88	33
Temp. Rise (deg. C)	21	13	13	13	12	•	7
Flashing Temp. (deg. O	116.5	96	85	20	58.5	42	39
Heat Transfer Rate (kj/S)	151.243	93.158	92.835	92.541	85.187	100.860	40.323
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)	12.107	10.149	12.383	10.149	11.473	6.166	6.952
U (KW/sq.m/x)	2.674	4.739	5.870	4.707	3.833	3.301	1.170
Clean-U Value (KW/sq.m/f0	3.9	9.9	5.7	5.1	5.7	Ç.	5.1
f (sq.m K/kW)	0.1176	0.0595	0.0623	0.0164	0.0648	0.1069	0.6583

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

ek	Run No. 5	Date: August 07, 94		ime: with		oral operation	iotal operation line: 500 m.	
1	Variables	Brine Heater			Evaporator Stages			
			*	#3	€ ₩	**	lC #	9#
·	Flowrate (kg/h)	6450	6450	6450	6450	6450	18400	18400
٠,	Specific Heat (KJ/Kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
	inlet Temp. (deg. C)	5	78	65	53	40	83	33
. - :	Outlet Temp. (deg. C)	112	ይ	. 78	99	8	38	33
	Temp. Rise (deg.: C)	24	13			13		2
- -	Flashing Temp. (deg. C)	116	8	84	69	88	42	33
	Heat Transfer Rate (kj/S)	150.079	92.442	92.121	84.775	91.586	101.411	40.543
-	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)	11,459	10.149	11.278	8.656	10.149	6.166	6.952
_	U (KW/sq.m/lo	2.803	4.702	4.217	5.056	4.659	3.319	1.177
	Clean-U Vaiue (kW/sq.m/k)	6 K	9.9	5.1	5.1	5.1	5.1	5.1
_	f (sq.m K/kW)	0.1003	0.0611	0.0411	0.0017	0.0186	0 1052	0.6537

Run No. 3	Date: August 07, 94		Time: 04:00	8	Total Operat	Total Operation Time: 304 hr.	
Variables	Brine Heater			Evaporator Stages	Stages		
		**	# 2	**	*	\$	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kj/kg/k)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)		77.5	64.5	23	40	ĸ	31
Outlet Temp. (deg. C)	112	91	77.5	64.5	23	88	33
Temp. Rise (deg. C)	23	13.5		11.5	13	6	2
Flashing Temp. (deg. C)	116	96	84.5	69	28	42	39
Heat Transfer Rate (kj/5)	150.079	95.991	92.109	81.238	91.586	101.962	40.764
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)	11.459	10.318	12.383	990'6	10.149	6.166	6.952
U (KW/sq.m/K)	2.803	4.803	3.840	4.626	4.659	3.337	1.183
Clean-U Value (kW/sq.m/k)	б; К	9.9	2.	5.1	એ	ŗ,	5.1
f (sq.m k/kW)	0.1003	0.0567	0.0643	0.0201	0.0186	0.1036	0.6491

Run No. 3	Date: August 07, 94		Time: 08:00		Total Operation	Total Operation Time: 508 hr.	
Variables	Brine Heater			Evaporator Stages	•		
		***	# 2	£#3	*	kn **	to
Flowrate (kg/h)	6420	6420	6420	6420	6420	18400	18400
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
inlet Temp. (deg. C)	۶	77	64.5	52	40	33	31.5
Outlet Temp. (deg. C)	112	9	77	64.5	52	38	33
Temp. Rise (deg. C)	23	14	12.5	12.5	12	ហ	1.5
Flashing Temp. (deg. C)	116	36	78	70	28 28	42	8 2
Heat Transfer Rate (kJ/S)	149.381	920.66	88.149	87.881	84.138	101.411	30.409
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)	11.459	8.071	12.201	10.543	10.923	6.166	6.722
U (KW/sq.m/lo	2.790	6.337	3.730	4.303	3.977	3.319	0.913
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.1	5.1	5.1	5.7	5.1
f (sq.m K/kW)	0.1020	0.0063	0.0720	0.0363	0.0554	0.1052	0.8994
					•		

Date: August 07, 94

Run No. 3

Time: 12:00

Variables	Brine Heater			Evaporator Stages	lages		
		# 1	# 5	£		40 *#:	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18400	18400
Specific Heat (kj/kg/N)	3.989	3.968	3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	. 91	11	92	52	40	2	32
Outlet Temp. (deg. C)	112	જ	77	92	52	39	34
Temp. Rise (deg. C)	5	14	12	Et 13	12	ĸ	2
Flashing Temp. (deg. C)	116	96	28	70	9	43	9
Heat Transfer Rate (kj/5)	149.381	96.076	84.628	91.402	84.138	101.427	40.549
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)	11.459	8.071	12.018	10.149	12.018	6.166	6.952
U (kw/sq.m/k)	2.790	6.337	3.636	4.650	3.614	3.319	1.177
Clean-U Value (kW/sq.m/k)	3.9	9.9	, v	5.1	5.7		'n
f Sq.m K/KW)	0.1020	0.0063	0.0790	0.0190	0.0806	0.1052	0.6536

Run No. 3	Date: August 07,94		Time: 16:00		Total Operation	Total Operation Time: 316 hr.	
Variables	Brine Heater			Evaporator Stages	88		
		#	*	£	*	10 #	6 0
Flowrate (kg/h)	6500	9200	0059	0059	9200	18400	18400
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.942	3.932	3.969	3.966
inlet Temp. (deg. C)	9	77.5	64.5	52	40	33	31.5
Outlet Temp. (deg. C)	112	5	77.5	64.5	52	39	33
Temp. Rise (deg. Cl	. Z	13.5	13	12.5	12	φ.	<u>x.</u>
Flashing Temp. (deg. C)	116	95.5	86	70	23	43	39.5
Heat Transfer Rate (kj/S)	151.243	96.735	92.823	88.976	85.187	121.703	30,409
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
L.M.T.D. (deg. lb	11.459	9.738	14.009	10.543	12.018	6.548	7.224
U (KW/sq.m/l0	2.825	5.128	3.421	4.357	3.660	3.750	0.849
Clean-U Value (kW/sq.m/K)	6.8	6.6	5.3	5.7	5.7	7.6	5.1
f (sq.m K/kw)	0.0976	0.0435	0.0963	0.0334	0.0772	90200	0.9812
-							

Date: August 07, 94

Run No. 3

Time: 20:00

				Evaporator Stages			
Variables	Brine Heater	*	# 2	m #	*	10	
Flowrate (kg/h)	6500	9200	029	9059	6500	18400	18400
Specific Heat (Kj/kg/K)	3.989	3.969	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	9	77.5	64	51.5	40	23	33
Outlet Temp. (deg. C)	112	93	77.5	64	51.5	38	33
Temp. Rise (deg. C)	2	13.5	13.5	12.5	11.5	L	2
Flashing Temp. (deg. C)	117	36.5	98	20	83	42	3
Heat Transfer Rate (kJ/S)	151.243	96.735	96.387	996.88	81.633	101.411	40.543
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)	12.738	10.890	14.196	11.101	12.372	6.166	6.952
U (kW/sq.m/lö	2.541	4.586	3.505	4.137	3.406	3.319	1.177
Clean-U Value (kW/sq.m/l0	Ø. K.	9.9	بر 13	<u>7</u>	5.7	ນ	5.
f (sq.m K/KW)	0.1371	0.0665	0.0892	0.0456	0.0975	0.1052	0.6537

Date: August 08, 94

Run No. 3

Total Operation Time: 328 hr.

Time: 04:00

Variebles	Brine Heater			Eva	Evaporator Stages			
		**	#2	•	£#3	*	10 4	6
Flowrate (kg/h)	6450	6450	6450		6450	6450	18300	18300
Specific Heat (kj/kg/k)	3.989	3.969	3.955		3.943	3.932	3.968	3.966
Inlet Temp. (deg. O	9	77.5	65		52	40	33 33 33	٣
Outlet Temp. (deg. C)	112	<u>ه</u>	77.5		85	25	со Ю	33
Temp. Rise (deg. C)		13.5	12.5		13	12	in	7
Flashing Temp. (deg. C)	116.5	. 94	84		8	82	42	38
Heat Transfer Rate (kJ/S)	150.079	95.991	88.572		91.829	84.532	100.860	40.323
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937		1.937	1,937	4.9556	4.9556
LM.T.D. (deg. l0	12.107	7.919	11.654		8.985	10.923	6.166	5.944
U (KW/sq.m/K)	2.653	6.258	3.924		5.277	3.995	3.301	1.369
Clean-U Value (kW/sq.m/K)	3.9	9.9	ν'n		ᅜ	7:	5.7	.
f (sq.m K/kw)	0.1205	0.0083	0.0588	¥	9900:01	0.0542	0.1069	0.5344

Run No. 3	Date: August 08, 94		Time: 08:00		Total Operation 11me: 332 hr.	Time: 332 hr.	
Veriables	Brine Heater			Evaporator Stages			
		#1	#2	#3	**	5 🖈	**
Flowrate (kg/h)	6450	6450	6450	6450	6450	18300	18300
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
inlet Temp. (deg. C)	હ	77	99	52	40	33	₹
Outlet Temp. (deg. C)	112	29	77	64	52	38	33
Temp. Rise (deg. Cl	2	14	13	12	12	ហ	2
Flashing Temp. (deg. C)	116.5	36	86	70	29	42	39
Heat Transfer Rate (kj/S)	150.079	99.539	92.097	84.755	84.532	100.860	40.323
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	12.107	9.308	14.544	10.923	12.018	6.166	6.952
U (kW/sq.m/k)	2.653	5.521	3.269	4.006	3.631	3.301	1.170
Clean-U Value (KW/sq.m/K)	6 K	6.6	5.1	5.1	5.1	5.1	5.1
f (sq.m K/kW)	0.1205	0.0296	0.1098	0.0536	0.0793	0.1069	0.6583

Run No. 3	Date: August 08, 94		Time: 12:00		Total Operation Time: 536 hr.	le: 536 hr.	
Variables	Brine Heater			Evaporator Stages			
		#	*2	#3	*	10	•
Flowrate (kg/h)	6450	6450	6450	6450	6450	18300	18300
Specific Heat (kj/kg/K)	3.989	3.968	3.955	3.943	3.932	3.969	3.967
inlet Temp. (deg. C)	94	77	65	52	40.5	34	32
Outlet Temp. (deg. C)	. 112	2	77	65	52	33	35
Temp. Rise (deg. C)	23	14	12	<u> 8</u>	11.5	L O	2
Flashing Temp. (deg. C)	116	95	98	70	S	53	Q
Heat Transfer Rate (kj/S)	150.079	99.539	85.024	91.829	81.014	100.875	40.329
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. ló	11.459	9.308	14.163	10.149	11.833	6.166	6.952
U daw/sq.m/lo	2.803	5.521	3.099	4.671	3.535	5.301	1171
Clean-U Value (kW/sq.m/l0	3.9	9.9	r.	5.7	5.1	2.2	5.3
f (sq.m K/KW)	0.1003	0.0296	0.1266	0.0180	0.0868	0.1068	0.6582

Run No. 3	Date: August 08, 94		Time: 16:00		Total Operation	Total Operation Time: 340 hr.	
Variables	Brine Heater			Evaporator Stages			
		**	#2	£	**	10 **	9#
Flowrate (kg/h)	6420	6420	6420	6420	6420	18400	18400
Specific Heat (kj/kg/k)	3.989	3.969	3.956	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	9	78	99	23	40.5	34	32
Outlet Temp. (deg. C)	112	2	78	99	53	39	34
Temp. Rise (deg. C)	27	13	12	13	12.5	មា	
Flashing Temp. (deg. C)	116	96	98	71	95	42	6 4
Heat Transfer Rate (kJ/S)	149.381	92.012	84.650	91.423	87.658	101.427	40.549
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)	11.459	10.149	13.096	10.149	11.101	5.098	6.952
U (KW/sq.m/K)	2.790	4.681	3.337	4.651	4.077	4.015	1.177
Clean-U Value (kW/sq.m/k)	6.6	6.6	5.1	5.1	5.1	5.7	5,1
f (sq.m K/KW)	0.1020	0.0621	0.1036	0.0189	0.0492	0.0530	0.6536

Date: August 08, 94

Run No. 3

Time: 20:00

Variables	Brine Heater			Evaporator Stages			
		*1	Z#	#3	*	10 10	*
Fiowrate (kg/h)	6410	6410	6410	6410	6410	18200	18200
Specific Heat (Kj/Kg/K)	3.989	3.969	3.956	3.943	3.932	3.969	3.967
inlet Temp. (deg. C)	ષ્ટ	79	99	23	40	34	32
Outlet Temp. (deg. C)	112	٩	79	99	23	36	34
Temp. Rise (deg. C)	54	12	13	13	13	S	2
Fiashing Temp. (deg. C)	116.5	96	98	Z,	53	43	97
Heat Transfer Rate (KJ/S)	149.149	84.814	91.573	91.281	91.018	100.324	40.108
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	12.107	9.806	12.383	10.149	11.278	6.166	6.952
U (KW/sq.m/K)	2.637	4.465	3.818	4.643	4.166	3.283	1.164
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.1	5.1	5.3		.
f isq.m K/kW)	0.1228	0.0724	0.0659	0.0193	0.0439	0.1085	0.6629

Run No. 3	Date: August 09, 94		Time: 00:00		rotal operation lime: 348 mr.	1 1 IIM 6: 348 III.	
Variables	Brine Heater			Evaporator Stages	6		
		*	# 2	6#	*	#3	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18300	18300
Specific Heat (KJ/kg/K)	3.989	3.968	3.954	3.942	3.932	3.969	3.966
Inlet Temp. (deg. C)	91		64.5	52	40.5	33	31.5
Outlet Temp. (deg. C)	112	Б	77	64.5	25	39	33
Temp. Rise (deg. C)	23	14	12.5		11.5	φ	7.5
Flashing Temp. (deg. C)	116.5	96	8	69.5	65	42.5	33
Heat Transfer Rate (KJ/S)	150.079	99.539	88.561	88.292	81.014	121.041	30.243
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	12.107	8.071	12.201	9.978	11.833	6.009	6.722
U (kW/sq.m/l0	2.653	6.367	3.747	4.568	3.535	4.065	0.908
Clean-U Value (KW/sq.m/K)	์ กั	6.6	ស្ត	5.1	5.1	5.1	5.1
f (sq.m K/KW)	0.1205	0.0055	0.0708	0.0228	0.0868	0.0499	0.9054

Date: August 09, 94

Run No. 3

Total Operation 11me: 352 hr.

Time: 04:00

Verjektee	Brine Heater			Eva	Evaporator Stages					
		#	#2		#3	**		kn Ma		9
Flowrate (kg/h)	6450	6450	6450		6450	6450		18200	Ì	18200
Specific Heat (kj/kg/K)	3.989	3.968	3.954		3.942	3.932		3.968		3.966
Inlet Temp. (deg. C)	94	76.5	64		51.5	40		32.5		۳
Outlet Temp. (deg. C)	112	55	76.5		3	51.5		3		32.5
Temp. Rise (deg. C)	21	14.5	12.5	:	12.5	11.5		6.5		1.5
Flashing Temp. (deg. C)	116.5	92	83			88		42		33
Heat Transfer Rate (K)/S)	150.079	103.087	88.549		88.282	81.005		130.406	М	30.076
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)	12.107	5.290	11.654		9.978	11.290		5.639		7.224
U (kw/sq.m/k)	2.653	10.060	3.923		4.568	3.704		4.667		0.840
Clean-U Value (kW/sq.m/lo	6.8	9.9	5.1		. 24	2		5.7		5.1
f (sq.m K/KW)	0.1205	-0.0521	0.0588		0.0228	0.0739		0.0182	0	0.9942

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Variables Fivaporator Stages # 1 # 2 # 3 # 4 # 5 # 6 Flow/rate (kg/h) 6420 6420 6420 6420 18200	Run No. 3	Date: August 09, 94		Time: 08:00		Total Opera	Total Operation Time: 356 hr.	
6420 6420 6420 6420 6420 18200 182 10 3.389 3.968 3.954 3.942 3.932 3.968 3.5 10 3.389 3.968 3.954 3.942 3.932 3.968 3.5 10 91 77 64 52 40 3.3 3.5 1.0 11 77 64 52 3.6 3.5 3.6 3.5 3.0 11 77 64 52 3.8 3.6 4.2 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 4.9 3.6 4.9 4.9 3.6 4.9 4.	Variables	Brine Heater			Evaporator Sta	sec		
6420 6420 6420 6420 6420 6420 18200			*	#3	£#	*	1G **	*
(1) 3.968 3.964 3.942 3.942 3.968 3	Flowrate (kg/h)	6420	6420	6420	6420	6420	18200	1820
C) 112 91 77 64 52 40 33 C) 112 91 73 64 52 38 3. C) 21 13 12 5 42 3. C) 117 93 84 69 58 42 5 6, G, M, S) 1,937 1,937 1,937 1,937 1,937 4,935 4,935 6, M, S) 6, 753 1,238 9,806 10,923 6,166 6,166 6,166 6,166 6,166 6,166 6,166 6,166 6,167 7,14	Specific Heat (KJ/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.96
112 91 77 64 52 38 21 13 12 5 5 117 93 84 69 58 42 149.381 99.076 91.669 84.361 84.138 100.309 20.0 4.6723 1.937 1.937 1.937 4.9556 4.95 12.738 6.733 12.383 9.806 10.923 6.166 6.4 2.510 7.597 3.283 4.442 3.977 3.283 0.6 3.97 6.6 5.1 5.1 5.1 5.1 5.1 0.0420 0.0420 0.0656 0.0291 0.0554 0.1085 1.40	inlet Temp. (deg. C)	91	77	99	52	40	23	KG.
21 14 13 12 12 5 117 93 84 69 58 42 149.381 99.076 91.669 84.361 84.138 100.309 4.6723 1.937 1.937 1.937 4.9556 12.738 6.735 12.383 9.806 10.923 6.166 2.510 7.597 3.822 4.442 3.977 3.283 6.1420 6.0 5.1 5.1 5.1 5.1 6.1420 -0.0199 0.0656 0.0291 0.0554 0.1085	Outlet Temp. (deg. C)	112	8	77	64	52	38	N
117 93 84 69 58 42 149.381 99.076 91.669 84.361 84.138 100.309 4.6723 1.937 1.937 4.9556 4.9556 12.738 6.733 12.383 9.806 10.923 6.166 2.510 7.597 3.822 4.442 3.977 3.283 6.166 5.1 5.1 5.1 5.1 6.1420 -0.0199 0.0656 0.0291 0.0554 0.1085	Temp. Rise (deg. C)	7	14	13	12	12	15	
449.381 99.076 91.669 84.361 84.138 100.309 4.6723 1.937 1.937 4.956 12.738 6.733 12.383 9.806 10.923 6.166 2.510 7.597 3.822 4.442 3.977 3.283 6.1460 5.1 5.1 5.1 5.1 6.1420 -0.0199 0.0656 0.0291 0.0554 0.1085	Flashing Temp. (deg. C)	117	86	84	69	28	42	M
4.6723 1.937 1.937 1.937 4.9556 12.738 6.738 12.383 9.806 10.923 6.166 2.510 7.597 3.822 4.442 3.977 3.283 3.9 6.6 5.1 5.1 5.1 5.1 0.1420 -0.0199 0.0656 0.0291 0.0554 0.1085	Heat Transfer Rate (KJ/S)	149.381	99.076	94.669	84.361	84.138	100.309	20.05
W/sq.m/No 3.93 6.733 12.383 9.806 10.923 6.166 8.51 7.597 3.822 4.442 3.977 3.283 W/sq.m/No 3.9 6.6 5.1 5.1 5.1 5.1 0.1420 -0.0199 0.0656 0.0291 0.0554 0.1085 1.1085	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.955
2.510 7.597 3.822 4.442 3.977 3.283 (KW/sq.m/K) 3.9 6.6 5.1 5.1 5.1 5.1 0.1420 -0.0199 0.0656 0.0291 0.0554 0.1085 1	L.M.T.D. (deg. K)	12.738	6.733	12.383	9.806	10.923	6.166	6.48
(KW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 6.0 0.0459 0.0656 0.0291 0.0554 0.1085	U (KW/sq.m/k)	2.510	7.597	3.822	4.442	3.977	3.283	0.62
0.1420 -0.0199 0.0656 0.0291 0.0554 0.1085	Clean-U Value (KW/sq.m/K)	3.9	6.6	5.1	5.1	5.1	5.1	. ഗ
	f (sq.m K/kW)	0.1420	-0.0199	0.0656	0.0291	0.0554	0.1085	1.407

Date: August 09, 94

Run No. 3

Total Operation Time: 560 hr.

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		# 4	#2	#3	**	10	6
Flowrate (kg/h)	6420	6420	6420	6420	6420	18500	18500
Specific Heat (k)/kg/k0	3.989	3.968	3.954	3.942	3.932	3.969	3.966
Inlet Temp. (deg. C)	2	77	. 64	52	40	33	32
Outlet Temp. (deg. C)	112	9	77	64	52	39	33
Temp. Rise (deg. C)	23	14	χ.	12	12	(
Flashing Temp. (deg. C)	117	94	88	69	28	42	39
Heat Transfer Rate (kj/S)	149.381	93.076	91.669	84.361	84.138	122.364	20.383
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
LM.T.D. (deg. K)	12.738	8.071	12.383	9.806	10.923	5.461	6.487
U (KW/sq.m/lo	2.510	6.337	3.822	4.442	3.977	4.521	0.634
Clean-U Value (kW/sq.m/lo	3.9	6.6	1.	, in	.	6.2	5.1
f (sq.m K/KW)	0.1420	0.0063	0.0656	0.0291	0.0554	0.0251	1.3811

Run No. 3	Date: August 09, 94		Time: 16:00		Total operatio	Total operation Time: 564 nr.	
Variables	Brine Heater			Evaporator Stages	•		
		**	2 #	£#	*	# 5	9#
Flowrate (kg/h)	6420	6420	6420	6420	6420	18300	18300
Specific Heat (k)/kg/k0	3.989	3.969	3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	9	78	65	53	40.5	34	32.5
Outlet Temp. (deg. C)	112	9	78	65	22	39	34
Temp. Rise (deg. C)	2	13	13	12	12.5	יט	1.5
Flashing Temp. (deg. C)	116.5	95	98	02	85	43	40
Heat Transfer Rate (kj/S)	149.381	92.012	91.692	84.381	87.658	100.875	30.248
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	12.107	8.985	13,470	9.806	11.101	6.166	6.722
U (KW/sq.m/K)	2.641	5.287	3.514	4.443	4.077	3.301	0.908
Clean-U Value (kW/sq.m/lo	3.9	6.6	5.7	ri,	5.7	7.0	5.1
f (sq.m K/kW)	0.1223	0.0376	0.0885	0.0290	0.0492	0.1068	0.9052

Date: August 09, 94

Time: 20:00

Variables	Brine Heater			Evaporator Stages			
		*	#2	£#.	*	6	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18200	18200
Specific Heat (kj/kg/k)	3.989	3.968	3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	91	7.	65	52	40	25	32
Outlet Temp. (deg. C)	112	9	77	65	52	39	34
Temp. Rise (deg. C)	. 23	14	12	13	12	ın	2
Flashing Temp. (deg. C)	116.5	8	88	ደ	SS	43	88
Heat Transfer Rate (kJ/S)	149.381	99.076	84.628	91.402	84.138	100.324	40.108
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)	12.107	8.071	12.018	10.149	12.018	6.166	5.944
U (KW/sq.m/K)	2.641	6.337	3.636	4.650	3.614	3.283	1.362
Clean-U Value (KW/sq.m/K)	3.9	6.6	5.7	5.7	5.7	5.3	5.
f (sq.m K/kM)	0.1223	0.0063	0.0790	0.0190	0.0806	0.1085	0.5383

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT, AND FOULING FACTOR Run No. 3 Date: August 10, 94

Run No. 3	Date: August 10, 94		Time: 00:00		Total Operation Time: 372 hr.	Time: 372 hr.	
Variebles	Brine Heater			Evaporator Stages	\$7.00 miles		
		#	#2	#3	**	to ₹:	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18200	18200
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	૪	12	64.5	52	40	33	31
Outlet Temp. (deg. C)	112	ક્ર		64.5	52	38	33
Temp. Rise (deg. C)	24	14	12.5	12.5	12	មា	2
Flashing Temp. (deg. C)	116.5	26	84	69	28	42	39
Heat Transfer Rate (KJ/S)	150.079	99.539	88.561	88.292	84.532	100.309	40.103
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	12.107	6.733	12.201	9.405	10.923	6.166	6.952
U (KW/sq.m/lo	2.653	7.633	3.747	4.847	3.995	3.283	1.164
Clean-U Value (kW/sq.m/k)	6.8	9.9	 5.7	5.1	5.1	. K.	5.7
f (sq.m K/KW)	0.1205	-0.0205	0.0708	0.0102	0.0542	0.1085	0.6630

Date: August 10, 94

Run No. 3

Time: 04:00

Variables	Brine Heater			Evay	Evaporator Stages			
		#1	# 2		#3	**	10	*
Flowrate (kg/h)	6450	6450	6450		6450	6450	18200	18200
Specific Heat (kj/kg/N)	3.989	3.968	3.954		3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	8	77	29		25	40	22	33
Outlet Temp. (deg. C)	112	94	77		3	52	 8 8	33
Temp. Rise (deg. C)	23	4	13		12	17	S	2
Flashing Temp. (deg. C)	116.5	26	84		69	28	42	38.5
Heat Transfer Rate (kJ/S)	150.079	99.539	92.097		84.755	84.532	100.309	40.103
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	12.107	6.733	12.383		9.806	10.923	6.166	6.448
U (kW/sq.m/lo	2.653	7.633	3.840	**	4.462	3.995	3.283	1.255
Clean-U Value (kW/sq.m/k)	3.9	6.6	5.4		5.1	5.7	ب	5.1
f (sq.m K/kw)	0.1205	-0.0205	0.0644		0.0280	0.0542	0.1085	0.6008

CALCULATIONS OF OVERALL HEAT TRANSFER		COEFFICIENT	COEFFICIENT AND FOULING FACTOR	TOR			
Run No. 3	Date: August 10, 94	:	Time: 08:00		Total Operation Time: 580 hr.	me: 580 hr.	
Variables	Brine Heater			Evaporator Stages			
		*	# 2	f)	**	10 **	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18500	18500
Specific Heat (kj/kg/K)	3.989	3.969	3.955	3.943	3.932	3.968	3.966
Inlet Temp. (deg. C)	8	77.5	65	52.5	40	33.5	31.5
Outlet Temp. (deg. C)	112	6	77.5	65	52.5	38	33.5
Temp, Rise (deg. C)	21	13.5	12.5	12.5	12.5	4.5	ē
Flashing Temp. (deg. C)	116.5	94	82	70	65	43	
Heat Transfer Rate (kJ/S)	150.079	95.991	88.572	88.302	88.058	91.770	40.767
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	12.107	7.919	12.744	9.978	11.654	7.011	6.448
U (kW/sq.m/ld	2.653	6.258	3.588	4.569	3.901	2.641	1.276
Clean-U Value (kW/sq.m/K)	6.8	6.6	'n	5.1	5.1	5.1	5.7
f (sq.m K/KW)	0.1205	0.0083	0.0826	0.0228	0.0603	0.1825	0.5878

Date: August 10, 94

Run No. 3

Time: 12:00

Variables	Brine Heater			Evaporator Stages			
		*	#2	#3	*	in the	to
Flowrate (kg/h)	6450	6450	6450	6450	6450	18200	18200
Specific Heat (KJ/Kg/K)	3.989	3.969	3,955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	9	77.5	92	52.5	40.5	34	32
Outlet Temp. (deg. C)	112	29	77.5	65	52.5	6 6	34
Temp. Rise (deg. C)	23	13.5	12.5	12.5	12	I O	7
Flashing Temp. (deg. C)	116.5	94.5	85.5	2	82	43	39.5
Heat Transfer Rate (KJ/S)	150.079	95.991	88.572	88.302	84.541	100.324	40.108
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	12.107	8.542	13.284	9.978	11.473	6.166	6.448
U (KW/sq.m/l0	2.653	5.802	3.442	4.569	3.804	3.283	1.255
Clean-U Value (KW/sq.m/K)	3.9	6.6	5.7	r,	5.3	5.1	5.7
f (sq.m K/kW)	0.1205	0.0209	0.0944	0.0228	0.0668	0.1085	0.6007

Run No. 3	Date: August 10, 94		Time: 16:00		Total Operation Time: 388 hr.	rime: 388 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	#3	S#	7	\$ \$	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18500	18500
Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.969	3.967
Inlet Temp. (deg. C)	8	11	29	52	40	34	32
Outlet Temp. (deg. C)	112	91	. 11	79	52	39	34
Temp. Rise (deg. C)	23	14	13	15	12	Ľ	7
Flashing Temp. (deg. C)	116.5	96	85	70	29	43	40
Heat Transfer Rate (kj/S)	149.381	99.076	91.669	84.361	84.138	101.978	40.770
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)	12.107	10,487	13.470	10.923	12.018	6.166	6.952
U (kW/sq.m/l0	2.641	4.877	3.513	3.987	3.614	3.338	1.183
Clean-U Value (KW/sq.m/K)	6. K	9.9	1. Z	5.1	5.1	5.1	5.1
f (sq.m K/kW)	0.1223	0.0535	0.0886	0.0547	0.0806	0.1035	0.6490
			-				

Date: August 10, 94

Run No. 3

Total Operation Time: 392 hr.

Time: 20:00

Variables	Brine Heater			Eva	Evaporator Stages			
		*	# 2		#3	***	*	*
Flowrate (kg/h)	6420	6420	6420		6420	6420	18500	18500
Specific Heat (kj/kg/k)	3.989	3.968	3.954		3.942	3.932	3.969	3.967
Inlet Temp. (deg. C)		77	64		52	40	35	32
Outlet Temp. (deg. C)	112	9	77		28	52	38	34
Temp. Rise (deg. C)	24	14	13		12	12	4	2
Flashing Temp. (deg. C)	117	76	98		2	59	42	9
Heat Transfer Rate (KJ/S)	149.381	99.076	91,669		84.361	84.138	81.576	40.770
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)	12.738	11.628	14.544		10.923	12.018	5.771	6.952
U (KW/sq.m/lo	2.510	4.399	3,254		3.987	3.614	2.853	1.183
Clean-U Value (KW/sq.m/K)	8 X	9.9	r.		.5.	, r	5.7	r.
f (sq.m K/kW)	0.1420	0.0758	0.1112		0.0547	0.0806	0.1545	0.6490

Run No. 3	Date: August 11, 94		Time: 00:00		Total Operation	Total Operation Time: 596 hr.	
Variables	Brine Heater			Evaporator Stages			
		#	#2	£	#4	*5	40
Flowrate (kg/h)	6420	6420	6420	6420	6420	18800	18800
Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.969	3.966
Inlet Temp. (deg. C)	8	77	. 64	25	40	33	32
Outlet Temp. (deg. C)	112	8	77	64	52	39	33
Temp. Rise (deg. C)	2	14	13	12	12	ဖ	
Flashing Temp. (deg. C)	118	9 6	84	69	58	42	39
Heat Transfer Rate (KJ/S)	149.381	99.076	91.669	84.361	84.138	124.348	20.714
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	13.962	8.071	12.383	9.806	10.923	5.461	6.487
U (kw/sq.m/k)	2.290	6.337	3.822	4.442	3.977	4.594	0.644
Clean-U Value (kW/sq.m/l0	o ; ∌o	9.6	r.	5.1	5.7		5.1
f (sq.m K/kW)	0.1803	0.0063	0.0656	0.0291	0.0554	0.0216	1,3559

Date: August 11, 94

Run No. 3

Total Operation Time: 400 hr.

Time: 04:00

Variebles	Brine Heater			Evaporator Stages	•			
		#	**	en **	#4	•	#5	**
Flowrate (kg/h)	6420	6420	6420	6420	6420		18900	18800
Specific Heat (KJ/kg/K)	3.989	3.968	3.954	3.942	3.932		3.968	3.966
Inlet Temp. (deg. O	9	77	64	52	94		33	. Σ
Outlet Temp. (deg. C)	112	5	7.7	99	52		38	33
Temp. Rise (deg. C)	21	14	13	12	12		Ŋ	
Flashing Temp. (deg. C)	117	95	88	69	87		42	39
Heat Transfer Rate (kj/S)	149.381	99.076	91.669	84.361	84.138	5	103.616	41.425
Heat Transfer Area (5q.m)	4.6723	1.937	1.937	1.937	1.937	4	4.9556	4.9556
L.M.T.D. (deg. K)	12.738	9.308	13.470	908.6	10.923		6.166	6.95
U (KW/sq.m/K)	2.510	5.495	3.513	4.442	3.977	.:	3.391	1.202
Clean-U Value (KW/sq.m/l0	3.9	6.6	5.1	52.7	7.		بن د	5.7
f (sq.m K/kW)	0.1420	0.0305	0.0886	0.0291	0.0554		0.0988	0.6356

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT. AND FOULING FACTOR

Run No. 3 Da	Date: August 11,94		Time: 08:00		Total Operat	Total Operation Time: 404 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	#2	**	*	¥0.	15
Flowrate (kg/h)	6410	6410	6410	6410	6410	18800	18800
Specific Heat (k)/kg/10	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	စ	12	. 64	.52	40	33	. 3
Outlet Temp. (deg. C)	112	ይ	11	94	52	38	23
Temp. Rise (deg. C)	24	14	13	12	12	ເກ	2
Flashing Temp. (deg. C)	116.5	95.5	85.5	20	88	42	39
Heat Transfer Rate (kJ/S)	149.149	98.922	91.526	84.230	84.007	103.616	41.425
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)	12.107	9.903	14.009	10.923	10.923	6.166	6.952
U (kW/sq.m/i0	2.637	5.157	3.373	3.981	3.971	3.391	1.202
Clean-U Value (kW/sq.m/l0	3.9	6.6	5.1	5.1	5,7	5.3	5.1
f (sq.m K/KW)	0.1228	0.0424	0.1004	0.0551	0.0558	0.0988	0.6356

Date: August 11, 94

Time: 12:00

Variables	Brine Heater			Evaporator Stages	ges		
		華	#2	6	7.8	9	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18800	18800
Specific Heat (K/kg/K)	3,989	3.968	3.954	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	91	77	64.5	23	40	33.5	
Outlet Temp. (deg. C)	112	91	77	64.5	53	39	33.5
Temp. Rise (deg. C)	24	10	12.5	11.5	13		2.5
Flashing Temp. (deg. C)	116.5	92	98	70	28	42.5	33
Heat Transfer Rate (KJ/S)	148.916	28.767	87.874	80.608	90.876	113.990	51.783
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)	12.107	9.308	14.354	10.191	10.149	5.823	6.672
U (KW/sq.m/f0	2.633	5.478	3.160	4.084	4.623	3.950	1.566
Clean-U Value (KW/sq.m/K)	3.9	6.6	5.1	5.1	រភ	5.7	5.1
f (sq.m K/kW)	0.1234	0.0310	0.1203	0.0488	0.0202	0.0571	0.4424

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Kun ac. s	Date: August 11, ut						
Variables	Brine Heater			Evaporator Stages			
		*	#5	£#	*	lrs #a	*
Flowrate (kg/h)	6400	6400	6400	6400	6400	18800	18800
Specific Heat (kj/kg/K)	3.989	3.968	3.955	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	6	11	65	53	4	33	32
Outlet Temp. (deg. C)	112	6		65	22	39	33
Temp. Rise (deg. C)	2	14		12	13	<i>y</i>	
Flashing Temp. (deg. C)	117	96	98	02	59	43	39
Heat Transfer Rate (KJ/S)	148.916	98.767	84.364	84.118	90.876	124.348	20.714
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	12.738	10.487	14.163	9.806	11.278	6.548	6.487
U (KW/sq.m/l0	2.502	4.862	3.075	4.429	4.160	3.832	0.644
Clean-U Value (kW/sq.m/K)	9.50	9.9	5.3	Ř.	5.3	5.3	5.1
f (sq.m K/KW)	0.1432	0.0542	0.1291	0.0297	0.0443	0.0649	1.3559

Date: August 11, 94

Run No. 3

Total Operation Time: 416 hr.

Time: 20:00

Veriables	Brine Heater			Evapon	Evaporator Stages			e e
		*	# 5	#3		**	5 #	*
Flowrate (kg/h)	6420	6420	6420	79	6420	6420	18800	18800
Specific Heat (kj/kg/K)	3.989	3.968	3.955	3.5	3.943	3.932	3.969	3.966
Inlet Temp. (deg. C)	૪	77	92		53	40	33	32
Outlet Temp. (deg. C)	112	6	77		65	53	85 83	33
Temp. Rise (deg. C)	2	14	12		42	13	9	
Flashing Temp. (deg. C)	117	96	98	70	70	65	43	40
Heat Transfer Rate (kJ/S)	149.381	99.076	84.628	84.3	₩.	91.160	124.348	20.7
Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	57	1.937	4.9556	4.9556
L.M.T.D. (deg. 10	12.738	10.487	14.163	8.6	90	11.278	6.548	7.4
U (kw/sq.m/xo	2.510	4.877	3.085	4.443	43	4.173	3.832	15:0
Clean-U Value (kW/sq.m/to	3.9	9.9	5.3		5.1	5.1	5.7	5.4
f (sq.m K/kW)	0.1420	0.0535	0.1281	0.0290	8	0.0436	0.0649	1.5956

Run No. 3	CALCULATIONS OF OVERALL HEAT TRANSFER Run No. 3 Date: August 12, 94	COEFFICIENT	COEFFICIENT AND FOULING FACTOR	ACTOR	Total Operation	Total Operation Time: 420 hr.	
Variables	Brine Heater			Evaporator Stages	.		
		#1	#2	竹幣	*	13	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18800	18800
Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Inlet Temp. (deg. C)	ક્ર		64	52	40	33	
Outlet Temp. (deg. C)	112	91	77	64	52	38	
Temp. Rise (deg. C)	2	14	13	12	12	ın	
Flashing Temp. (deg. Cl	417	25	84	69	88	42	٠
Heat Transfer Rate (kJ/S)	149.381	98.076	91.669	84.361	84.138	103.616	20.714
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	12.738	8.071	12.383	9.806	10.923	6.166	6.487
U (KW/sq.m/lo	2.510	6.337	3.822	4.442	3.977	5.391	0.644
Clean-U Value (kW/sq.m/k)	อ	6. 6	5.1	5.1	5.1	5.1	
f (sq. m) K/kW)	0.1420	7,000	0.0656	70000	0.0554	88800	1 3550

Date: August 12, 94

Run No. 3

Time: 04:00

(Kg/II) #2 #3 #4 #5 (Kg/II) 6420 6420 6420 6420 6420 18800 Leat (KI/Kg/IO) 5.989 3.968 3.954 3.942 3.932 3.968 D. Ideg. C) 91 77 64 52 40 3.3 mp. Ideg. C) 21 14 13 12 3.8 42 eideg. C) 21 14 13 12 5 3.8 42 eideg. C) 21 14 13 12 5 3.8 42 5 3.8 42 42 5 3.8 42 5 3.8 42 42 5 3.8 42 42 5 3.8 42	Variables	Brine Heater			Evaporator Stages			
(μ/μς/lk) 5.389 5.3968 3.3954 5.342 3.958 3.968 99. Ch 91 77 64 52 40 33 199. Ch 112 91 77 64 52 40 33 199. Ch 21 14 13 12 12 5 9. Ch 21 14 13 12 5 38 3. Ch 116.5 94 84 69.5 58 42 Arter (M/S) 149.381 99.076 91.669 84.361 84.138 103.7 4.9556 Arter (M/S) 12.107 8.071 12.383 10.37 4.201 3.97 3.391 Arter (M/S) 3.6 6.6 5.1 5.1 5.1 5.1 Arter (M/S) 3.9 6.6 5.1 5.1 5.1 5.1 Arter (M/S) 3.9 6.6 5.1 5.1 5.1 5.1 Arter (M/S) 6.6 <td< th=""><th>· .</th><th></th><th>*</th><th>#5</th><th>69 **</th><th>7</th><th>10</th><th></th></td<>	· .		*	#5	69 **	7	10	
40/Kg/lV 5.968 5.968 5.954 5.942 5.942 5.942 5.968 99. C) 77 64 52 40 33 9. C) 21 14 13 12 58 38 9. C) 21 14 13 12 5 38 42 9. C) 21 14 13 12 58 42	Flowrate (kg/h)	6420	6420	6420	6420	6420	18800	18800
91 77 64 52 40 33 deg.C) 112 91 77 64 52 38 g.C) 21 14 13 12 5 38 g.C) 21 14 13 12 5 42 5 G.Geg.C) 116.5 94 94 84 64 68.7 58 42 Area (sq.m) 4.6723 1.937 1.937 1.937 1.937 4.9556 Area (sq.m) 4.6723 8.071 12.383 10.923 6.166 Awisq.m/No 3.9 6.6 5.1 5.1 5.1 5.1 Awisq.m/No 3.9 6.6 5.1 5.1 5.1 5.1 Autoria 5.1 5.1 5.1 5.1 5.1 5.1	Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
Geg. C) 21 77 64 52 38 g. C) 21 13 12 5 5 Geg. C) 116.5 94 84 69.5 58 42 Geg. C) 116.5 94 84 66.9 5 58 42 Geg. C) 116.5 94.669 91.669 84.361 84.138 103.616 Area (sq. m) 46723 1.937 1.937 1.937 1.937 4.9556 Area (sq. m) 46723 8.071 12.383 10.368 6.166 Area (sq. m/lo 3.9 6.6 5.1 5.1 5.1 5.1 Area (sq. m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1 Area (sq. m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1 Area (sq. m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 Area (sq. m/lo 3.9	inlet Temp. (deg. C)	94	12	64	52	04	20	32
g. C) 21 14 13 12 12 5 (deg. C) 116.5 94 84 69.5 58 42 Rate (kJ/S) 149.381 99.076 91.669 84.361 84.138 103.616 Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 6.166 N 12.107 8.071 12.383 10.368 10.923 6.166 KW/Sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 CMJ223 0.0065 0.0420 0.0554 0.0554 0.0988	Outlet Temp. (deg. C)	112	8	77	99	25	38	33
(deg. C) 116.5 94 84 69.5 58 42 Rate (kl/s) 149.381 99.076 91.669 84.361 84.138 103.616 Area (Sq.m) 4.6723 1.937 1.937 1.937 1.937 4.9556 Area (Sq.m) 4.6723 8.071 12.383 10.368 10.923 6.166 S 5.4 5.7 5.7 5.7 5.7 5.7 KW/sq.m/k) 3.9 6.6 5.1 5.1 5.1 5.1 C 0.1223 0.0656 0.0420 0.0554 0.0558 0.0988	Temp. Rise (deg. C)	2	14	13	12	72		∇
Rate (kJ/S) 149.381 99.076 91.669 84.361 84.138 103.616 Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 3 12.107 8.071 12.383 10.368 10.923 6.166 4 1.247 3.877 3.391 3.391 3.391 5.1 5.1 5.1 5 6.6 5.1 5.1 5.1 5.1 5.1 5.1 6 6.6 5.1 5.1 5.1 5.1 5.1 6 6.6 5.1 5.1 5.1 5.1	Flashing Temp. (deg. C)	116.5	76	84	69.5	88	42	39
Area (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 1 12.107 8.071 12.383 10.368 10.923 6.166 2 6.41 6.337 3.822 4.201 3.977 3.391 KW/sq.m/NO 3.9 6.6 5.1 5.1 5.1 5.1 0.1223 0.0063 0.0656 0.0420 0.0554 0.0988	Heat Transfer Rate (KJ/S)	149.381	96.076	91.669	84.361	84.138	103.616	20.714
12.107 8.071 12.383 10.368 10.923 6.166 2.641 6.337 3.822 4.201 3.977 3.391 KW/sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 0.1223 0.0063 0.0656 0.0420 0.0554 0.0988	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
KW/sq.m/r0 3.97 3.391 6.6 5.1 5.1 5.1 0.1223 0.0063 0.0656 0.0420 0.0554 0.0988	L.M.T.D. (deg. 10	12.107	8.071	12.383	10.368	10.923	6.166	6.487
KW/sq.m/KO 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1	U (KW/sq.m/l0	2.641	6.337	3.822	4.201	3.977	3.391	0.644
0.1223 0.0063 0.0656 0.0420 0.0554 0.0988	Clean-U Value (kW/sq.m/k)	3.9	9.9	5.1	5.1	5.7	Ņ	5.1
	f (sq.m K/KW)	0.1223	0.0063	0.0656	0.0420	0.0554	0.0988	1.3559

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: August 12, 94		Time: 08:00		Total Operation Time: 428 hr.	ime: 428 hr.	
Variables	Brine Heater			Evaporator Stages			
		**	#2	#	*	10	9 74
Flowrate (kg/h)	6410	6410	6410	6410	6410	18800	18800
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.967
Inlet Temp. (deg. C)	91	77	9	52	40	33.5	32
Outlet Temp. (deg. C)	112	6	77	64	52	38	33.5
Temp. Rise (deg. C)	23	14	43	12	12	4.5	7.5
Flashing Temp. (deg. C)	116	94	84.5	02	89	42.5	39
Heat Transfer Rate (KJ/S)	149.149	98.922	91.526	84.230	84.007	93.258	31.072
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	11.459	8.071	12.929	10.923	10.923	6.492	6.220
U (KW/sq.m/k)	2.786	6.328	3.655	3.981	3.971	2.899	1.008
Clean-U Value (kW/sq.m/io	3.9	9.9	5.7	5.1	5.7	5.1	5.1
f (sq.m K/kW)	0.1026	0.0065	0.0775	0.0551	0.0558	0.1489	0.7959

Date: August 12,94

Run No. 3

Time: 12:00

Variables	Brine Heater			Evaporator Stages	ges		
		#1	# 2	#3	**	\$#	*
Flowrate (kg/h)	6420	6420	6420	6420	6420	18800	18800
Specific Heat (kj/kg/k)	5.989	3.969	3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	91	77.5	9	53	40.5	34	32
Outlet Temp. (deg. C)	112	94	77.5	65	ĸ	38.5	34
Temp. Rise (deg. C)		13.5	12.5	12	12.5	4.5	2
Flashing Temp. (deg. C)	116.5	96	88	22	28	42.5	39
Heat Transfer Rate (KJ/S)	149.381	95.544	88.160	84.381	87.658	93.265	41.431
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	12.107	7.919	12.744	9.806	9.978	5.970	5.944
Ü (kW/sq.m/ko	2.641	6.229	3.571	4.443	4.535	3.152	1.407
Clean-U Value (kW/sq.m/k)	3.9	9.9	5.7	5.3	5.1	5.1	5.1
f (sq.m K/kW)	0.1223	0600.0	0.0839	0.0290	0.0244	0.1211	0.5149

CALCULATIONS OF OVERALL HEAT TRANSFER COEFFICIENT AND FOULING FACTOR

Run No. 3	Date: August 12, 94		Ē	Time: 16:00		Total Operatio	Total Operation Time: 436 hr.	
Vertex	Brine Heater				Evaporator Stages	5 9		
		*		#2	n *	**	\$0 #k	9
Flowrate (kg/h)	6420	6420		6420	6420	6420	18800	18800
Specific Heat (kj/kg/l0	3.989	3.969		3.955	3.943	3.932	3.969	3.967
Inlet Temp. (deg. C)	8	77.5		65	52.5	40.5	34	32
Outlet Temp. (deg. C)	112	9		77.5	92	52.5	39	34
Temp. Rise (deg. C)	21	13.5		12.5	12.5	12	ທ	2
Flashing Temp. (deg. C)	116.5	96		98	02.	29	43	04
Heat Transfer Rate (kJ/S)	149.381	95.544		88.160	87.891	84.147	103.632	41.431
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	12.107	10.318		13.820	9.978	11.473	6.166	6.952
U (KW/sq.m/k)	2.641	4.780		3.293	4.548	3.787	3.392	1.203
Clean-U Value (kW/sq.m/K)	3.9	9.9		5.1	5.1	ς. Σ.3	5.1	5.1
f (sq.m K/KW)	0.1223	0.0577		0.1076	0.0238	0.0680	0.0988	0.6355
					,			

Date: August 12, 94

Run No. 3

Total Operation Time: 440 hr.

Time: 20:00

Variables	Brine Heater			Evaporator Stages			
		#1	# 2	6 #	*#	£	*
Flowrate (kg/h)	6410	6410	6410	6410	6410	18800	18800
Specific Heat (KJ/Kg/K)	3.989	3.968	3.955	3.943	3.932	3.969	3.966
inlet Temp. (deg. C)		11	65	52	9	88	32
Outlet Temp. (deg. C)	112	6	77	92	52	33	8 2
Temp. Rise (deg. C)	21	14	12	5	12	6	T
Flashing Temp. (deg. C)	116.5	95	98	70	88	43	40
Heat Transfer Rate (kj/S)	149.149	98.922	84.496	91.259	84.007	124.348	20.714
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)	12.107	9.308	14.163	10.149	12.018	6.548	7.489
U (KW/sq.m/K)	2.637	5.487	3.080	4.642	3.609	3.832	0.558
Clean-U Value (KW/sq.m/K)	3.9	9.9	5.3	5.1	2	7.5	
f (sq.m K/kW)	0.1228	0.0307	0.1286	0.0193	0.0810	0.0649	1.5956

Bettie Heater Bettie Heate	Run No. 3	Date: August 13,84		Time: 00:00		Total Operat	Total Operation Time: 444 hr.	
#1 #2 #3 #4 #5 I/I guillo 6410 6410 6410 18800 I/I guillo 3.963 3.965 3.943 3.962 3.968 3, Cl 3.963 3.965 3.943 3.962 3.968 3, Cl 3.963 3.965 3.965 3.968 3.968 9, Cl 112 90.5 78 65 82 3.8 1, Cl 21.5 12.5 13 12 5. 42 1, Cl 11. 94 83 6.8 5. 42 5. 42 1, Cl 11. 94 83 91.259 84.007 103.616 42 <td< th=""><th>Variables</th><th>Brine Heater</th><th></th><th></th><th>Evaporator Stages</th><th></th><th></th><th></th></td<>	Variables	Brine Heater			Evaporator Stages			
Viginary 6410 6410 6410 6410 6410 6410 6410 18800 Bg. Cl. 3.389 3.965 3.945 3.945 3.942 3.968 Bg. Cl. 90.5 78 65 40 3.3 Geg. Cl. 112 90.5 78 5.3 3.8 g. Cl. 21.5 12.5 13 5.2 40 3.8 g. Cl. 17 94 83 6.8 91.549 91.259 84.007 103.616 Area (sq. m) 4.672 1.937 1.937 1.937 4.9556 6.067 9.806 6.166 Awwisq.mio 3.5 6.6 5.1 5.7 5.1 5.7 5.1 5.7 5.1 5.7 5.1 5.7 5.1 5.7 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 <t< th=""><th></th><th></th><th>*</th><th>#2</th><th>£#</th><th>>#</th><th>to Th</th><th>*</th></t<>			*	#2	£#	>#	to Th	*
Hydyo 3.989 5.968 3.955 3.945 5.945 3.986 3.986 9.0 78 65 52 40 33 69.0 112 90.5 78 65 52 38 1.0 21.5 12.5 13 13 12 5 deg. Co 117 94 83 91.549 91.559 84.007 103.616 rea (k/s) 4.672 1.937 1.937 1.937 4.9556 9.806 6.166 rea (g,m) 2.535 5.544 4.657 6.067 4.423 3.391 W/sq.m/N 3.9 6.6 5.1 5.1 5.1 5.1 W/sq.m/N 3.9 6.6 5.1 6.067 4.423 3.391	Flowrate (kg/h)	6410	6410	6410	6410	6410	18800	18800
g. Cl 90.5 78 65 52 40 33 eg. Cl 112 90.5 78 65 52 38 L. Cl 21.5 12.5 13.5 13.6 75 38 L. Cl 21.5 4.6 7.6 91.549 91.549 91.549 84.007 403.616 ate (k/S) 15.2 68 88.329 91.549 91.559 84.007 103.61 40.556 rea (sq.m) 4.6723 10.149 7.766 9.806 6.166 W/sq.m/lo 3.9 6.6 5.1 5.1 5.1 W/sq.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 M/sq.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1 M/sq.m/lo 3.9 6.6 5.1 5.1 5.1 5.1 5.1 M/sq.m/lo 3.9 6.6 5.1 6.067 6.067 5.1 5.1 M/sq.m/lo </td <td>Specific Heat (kj/kg/i0</td> <td>3.989</td> <td>3.969</td> <td>3.955</td> <td>3.943</td> <td>3.932</td> <td>3.968</td> <td>3.966</td>	Specific Heat (kj/kg/i0	3.989	3.969	3.955	3.943	3.932	3.968	3.966
eg. Ch 112 90.5 78 65 52 38 I. Ch 21.5 12.5 13. 13. 12. 5 5 (deg. Ch 117 94 83. 68 57 42 42 ate (k/s) 152.688 88.329 91.549 91.259 84.007 103.616 4.9556 rea (Sq.m) 4.6723 1,937 1,937 1,937 4.9556 6.166 rea (Sq.m) 2.535 8.225 10.149 7.766 9.806 6.166 W/sq.m/No 3.9 6.6 5.1 5.1 5.1 5.1 M/sq.m/No 3.9 6.6 5.1 5.1 5.1 5.1	inlet Temp. (deg. C)	90.5	78	. 99	52	9	33	32
LO. 21.5 12.5 13. 13. 13. 14. 5 42. 5 42. 5 42.	Outlet Temp. (deg. C)	112	90.5	78	65	22	28 28	33
(deg. C) 117 94 83 68 57 42 ate (k/S) 152.688 88.329 91.549 91.259 84.007 103.616 rea (Sq.m) 4.672 1.937 1.937 1.937 4.9556 rea (Sq.m) 4.673 10.149 7.766 9.806 6.166 W/Sq.m/No 3.9 6.6 5.1 4.423 3.391 W/Sq.m/No 3.9 6.6 5.1 5.1 5.1 5.1 0.1381 0.0288 0.0187 0.0372 0.0300 0.0988	Temp. Rise (deg. C)	21.5	12.5	13	13	12	LO.	•
ate (t/s) 152.688 88.329 91.549 91.259 84.007 103.616 rea (5q.m) 4.6723 1.937 1.937 1.937 4.956 12.892 8.225 10.149 7.766 9.806 6.166 2.535 5.544 4.657 6.067 4.423 3.391 W/sq.m/lo 3.9 6.6 5.1 5.1 5.1 0.1381 0.0288 0.0187 0.0372 0.0300 0.0988	Flashing Temp. (deg. C)	117	94	833	89	75	42	38
rea (Sq.m) 4.6723 1.937 1.937 1.937 4.9556 12.892 8.225 10.149 7.766 9.806 6.166 2.535 5.544 4.657 6.067 4.423 3.391 W/sq.m/lo 3.9 6.6 5.1 5.1 5.1 0.1381 0.0288 0.0187 0.0372 0.0350 0.0988	Heat Transfer Rate (kj/S)	152.688	88.329	91.549	91.259	84.007	103.616	20.714
4.657 6.067 9.806 6.166 4.423 3.391 3.391 4.423 3.391 3.391 6.6 5.1 5.1 5.1 6.166 5.1 5.1 5.1 6.166 5.1 5.1 5.1 6.166 5.1 5.1 5.1 6.1381 6.0388 6.0988	Heat Transfer Area (Sq.m)	4.6723	1.937	1.937	1.937	1.937	4.9556	4.9556
2.535 5.544 4.657 6.067 4.423 3.391 (W//sq.m/l) 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 0.0388	L.M.T.D. (deg. K)	12.892	8.225	10.149	7.766	9.806	6.166	5.485
(KW/sq.m/lO 3.9 6.6 5.1 5.1 5.1 5.1 5.1 5.1 0.0988	U (kW/sq.m/lo	2.535	5.544	4.657	6.067	4.423	3.391	0.762
0.1381 0.0288 0.0187 (0.0312 0.0300 0.0988	Clean-U Value (kW/sq.m/lo	3.9	9.9	5.1	2 0	5.1	5.1	5.1
	f (sq.m K/kW)	0.1381	0.0288	0.0187	(0.0312	0.0300	0.0988	1.1161

Date: August 13, 94

Run No. 3

Time: 04:00

Væriables	Brine Hester			Evapora	Evaporator Stages				
		#	#2	**		**	£		•
Flowrate (kg/h)	6420	6420	6420	6420	Ω	6420	18800		18800
Specific Heat (KJ/Kg/K)	3.989	3.968	3.954	3.942	2	3.932	3.968		3.966
Inlet Temp. (deg. C)	90.5	11	64	52	22	39.5	33		32
Outlet Temp. (deg. C)	112	90.5	77		3 5	52	88		8 0
Temp. Rise (deg. C)	21.5	13.5	13		2	12.5	Ľ		-
Flashing Temp. (deg. C)	711	83	83	89	8	85	42		38
Heat Transfer Rate (KJ/S)	152.926	95.531	91.669	84.361	×	87.640	103.616	~	20.714
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)	12.892	7.273	11.278	8.656	ų,	11:101	6.166	÷	5.485
U (KW/sq.m/l0	2.539	6.782	4.196	5.037	1 2	4.076	3.391		0.762
Clean-U Value (KW/sq.m/K)	3.9	9.9	ř.	5.7		5.1	5.1		5.1
f (sq.m K/kW)	0.1375	-0.0041	0.0422	0.0027	6	0.0493	0.0988	- -	1.1161

Run No. 3	Date: August 13, 94		тіте: 08:00		Total Operation Time: 452 hr.	Time: 452 hr.	
Variables	Brine Heater			Evaporator Stages			
		#1	#5	£ #	**	to Th	*
Flowrate (kg/h)	6450	6450	6450	6450	6450	18800	18800
Specific Heat (kj/kg/K)	3.989	3.968	3.954	3.942	3.932	3.968	3.966
inlet Temp. (deg. C)	90.5	77	64	52	40	33	31.5
Outlet Temp. (deg. C)	112	90.5		79	52	38.5	
Temp. Rise (deg. C)	21.5	13.5	, 10	12	12	5.5	
Flashing Temp. (deg. C)	116	94	82	70	58.5	43	
Heat Transfer Rate (K)/S)	153.641	95.977	92.097	84.755	84.532	113.982	31.070
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)	11.607	8.542	13.470	10.923	11.473	6.888	5.717
U (KW/sq.m/K)	2.833	5.801	3.530	4.006	3.804	3.339	1.097
Clean-U Value (kW/sq.m/l0	б; Ю	9.9	5.1	5.1	5.1	7.	
f (sq.m K/kM)	9960.0	60200	0.0872	0.0536	0.0668	0.4024	927CO

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