

Frigaid Corporation limited

Applications & Case Study

Cooling Tower System



Formosa Plastics Group

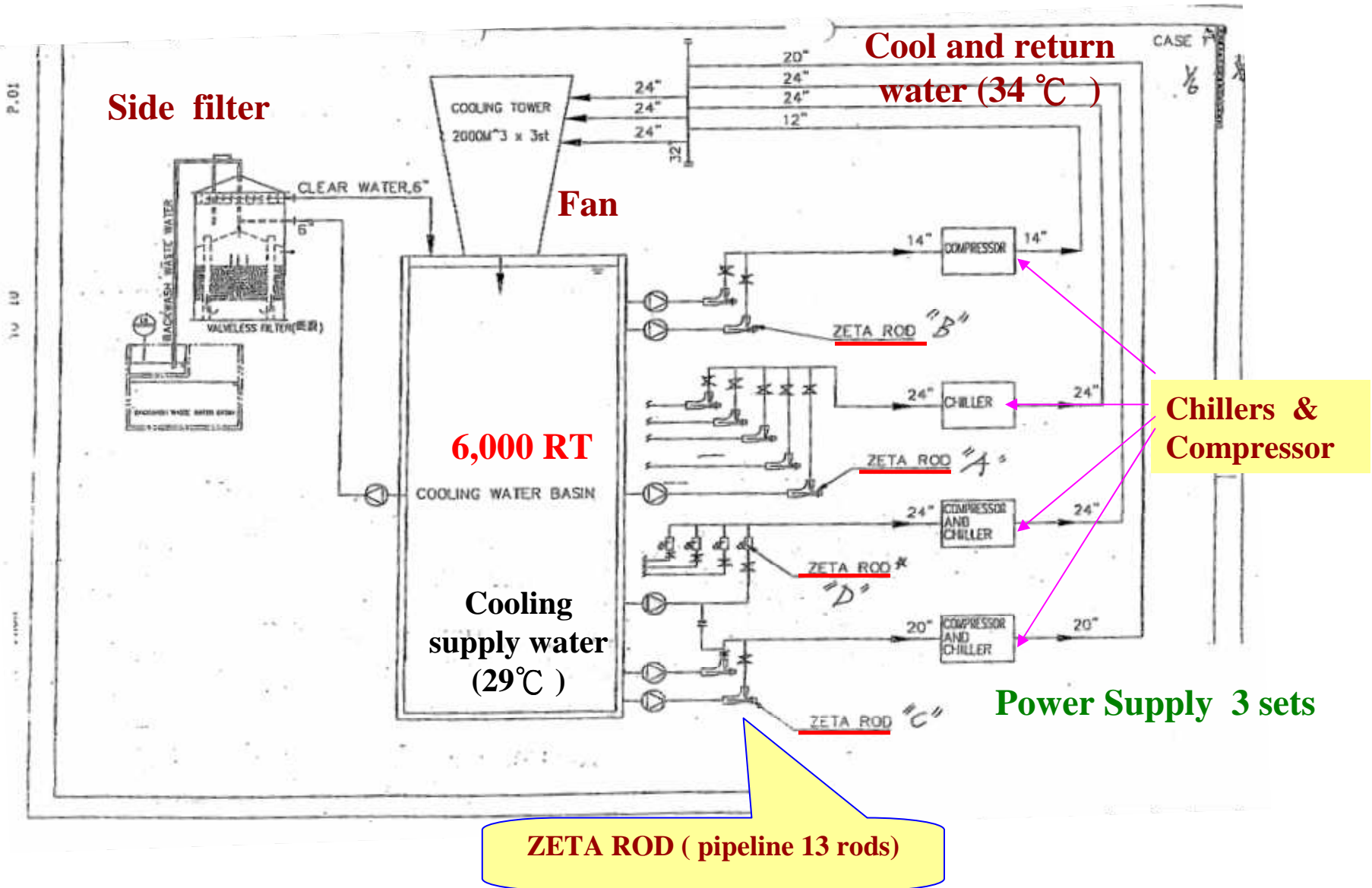


Nan-Ya Plastics Corp. - Factory of Chia-yi

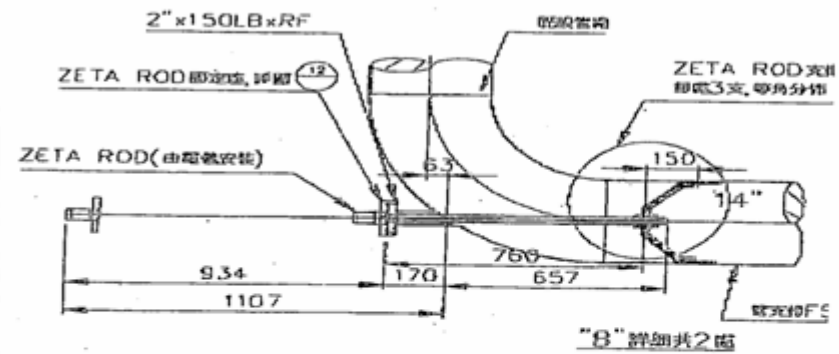
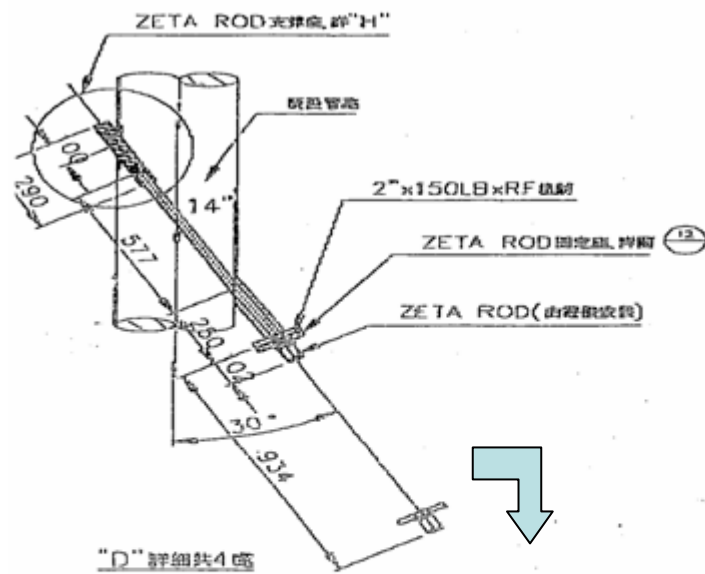


**System : 6000 RT cooling tower-
per 500 RT use 1 ZR36S Rod**

Map of the cooling tower system



Design drawing & picture



The reduction of chemical plan

2005.04.29~.12.31

Chemical Name	Original amount	Stage 1				Stage 2			2005 11/9	2005 12/23
		04-05	05-07	06-07	07-08	08-09	09-10	10-11		
Sulfuric acid H ₂ SO ₄	100%	100%				100%			75%	0%
Biocide		75%				50%	25%	0%	0%	0%
Sodium hypochlorite NaOCl		75%				75%			75%	75%
Corrosion inhibitor		75%	50%	25%	0%	0%			25%	25%

The chemical cost reduction

Chemical name	(H ₂ SO ₄)	(NaOCl)	(Biocide)	(Corrosion inhibitor)
Original amount kg/day	140	150	17.8	11.5



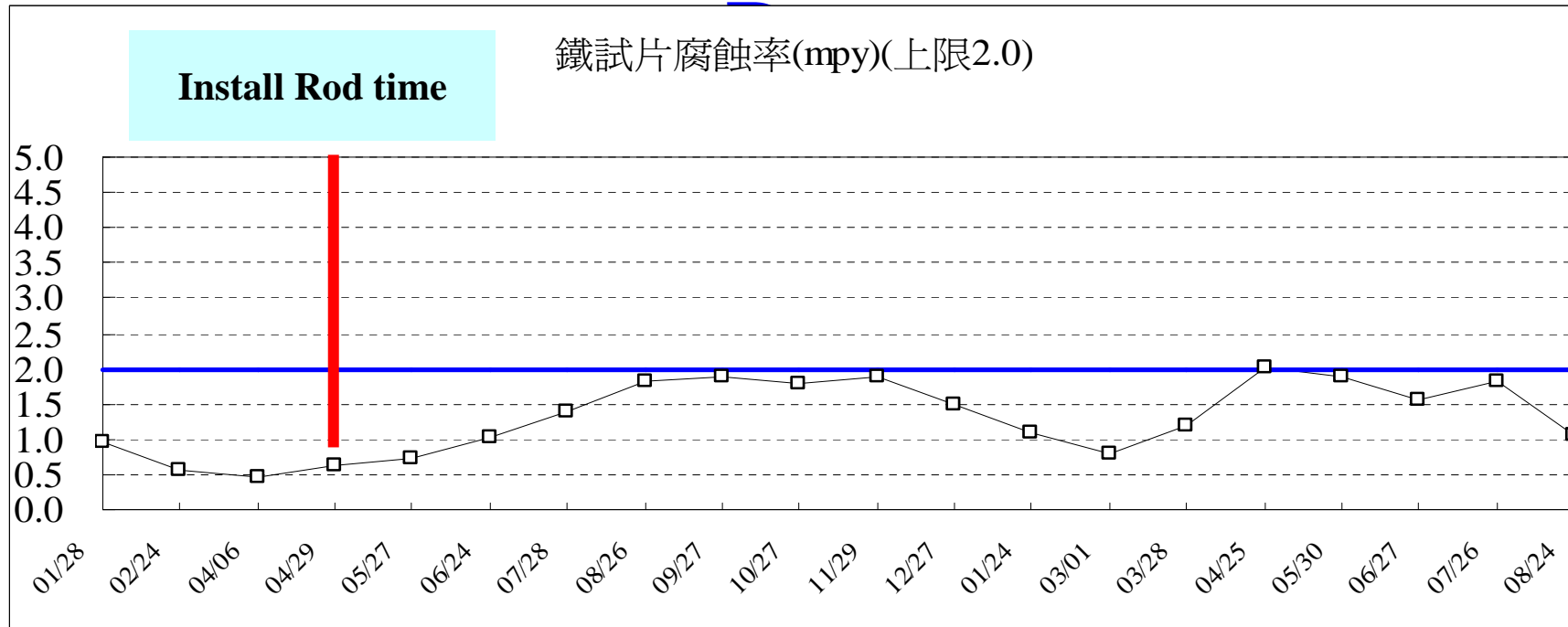
Result amount kg/day	0	112.5	0	2.9
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Before treatment: NT\$ 73,000/month ,

After treatment: NT\$ 33,288/month

Save chemical cost: NT\$39,712 per month

Corrosion Rate Test



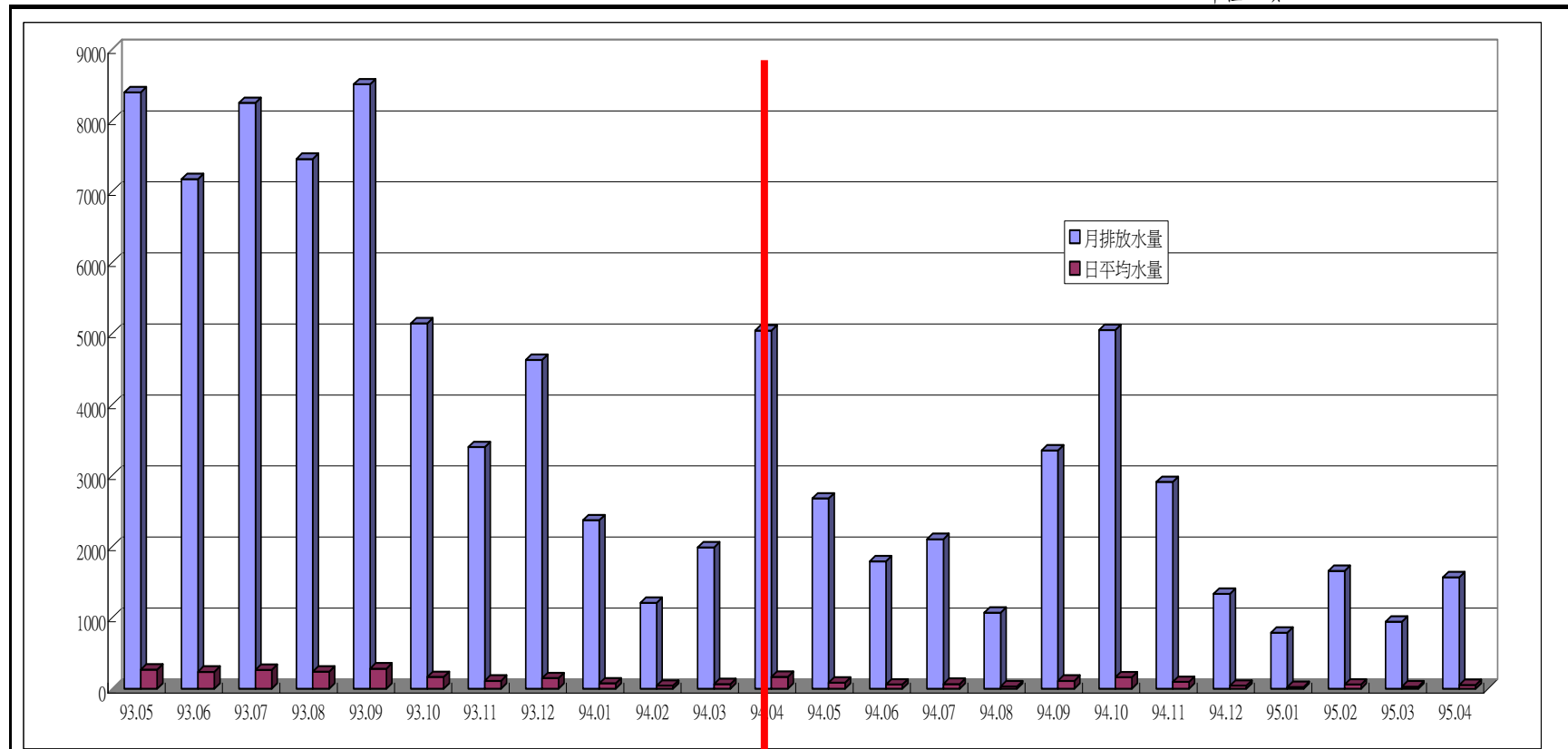
Control corroding rate data li

Corrosion rate < 2 mpy

Corroding rate of carbon steel (mpy)	Explanation
< 1	Fine
1- 3	Excellent
3- 5	Good
5- 8	Ordinary

Discharge trend - less Blow down Water

單位：噸



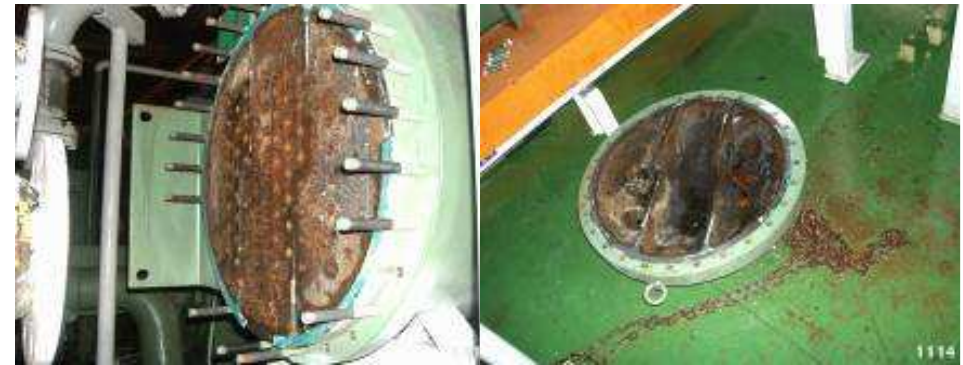
月份	93.05	93.06	93.07	93.08	93.09	93.10	93.11	93.12	94.01	94.02	94.03	94.04	94.05	94.06	94.07	94.08	94.09	94.10	94.11	94.12	95.01	95.02	95.03	95.04	平均 / 差異
月排放量	8394	7173	8245	7456	8506	5142	3401	4629	2371	1208	1988	5040	2679	1794	2105	1070	3355	5048	2912	1336	788	1658	945	1567	3700
日平均水量	271	239	266	241	284	166	113	149	76	43	64	168	86	60	68	35	112	163	97	43	25	59	30	52	121
月同期比較	93.05~94.04平均：								94.05~95.04平均：										3191						
日同期比較	93.05~94.04平均：								94.05~95.04平均：										104						

Discharge save per month: 3,191 M³ (monthly average in one year)

Coolers examine comparing



One section of coolers is dismantled and examined - 1500 HP air compressor

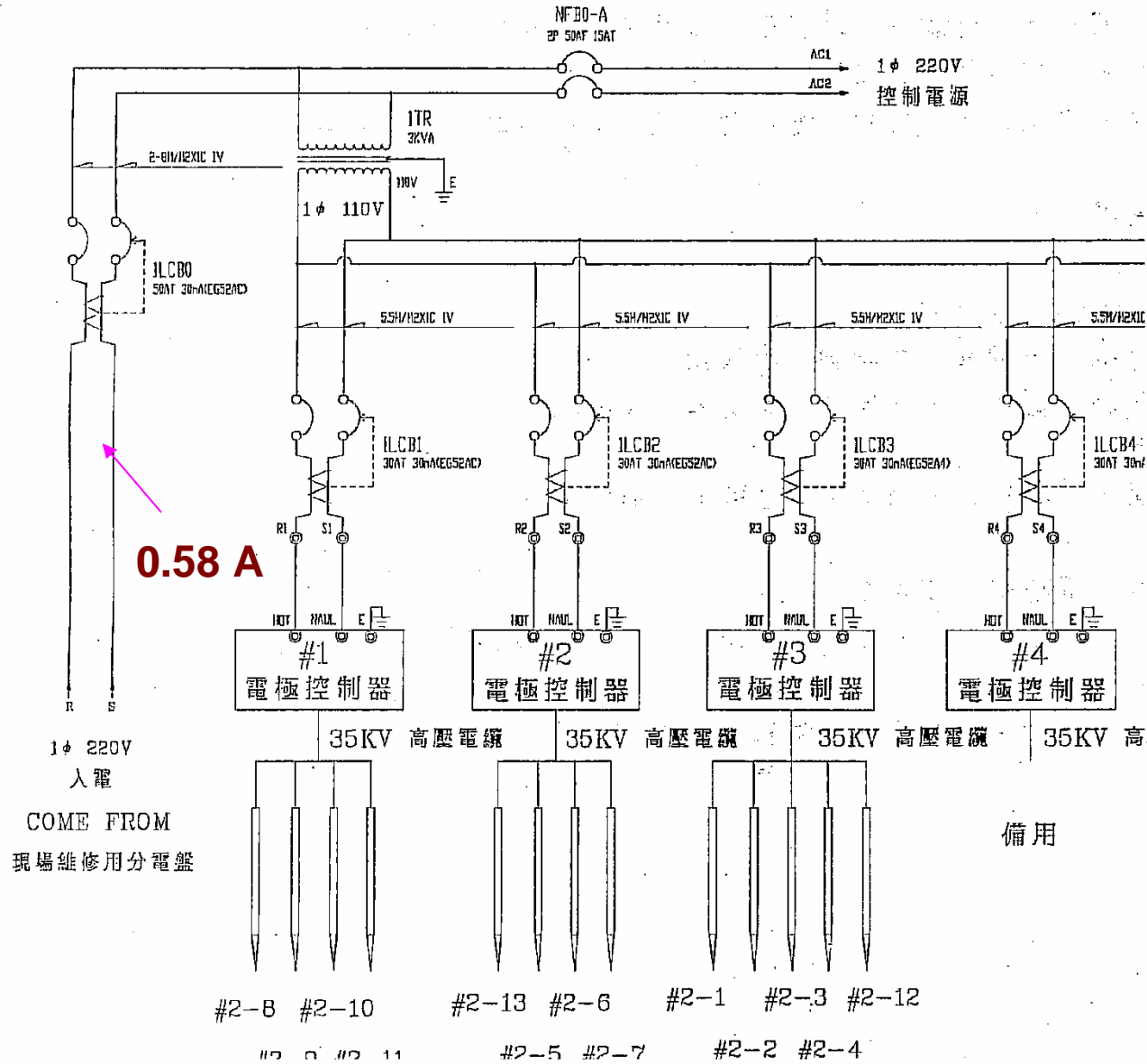


Before install (2005.04.28)



**after installing for 3 months
(2005.07.28)**

Zeta rod power consumption



Power consumption

Each ZR36S

< 100 kWh/month

Each ZR36S Rod
power consumption

About 130W