

7 機材管理状況表

List of The Equipment Donated by JICA for 1991/92

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
91-10101	Meeting table	240 X 90	31,000	91.11.29	Expert Room	Local purchase
91-10201	Book shelves	450 X 40 X 80	48,000	11.29	Expert Room	Local purchase
91-10202	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10203	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10204	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10205	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10206	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10207	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10208	Book shelves	285 X 40 X 80	23,000	11.29	Expert Room	Local purchase
91-10301	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10302	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10303	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10304	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10305	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10306	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10307	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10308	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10309	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10310	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10311	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10312	Filing cabinet	47 X 63 X 100, steel	22,500	12.03	Expert Room	Local purchase
91-10401	Vehicle	Toyota Kijang	1,380,000	12.27	Garage	Local purchase
91-10402	Vehicle	Toyota Kijang	1,380,000	12.27	Garage	Local purchase
91-10501	Mini bus	Mitsubishi L-300	1,767,000	92.01.08	Garage	Local purchase
91-10601	Personal computer	Toshiba T2000SXe Notebook	557,000	02.12	Expert Room	Local purchase
91-10701	Printer	Epson LQ-1170	107,000	02.12	Expert Room	Local purchase
91-10702	Printer	Epson LQ-1170	107,000	02.12	Comp. Room	Local purchase
91-10801	UPS	ICA UPS-601.B	45,000	02.12	Expert Room	Local purchase
91-10802	UPS	ICA UPS-601.B	45,000	02.12	Expert Room	Local purchase
91-10803	UPS	ICA UPS-601.B	45,000	02.12	Comp. Room	Local purchase

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Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
91-10901	LAN card	ARC LAN, Bus type, 2x8KB	733,000	92.02.12	Comp. Room	Local purchase
91-11001	Typewriter	Olivetti ET-2400	217,000	02.12	Expert Room	Local purchase
91-11101	Software	MS-DOS Ver.5	37,000	02.12	Expert Room	Local purchase
91-11102	Software	MS-DOS Ver.5	37,000	02.12	Comp. Room	Local purchase
91-11103	Software	Wordstar Ver.6.0	51,000	02.12	Expert Room	Local purchase
91-11104	Software	WordPerfect Ver.5.1	64,000	02.12	Expert Room	Local purchase
91-11105	Software	Lotus 1-2-3 Ver.3.1	98,000	02.12	Expert Room	Local purchase
91-11106	Software	Novel 386 Netware V.3.11	352,000	02.12	Comp. Room	Local purchase
91-11201	Personal computer	AST 386 Premium II 386/33	992,000	02.27	Expert Room	Local purchase
91-11202	Personal computer	AST 386 Premium II 386/33	992,000	02.27	Expert Room	Local purchase
91-11203	Personal computer	AST 386 Premium II 386/33	992,000	02.27	Comp. Room	Local purchase
91-11301	Laser printer	Hewlett-Packard LaserJetIII	371,000	02.27	Expert Room	Local purchase
91-11302	Laser printer	Hewlett-Packard LaserJetIII	371,000	02.27	Comp. Room	Local purchase
91-11401	Photocopy Machine	Zerox Vivace 500	1,918,000	03.12	Expert Room	Local purchase
91-11501	Mini bus	Mitsubishi Fuso 25 seats	4,898,000	03.31	Garage	Local purchase
91-11601	Dring Oven	Futabakagaku DF-150	4,275,000	03.31	ES Lab.	Local purchase

List of The Equipment Donated by JICA for 1992/93

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
92-10101	Vehicle	Mitsubishi L-300	1,846,000	92.09.24	Garage	Local purchase
92-10201	End suction centrifugal pump	Ebara 50X40 FSSH5.75	139,000	09.30	Workshop A	Local purchase
92-10202	End suction centrifugal pump	Ebara 50X40 FSSH5.75	139,000	09.30	Workshop A	Local purchase
92-10301	Video projector	Sony, VPH-1000ZH	1,087,000	10.23	Seminar R.	Local purchase
92-10302	Video projector	Sony, VPH-1000ZH	1,087,000	10.23	Lecture R.3	Local purchase
92-10401	Flat screen	Sony, VPS-100F1	108,000	10.23	Seminar R.	Local purchase
92-10402	Flat screen	Sony, VPS-100F1	108,000	10.23	Lecture R.3	Local purchase
92-10501	Remote control	Sony, VPR-722S	90,000	10.23	Seminar R.	Local purchase
92-10502	Remote control	Sony, VPR-722S	90,000	10.23	Lecture R.3	Local purchase
92-10601	Remote cable 25	Sony, CCQ-25BRS	80,000	10.23	Seminar R.	Local purchase
92-10602	Remote cable 25	Sony, CCQ-25BRS	80,000	10.23	Lecture R.3	Local purchase
92-10701	Ceiling mount bracket	Sony, PSS-722/10L	77,000	10.23	Seminar R.	Local purchase
92-10702	Ceiling mount bracket	Sony, PSS-722/10L	77,000	10.23	Lecture R.3	Local purchase
92-10801	VTR/superbeta	Sony, SL-HF99ES	127,000	10.23	Seminar R.	Local purchase
92-10802	VTR/superbeta	Sony, SL-HF99ES	127,000	10.23	Lecture R.3	Local purchase
92-10901	VTR/VHS	Panasonic, NV-J27EN	103,000	10.23	Seminar R.	Local purchase
92-10902	VTR/VHS	Panasonic, NV-J27EN	103,000	10.23	Lecture R.3	Local purchase
92-11001	Amplifier	Sony, TAF 101K	30,000	10.23	Seminar R.	Local purchase
92-11002	Amplifier	Sony, TAF 101K	30,000	10.23	Lecture R.3	Local purchase
92-11101	Speaker	Sony, SSA 7000	23,000	10.23	Seminar R.	Local purchase
92-11102	Speaker	Sony, SSA 7000	23,000	10.23	Lecture R.3	Local purchase
92-11201	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11202	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11203	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11204	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop E	Local purchase
92-11205	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11206	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11207	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11208	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11209	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase

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Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
92-11210	Leak noise detector	Fuji, FD-10	322,000	92.11.30	Workshop B	Local purchase
92-11211	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11212	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11213	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11214	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11215	Leak noise detector	Fuji, FD-10	322,000	11.30	Workshop B	Local purchase
92-11301	Water pressure recorder	Fuji, FJN-24	155,000	11.30	Workshop B	Local purchase
92-11302	Water pressure recorder	Fuji, FJN-24	155,000	11.30	Workshop B	Local purchase
92-11303	Water pressure recorder	Fuji, FJN-24	155,000	11.30	Workshop B	Local purchase
92-11304	Water pressure recorder	Fuji, FJN-24	155,000	11.30	Workshop B	Local purchase
92-11305	Water pressure recorder	Fuji, FJN-24	155,000	11.30	Workshop B	Local purchase
92-11401	Leak noise correlator	Fuji, LC-2000	4,119,000	11.30	Workshop B	Local purchase
92-11501	Septic tank	1:20	130,000	93.02.17	ES Lab.	Local purchase
92-11502	Pit ratrine	1:20	194,000	02.17	ES Lab.	Local purchase
92-11503	Sumur resapan	1:20	130,000	02.17	ES Lab.	Local purchase
92-11504	Pit ratrine & sumur resapan	1:1	162,000	02.17	Outside	Local purchase
92-11601	Digital current meter	Sanei LPW	1,177,000	06.03	WQ Lab.	Local purchase
92-11602	Digital current meter	Sanei LPW	1,177,000	06.03	WQ Lab.	Local purchase
92-11701	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11702	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11703	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11704	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11705	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11706	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11707	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11708	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11709	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11710	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11711	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase
92-11712	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	Local purchase

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Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
92-11713	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11714	Pocket computer	Sharp PC-E500	28,000	06.03	WQ Lab.	
92-11715	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11716	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11717	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11718	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11719	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11720	Pocket computer	Sharp PC-E500	29,000	06.03	WQ Lab.	
92-11801	Micro tube pump	Tokyo Rika MP-10111	262,000	06.03	WQ Lab.	
92-11802	Micro tube pump	Tokyo Rika MP-10111	262,000	06.03	WQ Lab.	
92-11803	Micro tube pump	Tokyo Rika MP-10111	262,000	06.03	WQ Lab.	
92-11804	Micro tube pump	Tokyo Rika MP-10111	262,000	06.03	WQ Lab.	
92-11901	Auto clave	Hirayama HL-42Ae	830,000	06.03	WQ Lab.	
92-12001	Hydro pump cut model	Ebara 50DL 5.4	212,000	06.03	Workshop A	
92-12002	Hydro pump cut model	Ebara 80BHS25 3.7	954,000	06.03	Workshop A	
92-12101	BOD Auto-measuring recorder	Central Kagaku D unit	4,623,900	06.03	ES Lab.	
92-12201	Microscope	Nikon, X-2F-MTH5-21	1,902,500	06.03	ES Lab.	
92-12301	TOC Analyzer	Shimadzu, TOC-500	2,858,730	06.03	WQ Lab.	
92-12401	Automatic sample injector	Shimadzu, ASI-502	1,842,000	06.03	WQ Lab.	
92-12501	High purity air cylinder	Shimadzu	87,000	06.03	WQ Lab.	
92-12601	Pressure regulator	Shimadzu, TU-1085	25,300	06.03	WQ Lab.	
92-12701	Oil-less air compressor	Shimadzu	85,000	06.03	WQ Lab.	
92-12801	Transformer for compressor	Shimadzu	60,000	06.03	WQ Lab.	
92-12901	IC removal set	Shimadzu, for ASI	134,000	06.03	WQ Lab.	
92-13001	Low pressure alarm device	Shimadzu	25,850	06.03	WQ Lab.	
92-13101	Adsorption type gas purifier	Shimadzu	122,000	06.03	WQ Lab.	
92-13201	High sensitivity TC catalyst	Shimadzu	44,000	06.03	WQ Lab.	
92-13202	High sensitivity TC catalyst	Shimadzu	44,000	06.03	WQ Lab.	
92-13203	High sensitivity TC catalyst	Shimadzu	44,000	06.03	WQ Lab.	
92-13301	Microsyringe set	Shimadzu, Manual, 10uL	22,000	06.03	WQ Lab.	

List of The Equipment Donated by JICA for 1992/93

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
92-13302	Microsyringe set	Shimadzu, Manual, 25ul	21,450	93.06.03	WQ Lab.	
92-13303	Microsyringe set	Shimadzu, Manual, 50ul	21,890	06.03	WQ Lab.	
92-13304	Microsyringe set	Shimadzu, Manual, 50ul	21,890	06.03	WQ Lab.	
92-13305	Microsyringe set	Shimadzu, Manual, 50ul	21,890	06.03	WQ Lab.	
92-13306	Microsyringe set	Shimadzu, Manual, 50ul	21,890	06.03	WQ Lab.	
92-13307	Microsyringe set	Shimadzu, Manual, 100ul	21,450	06.03	WQ Lab.	
92-13308	Microsyringe set	Shimadzu, Manual, 100ul	21,450	06.03	WQ Lab.	
92-13309	Microsyringe set	Shimadzu, Manual, 250ul	22,550	06.03	WQ Lab.	
92-13310	Microsyringe set	Shimadzu, Automatic, 10ul	22,000	06.03	WQ Lab.	
92-13311	Microsyringe set	Shimadzu, Automatic, 25ul	21,450	06.03	WQ Lab.	
92-13312	Microsyringe set	Shimadzu, Automatic, 50ul	21,890	06.03	WQ Lab.	
92-13313	Microsyringe set	Shimadzu, Automatic, 50ul	21,890	06.03	WQ Lab.	
92-13314	Microsyringe set	Shimadzu, Automatic, 50ul	21,890	06.03	WQ Lab.	
92-13315	Microsyringe set	Shimadzu, Automatic, 50ul	21,890	06.03	WQ Lab.	
92-13316	Microsyringe set	Shimadzu, Automatic, 100ul	21,450	06.03	WQ Lab.	
92-13317	Microsyringe set	Shimadzu, Automatic, 100ul	21,450	06.03	WQ Lab.	
92-13318	Microsyringe set	Shimadzu, Automatic, 250ul	22,550	06.03	WQ Lab.	

List of The Equipment Donated by JICA for 1993/94

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
93-10101	Vehicle	Daihatsu Taft Ranger	2,400,000	93.09.18	Garage	Local purchase
93-10201	Turbidity meter	HACH 2100A	350,000	10.25	WQ Lab.	Local purchase
93-10301	Fecal coliform field kit	MILLIPORE XX 63 001 50	777,000	10.26	WQ Lab.	Local purchase
93-10401	Leak noise correlator	Fuji, LC-2000	4,444,000	12.22	Workshop A	Local purchase
93-10501	Non-metarc pipe locator	Fuji, PL-130	1,167,000	12.22	Workshop A	Local purchase
93-10502	Non-metarc pipe locator	Fuji, PL-130	1,167,000	12.22	Workshop A	Local purchase
93-10503	Non-metarc pipe locator	Fuji, PL-130	1,167,000	12.22	Workshop A	Local purchase
93-10601	Cutmodel of diesel engine	Kubota, RD-55 N	1,805,000	94.01.15	Workshop B	Local purchase
93-10701	Water sampler	ISCO 3700	1,263,000	01.17	WQ Lab.	Local purchase
93-10801	DP tester	Shimadzu, DPC-203	740,000	01.19	Workshop B	Local purchase
93-10901	Industrial tester	Shimadzu, MATE-10	2,221,000	01.19	Workshop B	Local purchase
93-11001	Gas chromatograph	Shimadzu, GC-14BPF	5,714,000	02.03	WQ Lab.	Local purchase
93-11101	Ion chromatography	Shimadzu, LC-10A	6,340,000	02.03	WQ Lab.	Local purchase
93-11201	End suction centrifugal pump	Ebara, 50x40 FSPF	75,000	03.08	Workshop B	Local purchase
93-11301	Submergeble pump	Ebar, 50 DVSA 5.4	99,000	03.08	Workshop B	Local purchase
93-11302	Submergeble pump	Ebar, 50 DVSA 5.4	99,000	03.08	Workshop B	Local purchase
93-11401	Motor	Ebara, 7.5kwx4Pxl1500rpmx50HZ	98,000	03.08	Workshop B	Local purchase
93-11402	Motor	Ebara, 7.5kwx4Pxl1500rpmx50HZ	98,000	03.08	Workshop B	Local purchase
93-11403	Motor	Ebara, 7.5kwx4Pxl1500rpmx50HZ	98,000	03.08	Workshop B	Local purchase
93-11501	Sound bar	Fuji, FSB-7D	116,000	03.09	Workshop A	Local purchase
93-11502	Sound bar	Fuji, FSB-7D	116,000	03.09	Workshop A	Local purchase
93-11503	Sound bar	Fuji, FSB-7D	116,000	03.09	Workshop A	Local purchase
93-11601	Box locator	Fuji, F-80	130,000	03.09	Workshop A	Local purchase
93-11602	Box locator	Fuji, F-80	130,000	03.09	Workshop A	Local purchase
93-11603	Box locator	Fuji, F-80	130,000	03.09	Workshop A	Local purchase
93-11701	Sanitary landfill model	100 x100 x50	963,000	03.10	ES Lab.	Local purchase
93-11801	Water sampler	ISCO 3700 & accessories	1,450,000	03.30	WQ Lab.	Local purchase
93-11901	Water volume check system	Pipe Length 15m (VP)	1,432,000	03.30	Leakage yard	Local purchase
93-12001	Ventury meter	6001 PX, 200mm	1,409,000	03.30	Workshop A	Local purchase
93-12101	Closer joint	Victaulic, CL-A	337,000	03.30	Workshop A	Local purchase

List of The Equipment Donated by JICA for 1993/94

Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
93-12102	Closer joint	Victaulic, CL-D	304,000	94.03.30	Workshop A	Local purchase
93-12103	Flexible pipe joint	Sulken, FBW-US	364,000	03.30	Workshop A	Local purchase
93-12104	Buffer joint	Okudasekabe, BUM-100	649,000	03.30	Workshop A	Local purchase
93-12105	Repair sleeve for ACP	Taiseikikou, TA-60	77,000	03.30	Workshop A	Local purchase
93-12106	Repair sleeve for steel pipe	Taiseikikou, TN-65	42,000	03.30	Workshop A	Local purchase
93-12107	Repair sleeve for ACP	Taiseikikou, TN-65	39,000	03.30	Workshop A	Local purchase
93-12108	Repair sleeve for TS,RR	Taiseikikou, TH-60	30,000	03.30	Workshop A	Local purchase
93-12109	Sleeve for cast iron pipe	Taiseikikou, TN-65F, 100x100	94,000	03.30	Workshop A	Local purchase
93-12110	Sleeve for cast iron pipe	Taiseikikou, TN-65F, 150x100	88,000	03.30	Workshop A	Local purchase
93-12201	Water supply system pannel	200 x 300	116,000	03.30	Workshop A	Local purchase
93-12301	Jokaso model	Gappei-ttype	411,000	03.30	ES Lab.	Local purchase
93-12401	Atomic absorption lamp	Shimadzu, As lump, As generator	430,000	03.30	WQ Lab.	Local purchase
93-12501	Auto flow cell	Shimadzu, AFJ-120Z	590,000	03.30	WQ Lab.	Local purchase
93-12502	Printer for auto flow cell	Shimadzu, DP-90Z	416,000	03.30	WQ Lab.	Local purchase
93-12601	Pressure regulator for H ₂	Shimadzu	52,000	03.30	WQ Lab.	Local purchase
93-12602	Pressure regulator for Ar	Shimadzu	52,000	03.30	WQ Lab.	Local purchase
93-12701	Night soil treatment pannel	100 x 200	142,000	03.30	ES Lab.	Local purchase

List of The Equipment Donated by JICA for 1994/95

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
94-10101	Vehicle	Mitsubishi, COLT L-300	1,429,000	95.02.08	Garage	Local purchase
94-10201	Ductile vent pipe	A type, Ø100 X11	24,600	03.13	Workshop A	Local purchase
94-10202	Ductile vent pipe	A type, Ø100 X11	24,600	03.13	Workshop A	Local purchase
94-10203	Ductile vent pipe	A type, Ø100 X11	24,600	03.13	Workshop A	Local purchase
94-10204	Ductile vent pipe	A type, Ø100 X11	24,600	03.13	Workshop A	Local purchase
94-10301	T shaped tube with flange	T type, Ø100 X75	32,500	03.13	Workshop A	Local purchase
94-10302	T shaped tube with flange	T type, Ø100 X75	32,500	03.13	Workshop A	Local purchase
94-10303	T shaped tube with flange	T type, Ø100 X75	32,500	03.13	Workshop A	Local purchase
94-10304	T shaped tube with flange	T type, Ø100 X75	32,500	03.13	Workshop A	Local purchase
94-10305	T shaped tube with flange	T type, Ø100 X75	32,500	03.13	Workshop A	Local purchase
94-10401	Socket	No.2, Ø100	20,800	03.13	Workshop A	Local purchase
94-10402	Socket	No.2, Ø100	20,800	03.13	Workshop A	Local purchase
94-10403	Socket	No.2, Ø100	20,800	03.13	Workshop A	Local purchase
94-10404	Socket	No.2, Ø100	20,800	03.13	Workshop A	Local purchase
94-10405	Socket	No.2, Ø100	20,800	03.13	Workshop A	Local purchase
94-10501	J shaped pipe	J type, Ø100 X100	45,800	03.13	Workshop A	Local purchase
94-10502	J shaped pipe	J type, Ø100 X100	45,800	03.13	Workshop A	Local purchase
94-10503	J shaped pipe	J type, Ø100 X100	45,800	03.13	Workshop A	Local purchase
94-10601	Soft seal valve	Ø100	103,800	03.13	Workshop A	Local purchase
94-10602	Soft seal valve	Ø100	103,800	03.13	Workshop A	Local purchase
94-10603	Soft seal valve	Ø100	103,800	03.13	Workshop A	Local purchase
94-10604	Soft seal valve	Ø100	103,800	03.13	Workshop A	Local purchase
94-10605	Soft seal valve	Ø100	103,800	03.13	Workshop A	Local purchase
94-10701	Hydrant	Ø 75	117,400	03.13	Workshop A	Local purchase
94-10702	Hydrant	Ø 75	117,400	03.13	Workshop A	Local purchase
94-10703	Hydrant	Ø 75	117,400	03.13	Workshop A	Local purchase
94-10801	Air valve	Ø 20	100,000	03.13	Workshop A	Local purchase
94-10802	Air valve	Ø 20	100,000	03.13	Workshop A	Local purchase
94-10803	Air valve	Ø 20	100,000	03.13	Workshop A	Local purchase
94-10901	Ball valve	75X150	89,800	03.13	Workshop A	Local purchase

List of The Equipment Donated by JICA for 1994/95

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
94-10902	Ball valve	75×150	89,800	03.13	Workshop A	Local purchase
94-10903	Ball valve	75×150	89,800	03.13	Workshop A	Local purchase
94-11001	Water pipe coating sample	epoxy & polyethylene	107,400	03.13	Workshop A	Local purchase
94-11002	Water pipe coating sample	epoxy & asphalt	107,400	03.13	Workshop A	Local purchase
94-11101	Welded pipe coating sample	Plastic tape	107,400	03.13	Workshop A	Local purchase
94-11102	Welded pipe coating sample	Heat contractile tube	107,400	03.13	Workshop A	Local purchase
94-11201	Butter fly valve		2,625,100	03.13	Workshop A	Local purchase
94-11301	Field analysis kit	HACH, DR/2000	607,200	03.16	ES Lab.	Local purchase
94-11302	Field analysis kit	Millipore, X63 001 50	735,800	03.16	ES Lab.	Local purchase
94-11401	Mini water treatment plant	Accelerator, pulsator	2,620,000	03.30	Workshop C	Local purchase
94-11501	Oxydation ditch model	400-φ, acrylic sheet	1,848,000	03.30	ES Lab.	Local purchase
94-11601	Weight bridge	TANAKA, 20kg-20t, data process	5,358,000	03.30	ES Lab.	Local purchase
94-11701	Combined joint practice yard	φ400, K type ductile pipe	3,008,000	03.30	Workshop A	Local purchase
94-11801	Electromagnetic flowmeter	Fuji, TWO-WAY-TYPE, φ50/15	7,191,000	03.30	Workshop A	Local purchase
94-11901	Experimental ozoniser	Yanako, YOLS-1000	6,000,000	06.04	WQ Lab.	Local purchase
94-12001	Motor performance tester	Seikosha, MG-WD-210P	2,130,000	06.04	Workshop B	Local purchase
94-12101	Electric valve control pannel	Seibu denki, φ300, motor 0.75KW	2,970,000	06.04	Workshop B	Local purchase
94-12201	Process control pannel	Shimadzu, φ300, control panel	11,712,000	06.04	Workshop B	Local purchase
94-12301	Sequence control pannel	Mitsubishi, sequenser, printer	3,000,000	06.04	Workshop B	Local purchase
94-12401	Sludge density meter	Central kagaku, ML-52	420,000	06.04	ES Lab.	Local purchase
94-12501	Incineration plant model	Work, 1000 X 800 X 700	2,968,000	06.04	ES Lab.	Local purchase

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89A00101	Slide projector	ELMO/252AF	241,300	90.04.30	Lecture R.	
89A00102	Slide projector	ELMO/252AF	241,300	04.30	Lecture R.	
89A00103	Slide projector	ELMO/252AF	241,300	04.30	Lecture R.	
89A00201	Overhead projector	ELMO/HP-A270	280,000	04.30	Lecture R.	
89A00202	Overhead projector	ELMO/HP-A270	280,000	04.30	Lecture R.	
89A00203	Overhead projector	ELMO/HP-A270	280,000	04.30	Lecture R.	
89A00301	Video projector	2VICTOR/HR-337MS, NV-G 500EM	1,594,750	04.30	Lecture R.	
89A00302	Video projector	2VICTOR/HR-337MS, NV-G 500EM	1,594,750	04.30	Lecture R.	
89A00401	16mm sound projector	ELMO/CX350	560,400	04.30	Lecture R.	
89A00501	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00502	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00503	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00504	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00505	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00506	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00507	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00508	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00509	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00510	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00511	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00512	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00513	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00514	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00515	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00516	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00517	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00518	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00519	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00520	Personal computer	ICM/XI Comp.	432,500	04.30	Comp. R.	
89A00601	Portable overhead projector	ELMO/HP-285P	122,800	04.30	Lecture R.	

List of The Equipment Donated by JICA Under Grant Aid

Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89A00701	Panel	Water supply system	185,900	90.04.30	Workshop C	
89A00702	Panel	Water purification	185,900	04.30	Workshop C	
89A00703	Panel	Pump	185,900	04.30	Workshop B	
89A00704	Panel	Pipe laying	185,900	04.30	Workshop A	
89A00705	Panel	Waste disposal	185,900	04.30	ES Lab.	
89A00706	Panel	wastewater disposal	185,900	04.30	ES Lab.	
89A00801	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00802	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00803	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00804	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00805	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00806	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00807	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00808	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00809	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00810	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00811	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00812	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00813	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00814	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00815	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00816	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00817	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00818	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00819	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89A00820	Curvimeter & planimeter	UCHIDA/880-0100	51,000	04.30	WQ Lab.	
89B00101	Stencil duplicator	GAKKEN/CPX-3030	1,000,800	04.30	Printing R.	
89B00201	Plate making machine	GAKKEN/ODX-2020	851,960	04.30	Printing R.	
89B00301	Paper cutter	GAKKEN/GOM-39M	510,600	04.30	Printing R.	
89B00401	Book binding machine	LIHIT/No. 1331	547,700	04.30	Printing R.	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89B00501	Photomicroscope	NIKON/YF-T	866,300	90.04.30	WQ Lab.	
89B00601	Video camera	VICTOR/GF450	266,100	04.30	Lecture R.	
89C10101	Table balance	A & D/FY-3000	100,000	04.30	WQ Lab.	
89C10102	Table balance	A & D/FY-3000	100,000	04.30	WQ Lab.	
89C10201	Top loading balance	A & D/FY-3020	138,300	04.30	WQ Lab.	
89C10202	Top loading balance	A & D/FY-3020	138,300	04.30	WQ Lab.	
89C10301	Analytical balance	SHIMADZU/AEU-210	327,100	04.30	WQ Lab.	
89C10302	Analytical balance	SHIMADZU/AEU-210	327,100	04.30	WQ Lab.	
89C10401	Rotally evaporator	YAMATO/RE-47A	230,600	04.30	WQ Lab.	
89C10402	Rotally evaporator	YAMATO/RE-47A	230,600	04.30	WQ Lab.	
89C10501	Spectrophotometer	SHIMADZU/UV-120	767,100	04.30	WQ Lab.	
89C10502	Spectrophotometer	SHIMADZU/UV-120	767,100	04.30	WQ Lab.	
89C10503	Spectrophotometer	SHIMADZU/UV-120	767,100	04.30	WQ Lab.	
89C10504	Spectrophotometer	SHIMADZU/UV-120	767,100	04.30	WQ Lab.	
89C10505	Spectrophotometer	SHIMADZU/UV-120	767,100	04.30	WQ Lab.	
89C10601	Atomic absorption spectrometer	SHIMADZU/AA-680	6,878,200	04.30	WQ Lab.	
89C10701	COD reflux apparatus	MIYAMOTO/CD-6	490,400	04.30	WQ Lab.	
89C10702	COD reflux apparatus	MIYAMOTO/CD-6	490,400	04.30	WQ Lab.	
89C10801	Nitrate nitrogen heating chamber	MIYAMOTO/CJ-2	418,300	04.30	WQ Lab.	
89C10901	Phenol distillation apparatus	MIYAMOTO/FR-2D	709,300	04.30	WQ Lab.	
89C10902	Phenol distillation apparatus	MIYAMOTO/FR-2D	709,300	04.30	WQ Lab.	
89C11001	pH meter	TOA/FM-30S	269,700	04.30	WQ Lab.	
89C11002	pH meter	TOA/FM-30S	269,700	04.30	WQ Lab.	
89C11003	pH meter	TOA/FM-30S	269,700	04.30	WQ Lab.	
89C11004	pH meter	TOA/FM-30S	269,700	04.30	WQ Lab.	
89C11005	pH meter	TOA/FM-30S	269,700	04.30	WQ Lab.	
89C11101	Gas chromatographic apparatus	SHIMADZU/GC-15A	5,826,500	04.30	WQ Lab.	
89C11201	Portable residual chlorine meter	ISOMURA/AC-1	123,100	04.30	WQ Lab.	
89C11202	Portable residual chlorine meter	ISOMURA/AC-1	123,100	04.30	WQ Lab.	
89C11203	Portable residual chlorine meter	ISOMURA/AC-1	123,100	04.30	WQ Lab.	

List of The Equipment Donated by JICA Under Grant Aid

Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89C11204	Portable residual chlorine meter	ISOMURA/AC-1	123,100	90.04.30	WQ Lab.	
89C11205	Portable residual chlorine meter	ISOMURA/AC-1	123,100	04.30	WQ Lab.	
89C11301	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11302	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11303	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11304	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11305	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11306	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11307	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11308	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11309	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11310	Thermometer	IKEDA	21,100	04.30	WQ Lab.	
89C11401	Turbidity meter	HACH/2100A	1,387,700	04.30	WQ Lab.	
89C11501	Conductivity meter	TOA/CM-5S	414,800	04.30	WQ Lab.	
89C11601	Do meter	TOA/DO-5B	622,200	04.30	WQ Lab.	
89C11701	Fluorine ion concentration meter	TOA/IM-40S	580,500	04.30	WQ Lab.	
89C11801	pH comparator	SUZUKEN	87,200	04.30	WQ Lab.	
89C11802	pH comparator	SUZUKEN	87,200	04.30	WQ Lab.	
89C11901	Portable water analysis kit	HACH/DRLL-1C	474,000	04.30	WQ Lab.	
89C12001	Ammonium ion distilling apparatus	MIYAMOTO/RW-1D	862,000	04.30	WQ Lab.	
89C12002	Ammonium ion distilling apparatus	MIYAMOTO/RW-1D	862,000	04.30	WQ Lab.	
89C12101	Kjeldahl nitrogen distilling apparatus	SANSHIN/SPECIAL	656,500	04.30	WQ Lab.	
89C12102	Kjeldahl nitrogen distilling apparatus	SANSHIN/SPECIAL	656,500	04.30	WQ Lab.	
89C12201	Aspirator	YAMATO/WP-15	63,800	04.30	WQ Lab.	
89C12202	Aspirator	YAMATO/WP-15	63,800	04.30	WQ Lab.	
89C12203	Aspirator	YAMATO/WP-15	63,800	04.30	WQ Lab.	
89C12204	Aspirator	YAMATO/WP-15	63,800	04.30	WQ Lab.	
89C12205	Aspirator	YAMATO/WP-15	63,800	04.30	WQ Lab.	
89C12301	Bioassay tank	SAKO KOBGEL/SPECIAL	2,194,000	04.30	WQ Lab.	
89C20101	Microscope	NIKON/TMS-PH-5	579,800	04.30	WQ Lab.	

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Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89C20102	Microscope	NIKON/TMS-PH-5	579,800	90.04.30	WQ Lab.	
89C20103	Microscope	NIKON/TMS-PH-5	579,800	04.30	WQ Lab.	
89C20104	Microscope	NIKON/TMS-PH-5	579,800	04.30	WQ Lab.	
89C20105	Microscope	NIKON/TMS-PH-5	579,800	04.30	WQ Lab.	
89C20201	Accessories for microscope	IKEDA	101,600	04.30	WQ Lab.	
89C20202	Accessories for microscope	IKEDA	101,600	04.30	WQ Lab.	
89C20203	Accessories for microscope	IKEDA	101,600	04.30	WQ Lab.	
89C20204	Accessories for microscope	IKEDA	101,600	04.30	WQ Lab.	
89C20205	Accessories for microscope	IKEDA	101,600	04.30	WQ Lab.	
89C20301	Colony counter	KAYAGAKI/CL-560	249,000	04.30	WQ Lab.	
89C20302	Colony counter	KAYAGAKI/CL-560	249,000	04.30	WQ Lab.	
89C20303	Colony counter	KAYAGAKI/CL-560	249,000	04.30	WQ Lab.	
89C20304	Colony counter	KAYAGAKI/CL-560	249,000	04.30	WQ Lab.	
89C20305	Colony counter	KAYAGAKI/CL-560	249,000	04.30	WQ Lab.	
89C20401	Stereoscopic microscope	NIKON/SMZ-1	128,100	04.30	WQ Lab.	
89C20402	Chemical storage cabinet	NIKON/SMZ-1	128,100	04.30	WQ Lab.	
89C30101	Water still	YAMATO/WG25, WAT3	1,815,600	04.30	WQ Lab.	
89C30201	Chemical storage cabinet	SANYO/MFR-510R	538,900	04.30	WQ Lab.	
89C30301	Toxic chemical storage cabinet	YAMATO/OC-119	32,800	04.30	WQ Lab.	
89C30401	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30402	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30403	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30404	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30405	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30406	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30407	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30408	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30409	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30410	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30411	Desiccator	TGK	48,400	04.30	WQ Lab.	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89C30412	Desiccator	TGK	48,400	90.04.30	WQ Lab.	
89C30413	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30414	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30415	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30416	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30417	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30418	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30419	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30420	Desiccator	TGK	48,400	04.30	WQ Lab.	
89C30501	Drying oven	YAMATO/DV-61	207,000	04.30	WQ Lab.	
89C30601	Hot plate	YAMATO/EK-41	77,400	04.30	WQ Lab.	
89C30602	Hot plate	YAMATO/EK-41	77,400	04.30	WQ Lab.	
89C30701	Shaker	YAMATO/SA-31	255,300	04.30	WQ Lab.	
89C30702	Shaker	YAMATO/SA-31	255,300	04.30	WQ Lab.	
89C30801	Water Bath	YAMATO/BT-23	1,502,000	04.30	WQ Lab.	
89C30901	Electric muffle furnace	YAMATO/FP-41	572,200	04.30	WQ Lab.	
89C31001	Oven for drying instrument	YAMATO/DG-81	295,600	04.30	WQ Lab.	
89C31101	Incubator (low temp.)	YAMATO/IN-81	497,100	04.30	WQ Lab.	
89C31201	Incubator	YAMATO/IS-81	441,700	04.30	WQ Lab.	
89C31202	Incubator	YAMATO/IS-81	441,700	04.30	WQ Lab.	
89C31301	Drying sterilizer	YAMATO/SG-81	612,300	04.30	WQ Lab.	
89C31401	Autoclave	YAMATO/SP-31	557,500	04.30	WQ Lab.	
89C31501	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31502	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31503	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31504	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31505	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31506	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31507	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31508	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	

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Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89C31509	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31510	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31511	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31512	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31513	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31514	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31515	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31516	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31517	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31518	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31519	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31520	Magnetic stirrer	YAMATO/M-21	10,900	04.30	WQ Lab.	
89C31601	Multi magnetic stirrer	YAMATO/M-66	95,700	04.30	WQ Lab.	
89C31602	Multi magnetic stirr	YAMATO/M-66	95,700	04.30	WQ Lab.	
89C31701	Centrifuge	KOKUSAN/H103N	274,900	04.30	WQ Lab.	
89C31702	Centrifuge	KOKUSAN/H103N	274,900	04.30	WQ Lab.	
89C31801	Ultrasonic cleaner	YAMATO/DHA-1000	746,000	04.30	WQ Lab.	
89C31901	Stabilizer for spectrometer	MATSUNAGA/SVC-2222	149,200	04.30	WQ Lab.	
89C31902	Stabilizer for spectrometer	MATSUNAGA/SVC-2222	149,200	04.30	WQ Lab.	
89C31903	Stabilizer for spectrometer	MATSUNAGA/SVC-2222	149,200	04.30	WQ Lab.	
89C31904	Stabilizer for spectrometer	MATSUNAGA/SVC-2222	149,200	04.30	WQ Lab.	
89C31905	Stabilizer for spectrometer	MATSUNAGA/SVC-2222	149,200	04.30	WQ Lab.	
89C32001	Ion exchanger	ORGANO/NA-1	238,800	04.30	WQ Lab.	
89C32101	Vacuum pump	YAMATO/PG-15	39,500	04.30	WQ Lab.	
89C32102	Vacuum pump	YAMATO/PG-15	39,500	04.30	WQ Lab.	
89C32201	Lab.wastewater treatment apparatus	YAMATO/EF-60	1,847,000	04.30	WQ Lab.	
89C32301	Ice machine	HISEOZAKI/F-120B	560,600	04.30	WQ Lab.	
89C40101	Hyroth type water sampler	RIGOSHA/No.5001	164,000	04.30	WQ Lab.	
89C40201	Water sampler	RIGOSHA	423,900	04.30	WQ Lab.	
89C40301	Bottom sludge sampler	RIGOSHA	151,500	04.30	WQ Lab.	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89C40401	Current meter	RIGOSHA/OM-1BN	372,900	90.04.30	WQ Lab.	
89C40501	Plankton net	RIGOSHA/No.5504A	64,000	04.30	WQ Lab.	
89C40502	Plankton net	RIGOSHA/No.5504A	64,000	04.30	WQ Lab.	
89C40601	Miscellaneous sampling equipment	TGK	707,700	04.30	WQ Lab.	
89C40701	Miscellaneous lab. equipment	TGK	2,888,500	04.30	WQ Lab.	
89C40801	Laboratory Glassware	TGK	6,485,600	04.30	WQ Lab.	
89C40901	Plastic ware & others	TGK	915,900	04.30	WQ Lab.	
89C41001	Filter paper	TGK	739,700	04.30	WQ Lab.	
89C50101	Chemicals	WAKO	1,741,400	04.30	WQ Lab.	
89C60101	Washing shelf	YAMATO/SMR-90	400,500	04.30	WQ Lab.	
89C60201	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60202	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60203	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60204	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60205	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60206	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60207	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60208	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60209	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60210	Stop watch	TGK	11,600	04.30	WQ Lab.	
89C60301	Plastic container	IKEDA	20,000	04.30	WQ Lab.	
89C60401	Lab. cart	YAMATO/SWC	96,800	04.30	WQ Lab.	
89C60501	Hand truck	IKEDA	17,600	04.30	WQ Lab.	
89C60601	Lab. tools	TGK	48,800	04.30	WQ Lab.	
89C60701	Lab. ware	PT TANGGUH KARYA JAYA	152,900	04.30	WQ Lab.	20 sets, Local purchase
89C60801	Glove	TGK	74,000	04.30	WQ Lab.	20 sets
89C60901	Aneroid Barometer	ISUZU	20,200	04.30	WQ Lab.	
89D00101	Sieve shaker with sieve	HEIKOH S/S/D-B	520,300	04.30	Workshop C	
89D00201	Sampling tube for filter sand	IKEDA/SPECIAL	96,900	04.30	Workshop C	
89D00202	Sampling tube for filter sand	IKEDA/SPECIAL	96,900	04.30	Workshop C	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89D00203	Sampling tube for filter sand	IKEDA/SPECIAL	96,900	90.04.30	Workshop C	
89D00204	Sampling tube for filter sand	IKEDA/SPECIAL	96,900	04.30	Workshop C	
89D00205	Sampling tube for filter sand	IKEDA/SPECIAL	96,900	04.30	Workshop C	
89D00301	Stainless measuring cup	IKEDA	24,000	04.30	Workshop C	20 sets
89D00401	Table balance	A & D/FY-3000	100,000	04.30	Workshop C	
89D00501	Top loading balance	A & D/FY-3020	133,800	04.30	Workshop C	
89D00601	Enameled tray	TGK	25,000	04.30	Workshop C	5 sets
89D00701	Evaporating dish	TGK	75,000	04.30	Workshop C	50 sets
89D00801	Magnetic stirrer	YAMATO/MD-41	44,700	04.30	Workshop C	
89D00802	Magnetic stirrer	YAMATO/MD-41	44,700	04.30	Workshop C	
89D00803	Magnetic stirrer	YAMATO/MD-41	44,700	04.30	Workshop C	
89D00804	Magnetic stirrer	YAMATO/MD-41	44,700	04.30	Workshop C	
89D00805	Magnetic stirrer	YAMATO/MD-41	44,700	04.30	Workshop C	
89D00901	Jar tester	SUGIYAMA-GEN/WT-6P	305,780	04.30	Workshop C	
89D00902	Jar tester	SUGIYAMA-GEN/WT-6P	305,780	04.30	Workshop C	
89D00903	Jar tester	SUGIYAMA-GEN/WT-6P	305,780	04.30	Workshop C	
89D00904	Jar tester	SUGIYAMA-GEN/WT-6P	305,780	04.30	Workshop C	
89D00905	Jar tester	SUGIYAMA-GEN/WT-6P	305,780	04.30	Workshop C	
89D01001	Filtrability test kit	IKEDA	349,300	04.30	Workshop C	
89D01101	Box shaker	IKEDA	331,700	04.30	Workshop C	
89D01201	Turbidity meter	HACH/2100A	1,387,700	04.30	Workshop C	
89D01301	Centrifuge	KOKUSAN/H103N	268,700	04.30	Workshop C	
89D01401	Drying oven	YAMATO/DV-61	189,600	04.30	Workshop C	
89D01501	pH meter	TOA/FM-30S	269,700	04.30	Workshop C	
89D01502	pH meter	TOA/FM-30S	269,700	04.30	Workshop C	
89D01503	pH meter	TOA/FM-30S	269,700	04.30	Workshop C	
89D01504	pH meter	TOA/FM-30S	269,700	04.30	Workshop C	
89D01505	pH meter	TOA/FM-30S	269,700	04.30	Workshop C	
89D01601	Water still	YAMATO/WA-73	1,424,000	04.30	Workshop C	
89D01701	Ultrasonic cleaner	YAMATO/DHA-1000	533,500	04.30	Workshop C	

List of The Equipment Donated by JICA Under Grant Aid.

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89D01801	Hand truck	TGK	14,200	90.04.30	Workshop C	
89D01901	Test tube support	IKEDA	35,200	04.30	Workshop C	4 sets
89D02001	Specific gravity meter	TOA KEIKI	60,900	04.30	Workshop C	
89D02002	Specific gravity meter	TOA KEIKI	60,900	04.30	Workshop C	
89D02101	Conductivity meter	TOA/CM-5S	322,800	04.30	Workshop C	
89D02201	Zeta potential measuring apparatus	NIKIBO/EP-MH	1,731,560	04.30	Workshop C	
89D02202	Zeta potential measuring apparatus	NIKIBO/EP-MH	1,731,560	04.30	Workshop C	
89D02203	Zeta potential measuring apparatus	NIKIBO/EP-MH	1,731,560	04.30	Workshop C	
89D02204	Zeta potential measuring apparatus	NIKIBO/EP-MH	1,731,560	04.30	Workshop C	
89D02205	Zeta potential measuring apparatus	NIKIBO/EP-MH	1,731,560	04.30	Workshop C	
89D02301	Ladder	PT TANGGUH	21,600	04.30	Workshop C	Local purchase
89D02401	Clock	TGK	10,400	04.30	Workshop C	2 sets
89D02501	Glassware	TGK	835,900	04.30	Workshop C	
89D02601	Water bath	YAMATO/BM-82	44,100	04.30	Workshop C	
89E10101	Oscilloscope	KENWOOD/CS-1100A	388,600	04.30	Workshop B	
89E10201	Portable DC pontentiometer	YOKOGAWA/2727-41	302,700	04.30	Workshop B	
89E10301	Standard resistor	YOKOGAWA/2794-04	132,800	04.30	Workshop B	
89E10401	Portable wheatstone bridge	YOKOGAWA/2755-97	117,600	04.30	Workshop B	
89E10501	Portable double bridge	YOKOGAWA/2769-10	216,300	04.30	Workshop B	
89E10601	Galvanometer	YOKOGAWA/2708-00	23,500	04.30	Workshop B	
89E10701	Portable standard voltmeter	YOKOGAWA/2713-18	330,400	04.30	Workshop B	
89E10801	Portable standard ammeter	YOKOGAWA/213-06	390,200	04.30	Workshop B	
89E10901	Portable volt ammeter	YOKOGAWA/2014-00	117,200	04.30	Workshop B	
89E10902	Portable volt ammeter	YOKOGAWA/2014-00	117,200	04.30	Workshop B	
89E11001	Portable frequency meter	YOKOGAWA/2038-31	29,150	04.30	Workshop B	
89E11002	Portable frequency meter	YOKOGAWA/2038-31	29,150	04.30	Workshop B	
89E11101	Portable standard wattmeter	YOKOGAWA/2041-90/T03	178,550	04.30	Workshop B	
89E11102	Portable standard wattmeter	YOKOGAWA/2041-90/T03	178,550	04.30	Workshop B	
89E11201	Portable power factor meter	YOKOGAWA/2039-90/T02	75,200	04.30	Workshop B	
89E11301	Insulation tester	YOKOGAWA/2404-13	38,800	04.30	Workshop B	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89E11401	Earth tester	YOKOGAWA/3235-01	56,000	90.04.30	Workshop B	
89E11501	Circuit tester	YOKOGAWA/2411-00	8,200	04.30	Workshop B	
89E11601	Clamp meter	YOKOGAWA/2499-01	32,800	04.30	Workshop B	
89E11701	Leakage current tester	YOKOGAWA/3226-10	70,500	04.30	Workshop B	
89E11801	Indicator/recorder	FUJI/PG6V 282-0	485,500	04.30	Workshop B	
89E11901	DC power supply unit	FUJI/PXJ30031	296,700	04.30	Workshop B	
89E12001	Converter	FUJI/PRDIF005-10001	209,300	04.30	Workshop B	
89E12101	Flow signal transmission	FUJI/FFC 34WD2-100Y	1,138,200	04.30	Workshop B	
89E12201	Electrical tools	HOZAN/S56	20,200	04.30	Workshop B	
89E20101	Vernier caliper	MITSUBUYO/530-108	20,200	04.30	Workshop B	
89E20102	Vernier caliper	MITSUBUYO/530-108	20,200	04.30	Workshop B	
89E20103	Vernier caliper	MITSUBUYO/530-108	20,200	04.30	Workshop B	
89E20104	Vernier caliper	MITSUBUYO/530-108	20,200	04.30	Workshop B	
89E20105	Vernier caliper	MITSUBUYO/530-108	20,200	04.30	Workshop B	
89E20201	Dial gauge	MITSUBUYO/2109-10W	22,300	04.30	Workshop B	
89E20301	Steel rule	SINWA	10,500	04.30	Workshop B	5 sets
89E20401	Surface plate	NABEYA/SP-10	10,600	04.30	Workshop B	
89E20501	Portable electric drill	HITACHI/D-6C	17,000	04.30	Workshop B	
89E20601	Portable engine pump	TERADA/ETS-4W	248,800	04.30	Workshop B	
89E20701	Surface gauge	NIIGATA/250	3,300	04.30	Workshop B	
89E20801	Square	RIKEN KEISOKI/132	173,800	04.30	Workshop B	
89E20901	Mechanical tool set	BANZAI/CU-601	572,000	04.30	Workshop B	
89E20902	Mechanical tool set	BANZAI/CU-601	572,000	04.30	Workshop B	
89E21001	Pump cut model	EBARA	2,116,100	04.30	Workshop B	
89E21101	Fire hydrant	EBARA	79,900	04.30	Workshop B	
89E21201	Valve cut model	EBARA	144,100	04.30	Workshop B	
89E21301	Vibration meter	RION/WM-24	258,600	04.30	Workshop B	
89E21401	Noise meter	RION/NA-20	209,300	04.30	Workshop B	
89F10101	Piping training materials	WATANABE PIPE	1,513,100	04.30	Workshop A	19 items
89F20101	Service pipes	WATANABE PIPE	256,500	04.30	Workshop A	6 items

List of The Equipment Donated by JICA Under Grant-Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89F30101	Pipe threading machine	ASADA	548,300	90.04.30	Workshop A	
89F30201	Pipe cutter	ASADA	230,300	04.30	Workshop A	
89F30202	Pipe cutter	ASADA	230,300	04.30	Workshop A	
89F30301	Pipe cutter for PVC pipe	ASADA	33,100	04.30	Workshop A	
89F30302	Pipe cutter for PVC pipe	ASADA	33,100	04.30	Workshop A	
89F30401	Gas welding machine	BANZAI	74,800	04.30	Workshop A	
89F30501	AC/DC arc welding machine	NATIONAL/YK306	479,500	04.30	Workshop A	
89F30601	Air compressor	HITACHI KOKI/BEBICON	108,800	04.30	Workshop A	
89F30701	Movable crane	OKUDAYA/OPC	2,900,400	04.30	Workshop A	
89F30801	Chain block	ZO/H-Z	85,400	04.30	Workshop A	
89F30901	Disk grinder	HITACHI KOKI/PDA-1000	47,200	04.30	Workshop A	
89F30901	Disk grinder	HITACHI KOKI/PDA-1000	47,200	04.30	Workshop A	
89F31001	Bench grinder	HITACHI KOKI/GBK-2	38,800	04.30	Workshop A	
89F31101	Pipe jointing tool	WATANABE PIPE	682,100	04.30	Workshop A	
89F31201	Pipe wrench	TEZUKA	17,900	04.30	Workshop A	
89F31301	Pipe skids	PT TANGGUH	15,000	04.30	Workshop A	
89F31401	Welding machine for PVC	ZENYA/NEW SUPER	71,800	04.30	Workshop A	
89F40101	Water meter testing equipment	KIMON/SPECIAL	4,049,100	04.30	Workshop A	
89F40201	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40202	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40203	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40204	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40205	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40206	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40207	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40208	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40209	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40210	Water meter	KIMON/OSX13	83,000	04.30	Workshop A	
89F40301	Portable water tester	KIMON/BS013	226,400	04.30	Workshop A	
89F40401	Water pressure gauge	FUJI TECOM	72,500	04.30	Workshop A	

Local purchase

List of The Equipment Donated by JICA Under Grant Aid

Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89F40402	Water pressure gauge	FUJI TECOM	72,500	04.30	Workshop A	
89F40403	Water pressure gauge	FUJI TECOM	72,500	04.30	Workshop A	
89F40404	Water pressure gauge	FUJI TECOM	72,500	04.30	Workshop A	
89F40405	Water pressure gauge	FUJI TECOM	72,500	04.30	Workshop A	
89F50101	Leak detector	FUJI TECOM/WL-200	312,600	04.30	Workshop A	
89F50102	Leak detector	FUJI TECOM/WL-200	312,600	04.30	Workshop A	
89F50103	Leak detector	FUJI TECOM/WL-200	312,600	04.30	Workshop A	
89F50104	Leak detector	FUJI TECOM/WL-200	312,600	04.30	Workshop A	
89F50105	Leak detector	FUJI TECOM/WL-200	312,600	04.30	Workshop A	
89F50201	Metallic pipe locator	FUJI TECOM/PL-801GX II	461,600	04.30	Workshop A	
89F50202	Metallic pipe locator	FUJI TECOM/PL-801GX II	461,600	04.30	Workshop A	
89F50203	Metallic pipe locator	FUJI TECOM/PL-801GX II	461,600	04.30	Workshop A	
89F50204	Metallic pipe locator	FUJI TECOM/PL-801GX II	461,600	04.30	Workshop A	
89F50205	Metallic pipe locator	FUJI TECOM/PL-801GX II	461,600	04.30	Workshop A	
89F50301	Non-metallic pipe locator	FUJI TECOM/PL-130	1,084,800	04.30	Workshop A	
89F50401	Water pressure gauge (Hydrant)	FUJI TECOM	16,800	04.30	Workshop A	
89F50402	Water pressure gauge (Hydrant)	FUJI TECOM	16,800	04.30	Workshop A	
89F50501	Portable flow meter	FUJI TECOM/PORTAFLOW	1,643,400	04.30	Workshop A	
89F50502	Portable flow meter	FUJI TECOM/PORTAFLOW	1,643,400	04.30	Workshop A	
89G00101	Bucket	PT TANGGUH KARYA JAYA	15,300	04.30	ES Lab.	10 sets, Local purchase
89G00201	Platform scale	YAMATO/FV-150/KAI/JP	96,400	04.30	ES Lab.	
89G00301	Table balance	A & D/FX-3000	100,000	04.30	ES Lab.	
89G00401	Tray	TGK	53,900	04.30	ES Lab.	10 sets
89G00501	Top loading balance	A & D/FX-3200	133,800	04.30	ES Lab.	
89G00601	Pulverizer	YOSHIDA S/S/1029J-C	741,600	04.30	ES Lab.	
89G00701	Electric muffle furnace	YAMATO/EP-41	551,500	04.30	ES Lab.	
89G00801	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00802	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00803	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00804	Desiccator	TGK	23,500	04.30	ES Lab.	

List of The Equipment Donated by JICA Under Grant Aid

Ref. No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89G00805	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00806	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00807	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00808	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00809	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00810	Desiccator	TGK	23,500	04.30	ES Lab.	
89G00901	Calorimeter	YOSHIDA S/S/1013H	2,266,900	04.30	ES Lab.	2 sets
89G01001	Thermometer	TGK	30,400	04.30	ES Lab.	
89G01101	Drying oven	YAMATO/DK-83	441,200	04.30	ES Lab.	
89G01201	C/N analyzer	YAMATO/MT-600	5,430,600	04.30	ES Lab.	
89G01301	S/CL analyzer	MITSUBISHI/TSX-10	4,194,100	04.30	ES Lab.	
89G01401	Hand truck	TGK	13,300	04.30	ES Lab.	
89G01501	Home composting apparatus	IKEDA	132,000	04.30	ES Lab.	10 sets
89G01601	Oxidation-reduction potential meter	meter A/EM-30S	308,700	04.30	ES Lab.	
89G01701	pH meter	TOA/EM-30S	134,850	90.04.30	ES Lab.	
89G01702	pH mete	TOA/EM-30S	134,850	04.30	ES Lab.	
89G01801	pH comparator	SUZUKEN	87,200	04.30	ES Lab.	
89G01802	pH comparator	SUZUKEN	87,200	04.30	ES Lab.	
89G01901	COD reflux apparatus	MIYAMOTO/CD-6	419,200	04.30	ES Lab.	
89G01902	COD reflux apparatus	MIYAMOTO/CD-6	419,200	04.30	ES Lab.	
89G02001	Incubator (low tem.)	YAMATO/IN-81	497,100	04.30	ES Lab.	250 sets
89G02101	BOD bottle	TGK	1,100,000	04.30	ES Lab.	100 sets
89G02201	DO bottle	TGK	140,000	04.30	ES Lab.	
89G02301	DO meter	TOA/DO-1B	480,000	04.30	ES Lab.	
89G02401	Transparency meter	TGK	63,500	04.30	ES Lab.	5 sets
89G02501	Water still	YAMATO/WA-73	1,424,000	04.30	ES Lab.	
89G02601	Magnetic stirrer	YAMATO/MD-41	50,700	04.30	ES Lab.	
89G02602	Magnetic stirrer	YAMATO/MD-41	50,700	04.30	ES Lab.	
89G02603	Magnetic stirrer	YAMATO/MD-41	50,700	04.30	ES Lab.	
89G02604	Magnetic stirrer	YAMATO/MD-41	50,700	04.30	ES Lab.	

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89G02605	Magnetic stirrer	YAMATO/MD-41	50,700	04.30	ES Lab.	
89G02701	Titration apparatus	TGK	66,200	04.30	ES Lab.	
89G02801	Laboratory glassware	IKEDA	1,344,300	04.30	ES Lab.	
89G02901	Helmet	PT TANGGUH KARYA JAYA	57,100	04.30	ES Lab.	20 sets, Local purchase
89G03001	Gloves	PT TANGGUH KARYA JAYA	26,500	04.30	ES Lab.	20 sets, Local purchase
89G03101	Boots	PT TANGGUH KARYA JAYA	61,200	04.30	ES Lab.	20 sets, Local purchase
89G03201	Belt conveyor	KOYO/RM/H40-5	650,800	04.30	ES Lab.	
89G03301	Tamper	SAKAI/EC08D	275,800	04.30	ES Lab.	
89G03401	Shovel	PT TANGGUH KARYA JAYA	9,200	04.30	ES Lab.	5 sets, Local purchase
89G03501	Wastewater treatment apparatus	KPE/SPECIAL	2,609,900	04.30	ES Lab.	
89G03502	Wastewater treatment apparatus	KPE/SPECIAL	2,609,900	04.30	ES Lab.	
89H00101	Microbus	ISUZU/TLD 56	2,592,100	04.30	Garage	Local purchase
89H00201	Jeep	DAIHATSU/TAFT GT	2,188,100	04.30	Garage	Local purchase
89H00202	Jeep	DAIHATSU/TAFT GT	2,188,100	04.30	Garage	Local purchase
89H00301	Garbage collection vehicle	FUJI SHARYO/PL-245	4,765,300	90.04.30	Garage	
89I00101	Bed	ROLAND/SPECIAL	1,258,600	04.30	Dormitory	84 sets, Local purchase
89I00201	Desk & chair for bed room	ROLAND/SPECIAL	9,418,000	04.30	Dormitory	84 sets, Local purchase
89I00301	Locker	ROLAND/SPECIAL	1,481,200	04.30	Dormitory	84 sets, Local purchase
89I00401	Dining table	ROLAND/SPECIAL	646,300	04.30	Dormitory	17 sets, Local purchase
89I00501	Desk & chair for exercise	ROLAND/SPECIAL	307,800	04.30	Workshop	12 sets, Local purchase
89I00601	Desk for computer room	ROLAND/SPECIAL	256,900	04.30	Computer R.	20 sets, Local purchase
89I00701	Chair	PT TANGGUH/SPECIAL	211,900	04.30	Lecture R.	70 sets, Local purchase
89I00801	Lecture table & chair	ROLAND/SPECIAL	327,800	04.30	Lecture R.	6 sets, Local purchase
89I00901	Desk & chair for lecture room	ROLAND/SPECIAL	967,700	04.30	Lecture R.	60 sets, Local purchase
89I01001	Working bench & chair	ROLAND/SPECIAL	855,000	04.30	Workshop	6 sets, Local purchase
89I01101	Working table	PT TANGGUH	57,900	04.30	Workshop	4 sets, Local purchase
89I01201	Table & chair for reading room	ROLAND	64,300	04.30	Library	4 sets, Local purchase
89I01301	Book shelf	ROLAND/CALEDONIA	310,400	04.30	Library	7 sets, Local purchase
89I01401	Cabinet	PT TANGGUH	723,800	04.30	Office	10 sets, Local purchase
89I01501	Steel shelf	PT TANGGUH	407,000	04.30	Office	5 sets, Local purchase

List of The Equipment Donated by JICA Under Grant Aid

Ref.No.	Items	Specifications	Price (¥)	Date	Place	Remarks
89I01601	Meeting table	ROLAND	589,600	04.30	Seminar R.	12 sets, Local purchase
89I01701	Meeting chair	PT TANGGUH	846,400	04.30	Seminar R.	24 sets, Local purchase
89I01801	White board	PT TANGGUH	86,400	04.30	Lecture R.	6 sets, Local purchase
89I01901	Folding chair for seminar room	ROLAND/HAA	234,500	04.30	Seminar R.	100sets, Local purchase
89I02001	Rostrum	ROLAND	57,900	04.30	Seminar R.	Local purchase
89I02101	AV rack & chair	PT TANGGUH/SPECIAL	116,800	04.30	Lecture R.	3 sets, Local purchase

Operation and Maintenance Conditions of The Equipment Donated by JICA Under Grant Aid
(Vehicles and the equipment amounting more than ¥1,600,000.)

Water Supply and Environmental sanitation Training Center, Bekasi Indonesia As of 1st of Sep. 1995

Year	Ref.No.	Items (model and specifications)	QTY	Place	Maintenance	Remarks
1989	89C10601	Atomic absorption spectrometer SHIMADZU/AA-680	1	WQ Lab.	A	
1989	89C11101	Gas chromatographic apparatus SHIMADZU/GC-15A	1	WQ Lab.	A	
1989	89C12301	Bioassay tank SAKO KOHGEI/SPECIAL	1	Workshop C	B	
1989	89C30101	Water still YAMATO/WG25, WAT3	1	WQ Lab.	A	
1989	89C32201	Laboratory wastewater treatment YAMATO/EF-60	1	WQ Lab.	A	
1989	89D02201	Zeta potential measuring apparatus NIKIBO/EP-ME	5	Workshop C	A	
1989	89E21001	Pump cutmodel EBARA	1	Workshop B	B	
1989	89F30701	Movable crane OKUDAYA/OPC	1	Workshop A	B	
1989	89F40101	Water meter testing equipment KIMON/SPECIAL	1	Workshop A	B	
1989	89F50501	Portable flow meter FUJI TECOM/PORTAFLOW	2	Workshop A	B	
1989	89G00901	Calorimeter YOSHIDA S/S/1013H	1	WQ Lab.	B	
1989	89G01201	C/N analyzer YAMATO/MT-600	1	ES Lab.	C	To be calibrated
1989	89G01301	S/CL analyzer MITSUBISHI/TSX-10	1	ES Lab.	C	To be calibrated
1989	89G03501	Wastewater treatment apparatus KPE/SPECIAL	2	WQ Lab.	B	
1989	89H00101	Microbus ISUZU/TLD 56	1	Garage	A	
1989	89H00201	Jeep DAIHATSU/TAFT GT	1	Garage	A	
1989	89H00202	Jeep DAIHATSU/TAFT GT	1	Garage	A	
1989	89H00301	Garbage collection vehicle FUJI SHARYO/PL-245	1	Garage	A	

Maintenance A : in good condition with regular inspection
 B : in operational condition without regular inspection
 C : not in good condition but operational
 D : not in operational condition

Operation and Maintenance Conditions of The Equipment Donated by JICA Under Grant Aid

(The equipment amounting more than ¥100,000. and less than ¥1,600,000.)

Water Supply and Environmental sanitation Training Center, Bekasi Indonesia

1. General

As of 1st of Sep. 1995

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89A00101	Slide projector	3	0	3	A	
1989	89A00201	Overhead projector	3	0	3	C	
1989	89A00301	Video projector	2	0	2	A	
1989	89A00401	16mm sound projector	1	0	1	A	
1989	89A00501	Personal computer	2	0	2	A	
1989	89A00601	Portable overhead projector	1	0	1	A	
1989	89A00701	Panel	6	0	6	B	
1989	89B00101	Stencil duplicator	1	0	1	B	
1989	89B00201	Plate making machine	1	0	1	B	
1989	89B00301	Paper cutter	1	0	1	B	
1989	89B00401	Book binding machine	1	0	1	B	
1989	89B00501	Photomicroscope	1	0	1	A	
1989	89B00601	Video camera	1	0	1	B	

Maintenance A : in good condition with regular inspection

B : in operational condition without regular inspection

C : not in good condition but operational

D : not in operational condition

2. Water Quality Laboratory

Year	Ref.No.	Items (model and specifications)	No. donated	No. scraped	No. exist	Maintenance	Remarks
1989	89C10101	Table balance	2	0	2	A	
1989	89C10201	Top loading balance	2	0	2	A	
1989	89C10301	Analytical balance	2	0	2	A	
1989	89C10401	Rotary evaporator	2	0	2	A	
1989	89C10501	Spectrophotometer	5	0	5	A	
1989	89C10701	COD reflux apparatus	2	0	2	A	
1989	89C10801	Nitrate nitrogen heating chamber	1	0	1	A	
1989	89C10901	Phenol distillation apparatus	2	0	2	B	
1989	89C11001	pH meter	5	0	5	A	
1989	89C11201	Portable residual chlorine meter	5	0	5	A	
1989	89C11401	Turbidity meter	1	0	1	A	
1989	89C11501	Conductivity meter	1	0	1	A	
1989	89C11601	Do meter	1	0	1	A	
1989	89C11701	Fluorine ion concentration meter	1	0	1	A	
1989	89C11901	Portable water analysis kit	1	0	1	A	
1989	89C12001	Ammonium ion distilling apparatus	2	0	2	A	
1989	89C12101	Kjeldahl nitrogen distilling apparatus	2	0	2	A	
1989	89C20101	Microscope	5	0	5	A	
1989	89C20201	Accessories for microscope	5	0	5	A	
1989	89C20301	Colony counter	5	0	5	A	
1989	89C20401	Stereoscopic microscope	2	0	2	A	
1989	89C30201	Chemical storage cabinet	1	0	1	A	
1989	89C30501	Drying oven	1	0	1	A	
1989	89C30701	Shaker	2	0	2	A	
1989	89C30801	Water bath	1	0	1	A	

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89C30901	Electric muffle furnace YAMATO/FP-41	1	0	1	A	
1989	89C31001	Oven for drying instrument YAMATO/DG-81	1	0	1	A	
1989	89C31101	Incubator (low temp.) YAMATO/IN-81	1	0	1	A	
1989	89C31201	Incubator YAMATO/IS-81	2	0	2	A	
1989	89C31301	Drying sterilizer YAMATO/SG-81	1	0	1	A	
1989	89C31401	Autoclave YAMATO/SP-31	1	0	1	A	
1989	89C31701	Centrifuge KOKUSAN/H108N	2	0	2	A	
1989	89C31801	Ultrasonic cleaner YAMATO/DHA-1000	1	0	1	A	
1989	89C31901	Stabilizer for spectrophotometer MATSUNAGA/SVC-2222	5	0	5	A	
1989	89C32001	Ion exchanger ORGANO/MA-1	1	0	1	A	
1989	89C32301	Ice machine HISHOZAKI/F-120B	1	0	1	A	

3. Water Purification Workshop

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89C40101	Hydroth type water sampler RIGOSHA/No. 5001	1	0	1	A	
1989	89C40201	Water sampler RIGOSHA	1	0	1	A	
1989	89C40301	Bottom sludge sampler RIGOSHA	1	0	1	A	
1989	89C40401	Current meter RIGOSHA/CM-1BN	1	0	1	A	
1989	89D00101	Sieve shaker with sieve HEIKOH S/S/D-B	1	0	1	A	
1989	89D00401	Table balance A & D/FY-3000	1	0	1	A	
1989	89D00501	Top loading balance A & D/FY-3020	1	0	1	A	
1989	89D00901	Jar tester SUGIYAMA-GEN/MT-6P	5	0	5	A	
1989	89D01001	Filtrability test kit IKEDA	1	0	1	A	

Year	Ref. No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89D01101	Box shaker	1	0	1	A	
1989	89D01201	Turbidity meter	1	0	1	A	
1989	89D01301	Centrifuge	1	0	1	A	
1989	89D01401	Drying oven	1	0	1	A	
1989	89D01501	pH meter	5	0	5	A	
1989	89D01601	Water still	1	0	1	A	
1989	89D01701	Ultrasonic cleaner	1	0	1	A	
1989	89D02101	Conductivity meter	1	0	1	A	

4. Mechanical and Electrical Workshop

Year	Ref. No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89E10101	Oscilloscope	1	0	1	A	
1989	89E10201	Portable DC potentiometer	1	0	1	A	
1989	89E10301	Standard resistor	1	0	1	A	
1989	89E10401	Portable wheatstone bridge	1	0	1	A	
1989	89E10501	Portable double bridge	1	0	1	A	
1989	89E10701	Portable standard voltmeter	1	0	1	A	
1989	89E10801	Portable standard ammeter	1	0	1	A	
1989	89E10901	Portable volt ammeter	2	0	2	A	
1989	89E11101	Portable standard wattmeter	2	0	2	A	
1989	89E11801	Indicator/recorder	1	0	1	A	
1989	89E11901	DC power supply unit	1	0	1	A	
1989	89E12001	Converter	1	0	1	A	

Year	Ref. No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89E12101	Flow signal transmission	1	0	1	A	
1989	89E20601	Portable enginee pump	1	0	1	A	
1989	89E20801	Square	1	0	1	A	
1989	89E20901	Mechanical tool set	2	0	2	A	
1989	89E21001	Pump cut model	1	0	1	B	
1989	89E21201	Valve cut model	1	0	1	B	
1989	89E21301	Vibration meter	1	0	1	B	
1989	89E21401	Noise meter	1	0	1	A	

5. Pipe Laying Workshop

Year	Ref. No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1989	89F30101	Pipe threading machine	1	0	1	A	
1989	89F30201	Pipe cutter	2	0	2	A	
1989	89F30501	AC/DC arc welding machine	1	0	1	A	
1989	89F30601	Air compressor	1	0	1	A	
1989	89F40301	Portable water tester	1	0	1	A	
1989	89F50101	Leak detector	5	0	5	A	
1989	89F50201	Metallic pipe locator	5	0	5	A	
1989	89F50301	Non-metallic pipe locator	1	0	1	A	

6. Environmental Sanitation Laboratory

Year	Ref.No.	Items (model and specifications)	No. donated	No. scraped	No. exist	Maintenance	Remarks
1989	89G00301	Table balance	1	0	1	A	
1989	89G00501	Top loading balance	1	0	1	A	
1989	89G00601	Pulverizer	1	0	1	A	
1989	89G00701	Electric muffle furnace	1	0	1	A	
1989	89G01101	Drying oven	1	0	1	A	
1989	89G01501	Home composting apparatus	1	0	1	A	
1989	89G01601	Oxidation-reduction potential meter	1	0	1	B	
1989	89G01701	pH meter	2	0	2	A	
1989	89G01901	COD reflux apparatus	2	0	2	A	
1989	89G02001	Incubator (low tem.)	1	0	1	A	
1989	89G02301	DO meter	1	0	1	A	
1989	89G02501	Water still	1	0	1	A	
1989	89G03201	Belt conveyor	1	0	1	B	
1989	89G03301	Tamper	1	0	1	B	

Maintenance A : in good condition with regular inspection
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 D : not in operational condition

Operation and Maintenance Conditions of The Equipment Donated by JICA
(Vehicles and the equipment amounting more than ¥1,600,000.)

As of 1st of Sep. 1995

Water Supply and Environmental sanitation Training Center, Bekasi Indonesia

Year	Ref.No.	Items (model and specifications)	Price (¥)	QTY	Place	Maintenance	Remarks
1991	91-10401	Vehicle	1,380,000	1	Garage	A	
1991	91-10402	Vehicle	1,380,000	1	Garage	A	
1991	91-10501	Mini bus	1,767,000	1	Garage	A	
1991	91-11401	Photocopy Machine	1,918,000	1	Expert Room	A	
1991	91-11501	Mini bus	4,698,000	1	Garage	A	
1991	91-11601	Dring Oven	4,275,000	1	ES Lab.	B	
1992	92-10101	Vehicle	1,846,000	1	Garage	A	
1992	92-11401	Leak noise correlator	4,119,000	1	Workshop B	B	
1992	92-12101	BOD Auto-measuring recorder	4,623,900	1	ES Lab.	C	
1992	92-12201	Microscope	1,902,500	1	ES Lab.	B	To be calibrated
1992	92-12301	TOC Analyzer	2,858,730	1	WQ Lab.	A	
1992	92-12401	Automatic sample injector	1,842,000	1	WQ Lab.	A	
1993	93-10101	Vehicle	2,400,000	1	Garage	A	
1993	93-10401	Leak noise correlator	4,444,000	1	Workshop A	C	
1993	93-10501	Cutmodel of dieselengine	1,805,000	1	Workshop B	B	
1993	93-10901	Industrial tester	2,221,000	1	Workshop B	B	
1993	93-11001	Gaschromatograph	5,714,000	1	WQ Lab.	A	
1993	93-11101	Ion chromatography	6,340,000	1	WQ Lab.	C	

Maintenance A : in good condition with regular inspection

B : in operational condition without regular inspection

C : not in good condition but operational

D : not in operational condition

Year	Ref.No.	Items (model and specifications)	Price(¥)	QTY	Place	Maintenance	Remarks
1994	94-10101	Vehicle	1,429,000	1	Garage	A	
1994	94-11201	Butter fly valve	2,825,100	1	Workshop A	A	
1994	94-11401	Mini water treatment plant	2,620,000	1	Workshop C	A	Newly installed
1994	94-11501	Oxydation ditch model	1,848,000	1	ES Lab.	A	
1994	94-11601	Weight bridge	5,358,000	1	ES Lab.	B	
1994	94-11701	Combined joint practice yard	3,008,000	1	Workshop A	A	
1994	94-11801	Electromagnetic flowmeter	7,191,000	1	Workshop A	A	
1994	94-11901	Experimental ozoniser	6,000,000	1	WQ Lab.	A	Newly installed
1994	94-12001	Motor performance tester	2,130,000	1	Workshop B	A	Newly installed
1994	94-12101	Electric valve control pannel	2,970,000	1	Workshop B	A	Newly installed
1994	94-12201	Process control pannel	11,712,000	1	Workshop B		Not installed
1994	94-12301	Sequence control pannel	3,000,000	1	Workshop B	A	Newly installed
1994	94-12501	Incineration plant model	2,968,000	1	ES Lab.	A	

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Operation and Maintenance Conditions of The Equipment Donated by JICA
(The equipment amounting more than ¥100,000. and less than ¥1,600,000.)

Water Supply and Environmental sanitation Training Center, Bekasi Indonesia

As of 1st of Sep. 1995

I. General

Year	Ref.No.	Items (model and specifications)	No. donated	No. scraped	No. exist	Maintenance	Remarks
1991	91-10601	Personal computer	1	0	1	A	
1991	91-10701	Printer	2	0	2	A	
1991	91-10901	LAN card	1	0	1	B	
1991	91-11001	Typewriter	1	0	1	A	
1991	91-11106	Software	1	0	1	B	
1991	91-11201	Personal computer	3	0	3	A	
1991	91-11301	Laser printer	2	0	2	A	
1991	91-11302	Laser printer	2	0	2	A	
1992	92-10301	Video projector	2	0	2	B	
1992	92-10401	Flat screen	2	0	2	B	
1992	92-10801	VTR/superbeta	2	0	2	B	
1992	92-10901	VTR/VHS	2	0	2	B	

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 D : not in operational condition

2. Water Quality Laboratory

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist.	Maintenance	Remarks
1992	92-11601	Digital current meter	2	0	2	B	
1992	92-11801	Micro tube pump	4	0	4	B	
1992	92-11901	Auto clave	1	0	1	B	
1992	92-12901	IC removal set	1	0	1	A	
1992	92-13101	Adsorption gas purifier	1	0	1	A	
1993	93-10201	Turbidity meter	1	0	1	B	
1993	93-10301	Field analysis kit	1	0	1	B	
1993	93-10701	Water sampler	1	0	1	B	
1993	93-11801	Water sampler	1	0	1	B	
1993	93-12401	Atomic absorption lamp	1	0	1	A	To be calibrated
1993	93-12501	Auto flow cell	1	0	1	A	
1993	93-12502	Printer for auto flow cell	1	0	1	A	

Maintenance A : in good condition with regular inspection
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 C : not in good condition but operational
 D : not in operational condition

3. Pipe Laying Workshop

Year	Ref.No.	Items (model and specifications)	No. donated	No. scraped	No. exist	Maintenance	Remarks
1992	92-11201	Leak noise detector	1	0	1	A	
1992	92-11301	Water pressure recorder	5	0	5	A	
1993	93-10501	Non-metarric pipe locator	3	0	3	A	
1993	93-11501	Sound bar	3	0	3	A	
1993	93-11601	Box locator	3	0	3	A	
1993	93-11901	Water volume check system	1	0	1	B	
1993	93-12001	Ventury meter	1	0	1	B	
1993	93-12101	Closer joint	1	0	1	B	
1993	93-12102	Closer joint	1	0	1	B	
1993	93-12103	Flexible pipe joint	1	0	1	B	
1993	93-12104	Buffer joint	1	0	1	B	
1993	93-12201	Water supply system pannel	1	0	1	B	
1994	94-10601	Soft seal valve	5	0	5	B	
1994	94-10701	Hydrant	3	0	3	B	
1994	94-10801	Air valve	3	0	3	B	
1994	94-11001	Water pipe coating sample	1	0	1	B	epoxy & polyethylene
1994	94-11002	Water pipe coating sample	1	0	1	B	epoxy & asphalt
1994	94-11101	Welded pipe coating sample	1	0	1	B	Plastic tape
1994	94-11102	Welded pipe coating sample	1	0	1	B	Heat contractile tube

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 B : in operational condition without regular inspection
 C : not in good condition but operational
 D : not in operational condition

4. Mechanical and Electrical Workshop

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1992	92-10201	End suction pump Ebara 50×40 FS9H5.75	2	0	2	B	
1992	92-12001	Hydro pump cut model Ebara 50DL 5.4	1	0	1	B	
1992	92-12002	Hydro pump cut model Ebara 80BHS25 3.7	1	0	1	B	
1993	93-10801	DP tester Shimadzu, DPC-203	1	0	1	A	

5. Environmental Sanitation Laboratory

Year	Ref.No.	Items (model and specifications)	No. donated	No. scrapped	No. exist	Maintenance	Remarks
1992	92-11501	Septic tank 1:20	1	0	1	B	
1992	92-11502	Pit ratrine 1:20	1	0	1	B	
1992	92-11503	Sumur resapan 1:20	1	0	1	B	
1992	92-11504	Pit ratrine & sumur resapan 1:1	1	0	1	B	
1993	93-11701	Sanitary landfill model 100 × 100 × 50	1	0	1	B	
1993	93-12301	Jokaso model Gappel-type	1	0	1	B	
1993	93-12701	Night soil treatment pannel 100 × 200	1	0	1	B	
1994	94-11301	Field analysis kit HACH, DR/2000	1	0	1	B	
1994	94-11302	Field analysis kit Millipore, XX63 001 50	1	0	1	B	
1994	94-12401	Sludge density meter Central kagaku, ML-52	1	0	1	B	No manual

Maintenance A : in good condition with regular inspection
 B : in operational condition without regular inspection
 C : not in good condition but operational
 D : not in operational condition

8 サブコースカリキュラム

SYLLABUS/CURRICULUM

Course title: Water Supply Master Planning

Course code: WS-A

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total	
1. Introduction	1.1 History of water supply and its future	WS-A01	(6)	(0)	(6)	
	1.2 Objectives of water supply	WS-A02	2	0	2	
	1.3 Water supply and public health	WS-A03	2	0	2	
2. Master planning (Engineering aspect)	2.1 Procedure of water supply master planning	WS-A04	(18)	(10)	(28)	
		WS-A05	2	1	3	
		WS-A06	2	1	3	
	2.2 Service area	WS-A07	2	0	2	
	2.3 Basic statistical analysis	WS-A08	2	2	4	
	2.4 Population forecasting	WS-A09	2	2	4	
	2.5 Water demand forecasting	WS-A10	2	1	3	
	2.6 Water source	WS-A11	2	1	3	
	2.7 Selection of treatment process	WS-A12	2	1	3	
	2.8 Selection of distribution systems					
	2.9 Hydraulics of water supply		(11)	(13)	(24)	
	3. Master planning (Financial aspect)	3.1 Cost and revenue estimation	WS-A13	2	2	4
		3.2 Least cost analysis	WS-A14	2	2	4
		3.3 Project scale and schedule	WS-A15	2	2	4
		3.4 Unaccounted-for water	WS-A16	2	2	4
		3.5 Financial planning	WS-A17	3	5	8
	4. Project/Executive planning	4.1 Appropriate technology	WS-A18	(11)	(11)	(22)
4.2 Basic design of water source facilities		WS-A19	2	0	2	
4.3 Basic design of water treatment plant		WS-A20	2	1	3	
4.4 Basic design of water distribution facilities		WS-A21	1	2	3	
4.5 Feasibility study		WS-A22	4	8	12	
			2	0	2	

Water Supply Master Planning (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
5. Project implementation and others	5.1 Management of project implementation	WS-A23	(15)	(5)	(20)
	5.2 Management of project control	WS-A24	2	0	2
	5.3 Process management (Schedule management)	WS-A25	4	2	6
	5.4 Organization of water supply enterprise	WS-A26	2	0	2
	5.5 Personnel management	WS-A27	2	1	3
	5.6 Project Evaluation	WS-A28	2	2	4
6. Others	6.1 Opening/Closing ceremony		3	0	3
	6.2 Pre-test/Post test		(0)	(6)	(6)
			0	3	3
			0	3	3
Total			(61)	(45)	(106)

SYLLABUS/CURRICULUM

Course title: Water Supply Management

Course code: WS-D

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Concept of management	1.1 Role of manager	WS-D01	(3)	(0)	(3)
	1.2 Basis of management	WS-D02	2	0	2
2. Planning of management	2.1 Planning - Importance and progress -	WS-D03	1	0	1
	2.2 Case study : Planning of management	WS-D04	(2)	(4)	(6)
3. Organizational behavior	3.1 Groups in organization	WS-D05	2	0	2
	3.2 Types of organizational structure of PDAM	WS-D06	1	0	1
4. Concept of services in water supply	3.3 Decision making	WS-D07	2	0	2
	3.4 Motivation, leadership and communication	WS-D08	4	0	4
5. Concept and strategy of financial management of PDAM	3.5 Case study : Organizational behavior	WS-D09	0	4	4
	4.1 Concept of service in water works	WS-D10	(6)	(2)	(8)
6. Concept and strategy of financial management of PDAM	4.2 Marketing management	WS-D11	2	0	2
	4.3 Management information system	WS-D12	2	0	2
7. Concept and strategy of financial management of PDAM	4.4 Case study : Concept of services in water supply	WS-D13	0	2	2
	5.1 General principles of financial management for PDAM	WS-D14	(12)	(6)	(18)
8. Concept and strategy of financial management of PDAM	5.2 Role of PDAM as public utility of local government	WS-D15	2	0	2
	5.3 Concept and strategy of financial plan and budget management	WS-D16	2	0	2
9. Concept and strategy of financial management of PDAM	5.4 Concept and strategy of tariff planning	WS-D17	3	0	3
	5.5 Ratio analysis in PDAM financial report	WS-D18	2	0	2
10. Concept and strategy of financial management of PDAM	5.6 Internal audit (SPI) function on PDAM	WS-D19	2	0	2
			1	0	6

Water Supply Management (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Work improvement	5.7 Case study : Concept and strategy of financial management of PDAM)	WS-D20	0	6	6
	6.1 Japanese management	WS-D21	(6)	(10)	(16)
	6.2 Techniques of work improvement	WS-D22	4	0	4
	6.3 Field trip	WS-D23	2	0	2
7. Developing of human resources	6.4 Case study : Work improvement	WS-D24	0	8	8
	7.1 Human resources development management	WS-D25	0	2	2
	7.2 Management by objectives	WS-D26	(6)	(5)	(11)
	7.3 Concept of OJT	WS-D27	2	0	2
8. Special lecture	7.4 Case study : Developing of human resources	WS-D28	2	0	2
	8.1 Special lecture		0	5	5
9. Others	8.2 Discussion		(1)	(2)	(3)
	9.1 Opening/Closing ceremony		1	0	1
	9.2 Pre-test/Post test		0	2	2
			0	(4)	(4)
			0	2	2
			0	2	2
Total			45	37	82

SYLLABUS/CURRICULUM

Course title: Water Treatment Facilities Design

Course code: WS-B

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(10)	(0)	(10)
	1.1 Outline of water supply system	WS-801	2	0	2
	1.2 Treatment objectives and water quality standards	WS-802	2	0	2
	1.3 Water demand and capacity of water treatment plant	WS-803	2	0	2
	1.4 Raw water and treatment system	WS-804	2	0	2
	1.5 Technical guidance of water supply facilities in Indonesia	WS-805	2	0	2
2. Design of water treatment facilities			(36)	(0)	(36)
	2.1 Intake facilities	WS-806	2	0	2
	2.2 Coagulation and flocculation basin	WS-807	6	0	6
	2.3 Sedimentation basin	WS-808	6	0	6
	2.4 Filtration facilities	WS-809	6	0	6
	2.5 Chemicals and chemical handling facilities	WS-810	3	0	3
	2.6 Disinfection facilities	WS-811	3	0	3
	2.7 Packaged treatment facilities	WS-812	4	0	4
	2.8 Iron and manganese removal facilities	WS-813	2	0	2
	2.9 Solids handling, disposal, and recovery	WS-814	2	0	2
	2.10 Instrumentation for monitoring and control	WS-815	2	0	2
3. Design practices			(0)	(54)	(54)
	3.1 Capacity of treatment facilities	WS-816	0	2	2
	3.2 Receiving well	WS-817	0	2	2
	3.3 Coagulant feeding facilities	WS-818	0	4	4
	3.4 Coagulation/Flocculation basin	WS-819	0	8	8
	3.5 Chemical sedimentation	WS-820	0	8	8
	3.6 Rapid sand filter	WS-821	0	8	8
	3.7 Disinfection facilities	WS-822	0	3	3

Water Treatment Facilities Design (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
3.8	Clear water reservoir and pumping station	WS-B23	0	4	4
	Layout and water level of water treatment facilities	WS-B24	0	3	3
	Slow sand filter	WS-B25	0	4	4
	Iron and manganese removal facilities	WS-B26	0	2	2
	Solids handling and disposal	WS-B27	0	2	2
	Summary of practices and drawing	WS-B28	0	4	4
4. Presentation and discussion	4.1 Report preparation		(0)	(10)	(10)
	4.2 Presentation and discussion		0	4	4
5. Field trip			0	6	6
	5.1 Field trip		(0)	(8)	(8)
6. Others			0	8	8
	6.1 Opening/Closing ceremony		(0)	(4)	(4)
	6.2 Pre-test/Post test		0	2	2
			0	2	2
Total			46	76	122

SYLLABUS/CURRICULUM

Course title: Distribution System Planning & Design

Course code: WS-C

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction	1.1 Planning of water supply facilities	WS-C01	(16)	(0)	(16)
	1.2 Planned amount of water distribution	WS-C02	2	0	2
	1.3 Leakage prevention,	WS-C03	2	0	2
	1.4 Hydraulics I	WS-C04	4	0	4
	1.5 Hydraulics II	WS-C05	2	0	2
	1.6 Maps, Drawing, and Records	WS-C06	2	0	2
	1.7 Cost estimation	WS-C07	2	0	2
2. Design and installation of pipeline	2.1 Distribution pipe	WS-C08	(12)	(0)	(12)
	2.2 Design and installation of pipeline	WS-C09	2	0	2
	2.3 Corrosion resistance of pipe materials	WS-C10	4	0	4
	2.4 Design and installation of valve	WS-C11	3	0	3
3. Distribution network planning	3.1 Network analysis using cross method	WS-C12	3	0	3
	3.2 Network analysis by computer (I)	WS-C13	(4)	(26)	(30)
	3.3 Network analysis by computer (II)	WS-C14	4	0	4
4. Design of pumping facilities and water storage	4.1 Pumping facilities	WS-C15	0	14	14
	4.2 Water storage facilities	WS-C16	0	12	12
	4.3 Water hammering	WS-C17	(11)	(0)	(11)
5. Design practice	5.1 Case study I		4	0	4
	5.2 Case study II		4	0	4
			3	0	3
			(0)	(19)	(19)
			0	3	3
			0	8	8

Distribution System Planning & Design (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Field visit	5.3 Case study III		0	8	8
	6.1 Field visit		(0)	(8)	(8)
7. Presentation and discussion	7.1 Report preparation		0	8	8
	7.2 Presentation and discussion		(0)	(8)	(8)
8. Others)			0	2	2
			0	6	6
	(6)		(0)	(6)	
	8.1 Opening/Closing ceremony		0	3	3
	8.2 Pre-test/Post test		0	3	3
Total			45	67	112

SYLLABUS/CURRICULUM

Course title: Water Purification
 Course code: WS-F

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(11)	(0)	(11)
	1.1 Regulation on water supply	WS-F01	2	0	2
	1.2 Organization of water enterprise	WS-F02	2	0	2
	1.3 Water supply and public health	WS-F03	2	0	2
	1.4 Accident and first aid	WS-F04	1	0	1
	1.5 Water quality standard	WS-F05	2	0	2
	1.6 Water resources and quality	WS-F06	2	0	2
2. Theory and principle of water purification			(18)	(0)	(18)
	2.1 Hydraulic aspect of water purification	WS-F07	2	0	2
	2.2 Introduction of water purification system	WS-F08	2	0	2
	2.3 Principle of rapid sand filtration system	WS-F09	2	0	2
	2.4 Principle of slow sand filtration system	WS-F10	4	0	4
	2.5 Principle of aeration	WS-F11	2	0	2
	2.6 Principle of disinfection	WS-F12	2	0	2
	2.7 Principle of neutralization (pH adjustment)	WS-F13	2	0	2
	2.8 Introduction of sludge treatment	WS-F14	2	0	2
3. Operation and maintenance of intake facilities			(5)	(0)	(5)
	3.1 Operation and maintenance of river and reservoir water intake facilities	WS-F15	3	0	3
	3.2 Operation and maintenance of groundwater intake facilities	WS-F16	2	0	2
4. Operation and maintenance of conveyance facilities			(4)	(0)	(4)
	4.1 Operation and maintenance of conveyance conduit	WS-F17	2	0	2
	4.2 Operation and maintenance of clear water well and distribution reservoir	WS-F18	2	0	2

Water Purification (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
5. Operation and maintenance of rapid sand filtration system			(9)	(2)	(11)
5.1 Operation and maintenance of receiving well		WS-F19	1	0	1
5.2 Operation and maintenance of mixing and flocculation basin		WS-F20	2	0	2
5.3 Operation and maintenance of sedimentation basin		WS-F21	2	0	2
5.4 Operation and maintenance of solid contact clarifier		WS-F22	2	0	2
5.5 Operation and maintenance of rapid sand filter		WS-F23	2	0	2
5.6 Case study: O & M of rapid sand filtration		WS-F24	0	2	2
6. Operation and maintenance of slow sand filtration system			(4)	(2)	(6)
6.1 Operation and maintenance of presedimentation basin		WS-F25	2	0	2
6.2 Operation and maintenance of slow sand filter		WS-F26	2	0	2
6.3 Case study: O & M of slow sand filtration		WS-F27	0	2	2
7. Operation and maintenance of special treatment facilities			(6)	(0)	(6)
7.1 Operation and maintenance of Fe and Mn removal facilities		WS-F28	2	0	2
7.2 Operation and maintenance of color removal facilities		WS-F29	2	0	2
7.3 Operation and maintenance of other special treatment facilities		WS-F30	2	0	2
8. Operation and maintenance of chemical feeding facilities			(6)	(2)	(8)
8.1 Operation and maintenance of coagulant and coagulant and feeding facilities		WS-F31	2	0	2
8.2 Operation and maintenance of pH control chemical feeding facilities		WS-F32	2	0	2
8.3 Operation and maintenance of disinfectant feeding facilities		WS-F33	2	0	2
8.4 Case study (1): O & M of chemical feeding facilities		WS-F34	0	1	1
8.5 Case study (2): O & M of disinfection facilities		WS-F35	0	1	1

Water Purification (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
9. Record and report	9.1 Record keeping and reporting of operation and maintenance of water purification facilities	WS-F36	(2)	(0)	(2)
10. Water purification practice	10.1 Structure of mini purification plant	WS-E37	2	0	2
	10.2 Jar-test and pH control	WS-E38	(0)	(27)	(27)
	10.3 Disinfection	WS-E39	0	8	8
	10.4 Mini purification plant operation	WS-E40	0	8	8
	11. Field trip	11.1 Field trip		0	3
12. Presentation and discussion			0	8	8
			(0)	(8)	(8)
13. Others	12.1 Report preparation		0	8	8
	12.2 Presentation and discussion		(0)	(12)	(12)
	13.1 Opening/Closing ceremony		0	2	2
	13.2 Pre-test/Post test		0	10	10
			(0)	(6)	(6)
			0	4	4
			0	2	2
Total			65	59	124

SYLLABUS/CURRICULUM

Course title: Water Quality Control
 Course code: WS-E

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction	1.1 Water supply and public health	WS-E01	(9)	(0)	(9)
	1.2 Chemistry for water quality control	WS-E02	1	0	1
	1.3 Water quality standards	WS-E03	4	0	4
	1.4 Regulation on water supply	WS-E04	2	0	2
2. Quality control and surveillance in water sources	2.1 River water quality control and surveillance	WS-E05	2	(0)	(6)
	2.2 Reservoir water quality control and surveillance	WS-E06	2	0	2
	2.3 Groundwater quality control and surveillance	WS-E07	2	0	2
3. Quality control in water supply facilities	3.1 Quality control in rapid sand filtration system	WS-E08	(13)	(0)	(13)
	3.2 Quality control in slow sand filtration system	WS-E09	3	0	3
	3.3 Quality control in disinfection process	WS-E10	2	0	2
	3.4 Quality control in special treatment processes	WS-E11	2	0	2
	3.5 Tap water quality monitoring	WS-E12	2	0	2
	3.6 Countermeasures for emergency cases	WS-E13	2	0	2
4. General knowledge of water quality analysis	4.1 Classification and principle of water quality analysis	WS-E14	(12)	(0)	(12)
	4.2 Laboratory apparatus, reagents and techniques	WS-E15	3	0	3
	4.3 Sampling and preservation of water sample	WS-E16	3	0	3
	4.4 Basic and applied statistics	WS-E17	2	0	2
	4.5 Precision and accuracy of analytical data	WS-E18	3	0	3
5. Analytical methods of water quality	5.1 Physico-chemical analysis	WS-E19	1	0	1
	5.2 Bio-chemical analysis	WS-E20	(9)	(0)	(9)
	5.3 Microbiological analysis	WS-E21	5	0	5
			2	0	2
			2	0	2

Water Quality Control (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Practice of water quality analysis	6.1 Physico-chemical parameters	WS-E22	(0)	(71)	(71)
	6.2 Bio-chemical parameters	WS-E23	0	27	27
	6.3 Microbiological parameters	WS-E24	0	30	30
7. Water purification practice	7.1 Jar-test and pH control	WS-E25	(0)	14	14
	7.2 Disinfection	WS-E26	(0)	(16)	(16)
	7.3 Mini purification plant operation	WS-E27	0	6	6
8. Field trip	8.1 Field trip		0	2	2
			0	8	8
9. Presentation and discussion	9.1 Report preparation		(0)	(8)	(8)
	9.2 Presentation and discussion		0	8	8
10. Others	10.1 Opening/Closing ceremony		(0)	(10)	(10)
	10.2 Pre-test/ Post test		0	2	2
			0	(4)	(4)
			0	2	2
			0	2	2
Total			49	109	158

SYLLABUS/CURRICULUM

Course title: Pipe Laying
 Course code: WS-1

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(5)	(6)	(11)
	1.1 Scope of pipe laying	WS-101	1	0	1
	1.2 Outline of water supply facilities	WS-102	2	0	2
	1.3 Basic hydraulics in pipe laying	WS-103	2	6	8
2. Planning & design of pipe laying			(12)	(4)	(16)
	2.1 Types and characteristics of pipes	WS-104	1	0	1
	2.2 Preparatory survey	WS-105	1	0	1
	2.3 Selection of pipe diameter	WS-106	2	0	2
	2.4 Selection of pipe	WS-107	2	0	2
	2.5 Foundation & escapement prevention	WS-108	2	4	6
	2.6 Causes of corrosion & countermeasures	WS-109	2	0	2
	2.7 Pipeline drawing	WS-110	2	0	2
3. Construction management of pipe laying			(13)	(0)	(13)
	3.1 Schedule control	WS-111	2	0	2
	3.2 Quality control and inspection	WS-112	2	0	2
	3.3 Safety control	WS-113	2	0	2
	3.4 Administrative procedures of pipe laying	WS-114	2	0	2
	3.5 Water pressure test	WS-115	3	0	3
	3.6 Earth work & temporary work	WS-116	2	0	2
4. Pipe laying and pipe connection			(7)	(4)	(11)
	4.1 Ductile pipe	WS-117	2	0	2
	4.2 Steel pipe	WS-118	2	0	2
	4.3 PVC, Asbest pipes	WS-119	1	0	1
	4.4 Suspension and injection of water	WS-120	2	4	6
5. Special works			(4)	(0)	(4)
	5.1 Aqueduct bridge and inverted siphone	WS-121	2	0	2
	5.2 Non-excavation method & non-suspension valve method	WS-122	2	0	2

Pipe Laying (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Service installations.	6.1 Outline of service installations.	WS-123	(12)	(8)	(20)
	6.2 Design of service installations	WS-124	2	0	2
	6.3 Execution of installation work	WS-125	2	4	6
	6.4 Administrative procedure of service installations	WS-126	2	0	2
	6.5 Water meter management	WS-127	2	4	6
	6.6 Service ledger and drawing management	WS-128	2	0	2
7. Presentation and discussion	7.1 Discussion : Current problems in PDAMs in connection with pipe laying		(0)	(10)	(10)
	7.2 Report preparation	WS-129 WS-130	0 0	6 4	6 4
8. Practice of pipe laying	8.1 Pipe laying of DIP 100 mm	WS-131	(0)	(22)	(22)
	8.2 Combined bend of DIP 400 mm	WS-132	0	4	4
	8.3 Branching with saddle	WS-133	0	2	2
	8.4 Pipe connection of PE, PVC, GI, ACP	WS-134	0	12	12
9. Field trip	9.1 Field trip		(0)	(8)	(8)
10. Others	10.1 Opening/Closing ceremony		0	8	8
	10.2 Pre-test/Post test		(0)	(4)	(4)
			0	2	2
			0	2	2
Total			53	66	119

SYLLABUS/CURRICULUM

Course title: Pipeline Maintenance
 Course code: WS-J

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction					
	1.1 General of pipeline maintenance	WS-J01	(8)	(6)	(14)
	1.2 Outline of water supply facilities	WS-J02	2	0	2
	1.3 Basic knowledge of pipeline	WS-J03	2	0	2
	1.4 Basic hydraulics of pipeline	WS-J04	2	0	2
2. Pipeline data management					
	2.1 Drawing management	WS-J05	(4)	(0)	(4)
	2.2 Analysis of distributed water	WS-J06	2	0	2
3. Activities of maintenance sector					
	3.1 Inspection and maintenance of distribution facilities	WS-J07	(8)	(6)	(14)
	3.2 Operation of waterworks facilities	WS-J08	2	0	2
	3.3 Water quality control in pipeline	WS-J09	2	6	8
	3.4 Management organization for pipeline	WS-J10	2	0	2
4. Evaluation and rehabilitation of pipelines					
	4.1 Rehabilitation plan of pipeline	WS-J11	(16)	(7)	(23)
	4.2 Evaluation of pipeline condition	WS-J12	4	0	4
	4.3 Evaluation of asbest cement pipe	WS-J13	2	0	2
	4.4 Corrosion of pipeline and countermeasures against corrosion	WS-J14	2	0	2
	4.5 Renewal of service pipe	WS-J15	2	4	6
	4.7 Water meter management	WS-J16	2	0	2
	4.7 Pipe lining	WS-J17	1	0	1
	4.8 Pipe-in-pipe and hose-lining	WS-J18	1	0	1
5. Countermeasures against accident					
	5.1 Countermeasures against pipeline accidents	WS-J19	(4)	(0)	(4)
	5.2 Restoration works after pipeline accidents	WS-J20	2	0	2
			2	0	2

Pipeline Maintenance (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Leakage control	6.1 Introduction to leak survey	WS-J21	(6)	(19)	(25)
	6.2 Data for leak survey	WS-J22	2	0	2
	6.3 Method and planning of leak survey and necessary equipment	WS-J23	2	0	2
	6.4 Workshop: Explanation of equipments	WS-J24	0	3	3
	6.5 Practice: Leak yard training	WS-J25	0	16	16
7. Advanced system for pipeline maintenance	7.1 Improvement of advanced maintenance system	WS-J26	(4)	(0)	(4)
	7.2 Block distribution system in P D A M	WS-J27	2	0	2
8. Presentation and discussion	8.1 Leak control in PAMJAYA	WS-J28	0	4	4
	8.2 Discussion: Current problems in PDAMs in connection with pipeline maintenance	WS-J29	0	8	8
9. Field trip	8.1 Field trip		(0)	(12)	(12)
	8.2 Report preparation		0	9	9
10. Others	9.1 Opening/Closing ceremony		0	3	3
	9.2 Pre-test/Post test		(0)	(4)	(4)
			0	2	2
			0	2	2
Total			50	54	104

SYLLABUS/CURRICULUM

Course title: Leakage Control
 Course code: WS-K

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction	1.1 Outline of water supply facilities	WS-K01	(6)	(0)	(6)
	1.2 Basic knowledge on pipeline and hydraulics	WS-K02	2	0	2
	1.3 Introduction of leak survey	WS-K03	2	0	2
2. Basic knowledge for leak survey	2.1 Sound from leak	WS-K04	(14)	(0)	(14)
	2.2 Cause of leak	WS-K05	2	0	2
	2.3 Measurement of leak amount	WS-K06	2	0	2
	2.4 Arrangement and application of leak survey record	WS-K07	2	0	2
	2.5 Unaccounted-for water	WS-K08	2	0	2
	2.6 Benefit and cost of leak control	WS-K09	2	0	2
	2.7 Comprehensive measures for leak	WS-K10	2	0	2
3. Method and planning of leak survey	3.1 Data for leak survey	WS-K11	(7)	(0)	(7)
	3.2 Planning of leak survey	WS-K12	2	0	2
	3.3 Method of leak survey	WS-K13	3	0	3
4. Equipments	4.1 Equipments for leak detection	WS-K14	2	0	2
	4.2 Equipments for detection of pipelines	WS-K15	2	0	2
	4.3 Equipments for measurement of flow and pressure	WS-K16	(5)	(39)	(44)
	4.4 Workshop: Explanation of equipments	WS-K17	1	0	1
	4.5 Practice: Exercise in training yard	WS-K18	0	3	3
	4.6 Practice: Exercise at actual site	WS-K19	0	16	16
5. Presentation and discussion	5.1 Leak control in PAMJAYA	WS-K20	(0)	(15)	(15)
	5.2 Discussion: Problems and countermeasures of leak control in PDAMs	WS-K21	0	4	4
			0	8	8

Leakage Control (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Others	5.3 Report preparation and presentation	WS-K22	0	3	3
	7.1 Opening/Closing ceremony		(0)	(4)	(4)
	7.2 Pre-test/ Post test		0	2	2
			0	2	2
Total			32	58	90

SYLLABUS/CURRICULUM

Course title: Mechanical Installation

Course code: WS-G

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(3)	(0)	(3)
	1.1 Maintenance of mechanical installation	WS-G01	1	0	1
	1.2 Occupational safety and health	WS-G02	1	0	1
	1.3 Measures against accident	WS-G03	1	0	1
2. Hydraulics of pump			(8)	(8)	(16)
	2.1 Pumping capacities and number of unit and head	WS-G04	2	0	2
	2.2 System head curves and operating condition	WS-G05	2	0	2
	2.3 Control and pump output	WS-G06	2	0	2
	2.4 Water hammer and its prevention	WS-G07	2	0	2
	2.5 Case study: Hydraulic calculation	WS-G08	0	8	8
3. Water pump facilities			(17)	(4)	(21)
	3.1 Pumping system planning	WS-G09	2	0	2
	3.2 Types of pumps	WS-G10	2	0	2
	3.3 Operation of pump	WS-G11	2	0	2
	3.4 Automatic operation of pump	WS-G12	2	0	2
	3.5 Economical operation of pump	WS-G13	2	0	2
	3.6 Maintenance and inspection of pump	WS-G14	2	0	2
	3.7 Causes of pump trouble and trouble shooting	WS-G15	2	0	2
	3.8 Chemical feeding pump	WS-G16	2	0	2
	3.9 Cavitation of pump	WS-G17	1	0	1
	3.10 Case study: Case study of pump	WS-G18	0	4	4
4. Valves			(4)	(0)	(4)
	4.1 Types of valves	WS-G19	1	0	1
	4.2 Maintenance and inspection of valve	WS-G20	1	0	1
	4.3 Maintenance and inspection of motor valve	WS-G21	2	0	2

Mechanical Installation (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
5. Electric motor and generator	5.1 Basic theory of motor revolution	WS-G22	(12)	(0)	(12)
	5.2 Structure and rating of induction motor	WS-G23	4	0	4
	5.3 Starting of induction motor	WS-G24	2	0	2
	5.4 Structure of generator and engine	WS-G25	2	0	2
	5.5 Maintenance of motor and generator	WS-G26	2	0	2
6. Submerged equipment	6.1 Screen	WS-G27	(6)	(0)	(6)
	6.2 Stirring device	WS-G28	2	0	2
	6.3 Sludge clarifier	WS-G29	2	0	2
	6.4 Causes of submerged equipment trouble and trouble shooting	WS-G29	1	0	1
7. Crane	7.1 Special caution for crane operation	WS-G30	1	0	1
	7.2 Regular inspection of crane and the like	WS-G31	(2)	(0)	(2)
8. Other installations	8.1 Compressor	WS-G32	1	0	1
	8.2 Instrumentation/ Process control	WS-G33	(6)	(0)	(6)
	8.3 Diesel engine	WS-G34	2	0	2
9. Workshop	9.1 Pump operation	WS-G35	2	0	2
	9.2 Generator operation		0	(25)	(25)
	9.3 Disassembly and assembly of pump		2	2	4
	9.4 Disassembly and assembly of electric motor		0	3	3
	9.5 Disassembly and assembly of valve		0	5	5
10. Field trip	9.6 Disassembly and assembly of diesel engine		0	3	3
	10.1 Field trip		0	2	2
			0	6	6
			(0)	(8)	(8)
11. Others	11.1 Opening/Closing ceremony		0	8	8
	11.2 Pre-test/Post test		(0)	(21)	(21)
	11.3 Report from participants		0	3	3
	11.4 Group discussion		0	4	4
Total			58	66	124

SYLLABUS/CURRICULUM

Course title: Electrical Installation and Instrumentation

Course code: WS-H

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction	1.1 Maintenance of electrical installation	WS-H01	(2)	(0)	(2)
	1.2 Occupational safety and health	WS-H02	1	0	1
2. Electric power facilities			1	0	1
	2.1 Planning of electric power facilities	WS-H03	(7)	(2)	(9)
	2.2 Electric power facilities	WS-H04	1	0	1
	2.3 Maintenance of electric power facilities	WS-H05	2	0	2
	2.4 Principle of uninterruptible power system	WS-H06	2	0	2
3. Electric motor	2.5 Case study: Electric power facilities circuit analysis	WS-H07	0	2	2
			(10)	(4)	(14)
	3.1 Types of electric motors and revolving theory	WS-H08	2	0	2
	3.2 Structure and rating of induction motor	WS-H09	2	0	2
	3.3 Starting of induction motor	WS-H10	2	0	2
	3.4 Speed control of induction motor	WS-H11	2	0	2
	3.5 Maintenance of electric motor	WS-H12	2	0	2
4. Generator	3.6 Case study: Calculation of motor output	WS-H13	0	2	2
	3.7 Workshop: Motor characteristics test		0	2	2
			(4)	(6)	(10)
	4.1 Planning of generator	WS-H14	1	0	1
	4.2 Generator	WS-H15	2	0	2
	4.3 Engine of generator	WS-H16	1	0	1
	4.4 Workshop: Test of generator characteristics		0	6	6
5. Other installations			(7)	(5)	(12)
	5.1 Maintenance and inspection of motor valve	WS-H18	1	0	1
	5.2 Ozonizer	WS-H19	2	0	2
	5.3 Maintenance and inspection of solar pump system	WS-H20	4	0	4
	5.4 Workshop: Handling of motor valve		0	1	1
5.5 Workshop: Solar pump system operation and maintenance		0	4	4	

Electrical installation and instrumentation (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
6. Earthing and insulation resistance	6.1 Earthing and insulation resistance	WS-H21	(1)	(1)	(2)
	6.2 Workshop: Earth test and insulation resistance test		1	0	1
7. Instrumentation	7.1 Planning of instrumentation	WS-H22	0	1	1
	7.2 Basic principle of instrumentation	WS-H23	(3)	(0)	(3)
8. Detector and indicator	8.1 Flow meter	WS-H24	1	0	1
	8.2 Pressure meter and level meter	WS-H25	2	0	2
	8.3 Water quality measurement instrument	WS-H26	2	0	2
	8.4 Other detectors	WS-H27	1	0	1
	8.5 Indicator and recorder	WS-H28	1	0	1
9. Controller	9.1 Controller	WS-H29	(8)	(0)	(8)
	9.2 Automatic control	WS-H30	2	0	2
	9.3 Telemetering	WS-H31	2	0	2
	9.4 Telecontrolling	WS-H32	2	0	2
10. Case study and workshop of instrumentation	10.1 Case study: Instrumental circuit analysis	WS-H33	(0)	(13)	(13)
	10.2 Case study: Sequential control circuit training (1)	WS-H34	0	1	1
	10.3 Case study: Sequential control circuit training (2)	WS-H35	0	2	2
	10.4 Workshop: Maintenance of instrumentation		0	2	2
11. Field trip	11.1 Field trip		0	8	8
12. Others	12.1 Opening/Closing ceremony		(0)	(9)	(9)
	12.2 Pre-test/Post test		0	8	8
	12.3 Report from participants		(0)	(21)	(21)
	12.4 Group discussion		0	3	3
			0	4	4
			0	8	8
			0	6	6
Total			50	60	110

SYLLABUS/CURRICULUM

Course title: Solid Waste Management and Planning

Course code: ES-A

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Solid waste management policy and developing program	1.1 Solid waste management policy and developing program	ES-A01	(2)	(0)	(2)
2. Solid waste management principles	2.1 Solid waste management principles	ES-A02	2	0	2
3. Solid waste facilities	3.1. Solid waste facilities	ES-A03	(3)	(0)	(3)
4. The nature of management	4.1 The nature of management	ES-A04	3	0	3
	4.2 Organization principles	ES-A05	(4)	(0)	(4)
5. Human resource management	5.1 Human resource management	ES-A06	(4)	(0)	(4)
6. Management technique	6.1 Management information system	ES-A07	(5)	(7)	(12)
	6.2. Management by objectives	ES-A08	3	0	3
	6.3 Strategic planning and organization objectives	ES-A09	2	7	9
7. Institutional development	7.1 Institutional development	ES-A10	(2)	(0)	(2)
8. Financial development	8.1 Fund resource and budgeting system	ES-A11	2	0	2
	8.2 Tariff setting	ES-A12	(6)	(0)	(6)
9. Law and regulation development	9.1 Law and regulation system of SWM	ES-A13	3	0	3

Solid Waste Management and Planning (cont'd)

(1 unit =45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
10. Community participation and privatization	10.1 Government, community and private role in SWM	ES-A14	(7)	(0)	(7)
	10.2 Campaign and education system	ES-A15	5	0	5
11. Basic planning of SWM	11.1 Data collection and analysis	ES-A16	(12)	(0)	(12)
		ES-A17	2	0	2
	11.2 SWM design and analysis	ES-A18	2	0	2
		ES-A19	2	0	2
	11.3 Planning procedure	ES-A20	2	0	2
		ES-A21	2	0	2
	11.4 Master plan of SWM	ES-A22	(8)	(0)	(8)
ES-A23		2	0	2	
12. Final disposal	12.1 Site selection	ES-A24	2	0	2
	12.2 Completed site utilization	ES-A25	2	0	2
13. Others	12.3 Environmental Impact Assessment		2	0	2
	13.1 Opening/closing ceremony		(0)	(4)	(4)
	13.2 Pre-test/post test		0	2	2
Total			59	12	71

SYLLABUS/CURRICULUM

Course title: Solid Waste Disposal

Course code: ES-B

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(9)	(0)	(9)
	1.1 Policy, strategy and program of SWM in Indonesia	ES-801	2	0	2
	1.2 Condition and problems of SWM in Indonesia	ES-802	2	0	2
	1.3 Domestic waste and environmental sanitation	ES-803	3	0	3
	1.4 SWM and community participation	ES-804	2	0	2
			(16)	(0)	(16)
2. Technical aspect of management			2	0	2
	2.1 Planning of SWM	ES-805	2	0	2
	2.2 Waste classification, composition and characteristics	ES-806	2	0	2
	2.3 Domestic waste generation	ES-807	1	0	1
	2.4 Survey and data collection	ES-808	2	0	2
	2.5 Staging in solid waste handling	ES-809	2	0	2
	2.6 Collection and transportation	ES-810	3	0	3
	2.7 Intermediate treatment of solid waste	ES-811	2	0	2
	2.8 Final disposal of solid waste	ES-812	2	0	2
			(16)	(0)	(16)
3. Collection and transportation			5	0	5
	3.1 Selection of collection and transportation method	ES-813	5	0	5
	3.2 Collection plan	ES-814	2	0	2
	3.3 Transportation plan	ES-815	2	0	2
	3.4 Selection and maintenance of equipment	ES-816	2	0	2
	3.5 Improvement of collection efficiency	ES-817	3	0	3
	3.6 Operation planning and monitoring	ES-818	2	0	2
			(16)	(0)	(16)
4. Final disposal of waste			2	0	2
	4.1 Site selection	ES-819	2	0	2
	4.2 Receiving facility	ES-820	2	0	2

Solid Waste Disposal (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
5. Operation of disposal site	4.3 Water sealing	ES-821	2	0	2
	4.4 Leachate collection	ES-822	3	0	3
	4.5 Gas removing facility	ES-823	2	0	2
	4.6 Drainage facility	ES-824	3	0	3
	4.7 Post landfill utilization	ES-825	2	0	2
				(10)	(10)
				2	0
6. Leachate handling	5.1 Waste disposal operation	ES-826	2	0	2
	5.2 Sanitation control	ES-827	2	0	2
	5.3 Safety and security	ES-828	1	0	1
	5.4 Landfill preparation and monitoring	ES-829	3	0	3
	5.5 Selection of equipment	ES-830	2	0	2
			(9)	(9)	
7. Intermediate treatment	6.1 Treatment method of leachate	ES-831	3	0	3
	6.2 Treatment plant design	ES-832	6	0	6
			(13)	(13)	
8. Environmental Impact Assessment	7.1 Incineration	ES-833	4	0	4
	7.2 Composting	ES-834	3	0	3
	7.3 Recycling	ES-835	2	0	2
	7.4 Bailing	ES-836	2	0	2
	7.5 Other treatment technologies	ES-837	2	0	2
			(8)	(8)	
9. Workshop and laboratory practice	8.1 Introduction of EIA	ES-838	2	0	2
	8.2 EIA of collection and transportation	ES-839	2	0	2
	8.3 EIA of treatment and disposal	ES-830	2	0	2
	8.4 EIA preparation	ES-831	2	0	2
			(0)	(25)	
			0	4	4
			0	3	3

Solid Waste Disposal (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
10 Others	9.3 Workshop and lab.practice		0	18	18
	10.1 Opening/ Closing ceremony		(9)	(6)	(6)
	10.2 Orientation/evaluation		0	2	2
	10.3 Pre-test/Post test		0	2	2
Total			97	31	128

SYLLABUS/CURRICULUM

Course title: Human Waste and Domestic Wastewater (HW&DW) Disposal

Course code: ES-C

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
1. Introduction			(4)	(0)	(4)
	1.1 National policy of HW&DW disposal	ES-C01	2	0	2
	1.2 Wastewater management in Indonesia	ES-C02	2	0	2
2. Management of HW & DW			(7)	(0)	(7)
	2.1 Non-technical aspects of HW&DW management	ES-C03	5	0	5
	2.2 Regulation and guideline for HW&DW disposal	ES-C04	2	0	2
			(15)	(0)	(15)
3. Planning and design of HW&DW disposal			3	0	3
	3.1 Environmental Impact Assessment (AMDAL)	ES-C05	3	0	3
	3.2 Preliminary design of wastewater disposal	ES-C06	3	2	5
	3.3 Small bore sewer and shallow sewer	ES-C07	3	0	3
	3.4 Wastewater collection system and design	ES-C08	6	0	6
	3.5 Exercise: Wastewater collection system	ES-C09	0	3	3
			(6)	(0)	(6)
4. Environmental sanitation and public health			2	0	2
	4.1 Water pollution control	ES-C10	2	0	2
	4.2 Environmental sanitation and public health	ES-C11	2	0	2
	4.3 Pathogen removal and disinfection	ES-C12	2	0	2
			(27)	(0)	(27)
5. HW & DW disposal technology			2	0	2
	5.1 General knowledge of wastewater treatment	ES-C13	2	0	2
	5.2 Wastewater treatment system	ES-C14	2	0	2
	5.3 Mechanisms of biological treatment	ES-C15	2	0	2
	5.4 Activated sludge process	ES-C16	3	0	3
	5.5 Rotated biological contactor (RBC), Up-flow Anaerobic Sludge Blanket (UASB)	ES-C17	4	0	4
	5.6 Pond, Lagoon, Oxidation pond	ES-C18	5	0	5

Human Waste and Domestic Wastewater Disposal (cont'd)

(1 unit = 45 min.)

Subject	Module	Code	Lecture	Case study/Practice	Total
	5.7 Septic tank, Leaching pit	ES-C19	2	0	2
	5.8 Jonkasou	ES-C20	2	0	2
	5.9 Septage treatment	ES-C21	3	0	3
	5.10 Sludge treatment	ES-C22	2	0	2
6. Operation & maintenance of waste water disposal facilities	6.1 Physical treatment units (Clarifier, Sludge thickener)	ES-C23	(7)	(0)	(7)
	6.2 Secondary treatment units (Activated sludge process)	ES-C24	4	0	4
7. Laboratory practice			3	0	3
	7.1 Environmental chemistry		(6)	(11)	(17)
	7.2 Theory of wastewater examination	ES-C25	3	0	3
8. Field trip	7.3 Analysis of wastewater	ES-C26	3	0	3
	8.1 Field trip	ES-C27	0	11	11
	8.2 Discussion		(0)	(26)	(26)
9. Others			0	18	18
	9.1 Opening/Closing ceremony		0	8	8
	9.2 General orientation/ evaluation		(0)	(15)	(15)
	9.3 Pre-test/Post test		0	2	2
	9.4 Report from participants		0	2	2
	9.5 Video show		0	7	7
			0	2	2
Total			72	57	129

9 サブコース評価シート

S-1
Sub-Course Evaluation Sheet

September 4, 1995

1. Water Supply Management, Planning & Design

1) Water Supply Master Planning

(Name of the Sub-Course)

Items	Achievement / Present Situation	Evaluation/Problems	Sustainability/Measures to be taken
1. Inputs			
1.1. Japanese Experts	Long-term Expert ... 2 years 2persons Short-term Expert ... 3 months 4 persons Present Situation ... 2 months 1 person 4 C/P in 3 sub-courses	3 months is too short to work for short-term expert	
1.2. C/P Training in Japan		The most of organizations which receive C/P do not have training system in Japan. And some counterparts can not get the training that they want. They are old type and low capacity computers. No body maintain these computers.	To change the PC. To arrange personnel in charge of PC maintenance.
1.3. Equipment	20 Personal computers (common use with distribution sub-)		
1.4. Indonesia Budget			
2. Outputs			
2.0. Course Implementation			
Duration	3 Weeks	Good for concentrating there attention on the lecture	
No of courses implemented, planned no. is ()	92 hour 8 courses (92-94) Course (1) (95)	There are not enough courses for lack of budget in 95	
No. of Counterpart (Fullpart time)	4 C/P (2 full/2 part time)	Trainers sometimes absent from class and some trainers have not enough time to improve the training materials because of being busy with their own works.	To increase more full-time instructor
No. of trainees	134 persons (140)		
Qualified Officials contacted with planning of a Water Supply system	Engineers & Qualified Officials contacted with planning of a Water Supply system	Different abilities among trainees	To divide the course as the size of enterprise or make several kinds of case of case studies as the case.
Budget			
2.1. Curriculum Development			
Standard technology	Introduction to water supply planning Master Planning, Project Planning, Finance & Project schedule, Project implementation and organization.	There are too many subjects. Duplication of material contents in Master Planning & Project Planning	To review and modify the component of the curriculum.
Appropriate technology	10 Case Studies	There are too many stories of too much information. It is difficult for C/P to apply the technology to existing Indonesian situation.	Case studies should be improved
2.2. Teaching Methods Development			
Information Sheet	0% / 0%	Not yet completed because C/P are not enough time to make IS, SN.	To increase more full-time instructor

Session Note	0 % / 50 %			To review and modify the handout
Handout	100 % / 100 %	It is necessary to review the handout		
Visual Aid	0 % / 0 %	Some of instructors made VA by themselves but not yet submitted.		
Easy to understand				
2.5. Network Training				
Subjects	Counterpart training was not done. It learned out through the material development and the discussions with experts.			C/P should discuss with Experts 2 or 3 times a week.
Instructor ability	Most of instructors are good Fewer C/P are our expert to instruct			
Training in Japan				
2.6. Computers and Display				
Subjects	20 personal computers (Great Aids) for Network Analysis			To change the old PC the new one. To arrange personnel in charge of PC maintenance. To make the program of usage of computer.
2.7. Course Management				
Appointing procedure				
3. Impact				
3.1. Application of Technology	Many trainees answered in questionnaire that the course was useful such as subjects, Master Planning and Project implementation planning.	There are some constraints in their offices like the lack of budget, small number of trained staff and so forth.		To increase the personnel who took the course in their enterprises.
3.2. Impact to the sector	It takes time for getting some impact to the sector			
Sustainability (overall evaluation)	It is possible to replicate the course by Japanese instructors after project. But it depends on their selling or eagerness to continue TC.			
Necessary measurement to be taken	To have good instructors. To have a instructor to be able to think total course (3 courses) concept. Each instructor should understand the course concept. To have the seminar of the instruction method for instructor.			

S-2
Sub-Course Evaluation Sheet

1. Water Supply Management, Planning & Design 2) Water Supply Management

(Name of the Sub-Course)

Items	Achievement / Present Situation	Evaluation/Problems	Sustainability/Measures to be taken
1. Japets			
1.1. Japanese Exports	Long-term Expert ... 1 year 2 persons Short-term Expert ... 6 months 1 person 3 weeks*1 1 CP	There are some problems that Japanese system and Indonesian is different.	
1.2. CP Training in Japan	Nothing		
1.3. Equipment			
1.4. Indonesian Budget			
2. Outputs			
2.1. Course Implementation			
Duration	2 weeks		
No. of courses implemented, planned no. in ()	93 Start, 6 courses (6) (92 - 94)	4 or 5 courses in a year is enough	
No. of counterpart (full/part time)	Course (4) (95) 2 CP (2 full)	2 CP is good number for transferring technology	
No. of trainees planned no. in ()	108 persons (120)	10 - 15 trainees in a class is good size	To extend the range of quality and to develop the teaching materials for them.
Qualification of trainees	Directors of sub-directors of water works		
Budget			
2.2. Curriculum Development			
Standard technology	To have ability of the management of water works, Theory of administration and water tariff and self-supporting system. (See Appendix)	There are difficulty to cope course problems such as realizing of potable water or water loss reduction.	To can assume limited role about these problem.
Appropriate technology	All subject is appropriate technology because CP made handout.		
2.3. Teaching Material Development			
Information Sheet	Indonesian English 100 % 100 %		

Session Note	30 %	100 %	
Handout	100 %	100 %	
Visual Aid	0 %	0 %	VA is not necessary for this sub-course
Easy to understand			Getting of the attainment of favorable review by trainees
2.2. Trainees' Feedback			
Subjects	CIP training was not done. It is carried out through the material development and the discussion with Experts.		What Japanese Experts teach the management of them is limited because there are difference of culture and social system between Japan and Indonesia
Instruction ability	Most of instructors are getting of instructional technique.		Good
Training in Japan			
2.3. Distribution of Equipment			
Subjects	Nothing		
2.4. Course Management			
Application procedure			
3. Impact	3.1. Application of Technology	Many trainees answered in questionnaires that the courses was useful such as subjects, Work improvement, Concept and planning of management, Concept of service in water supply	There are some constraints in their offices like the lack of budget.
	3.2. Impact to the sector		
Sustainability (overall evaluation)			
Training center can operate this course by the present materials and the instructors for the moment. TC should reconsider than an occasion demand of the level on the trainees from now or based on the lines of course improvement and operation.			
To realize potable water that is the target of the project, the role of training center is limited consequently. It should be considered urgency to other wayso realize potable water.			
Necessary measurement to be taken			

S-3
Sub-Course Evaluation Sheet

1. Water Supply Management, Planning & Design 3) Water Treatment Facility Planning & Design

(Name of the Sub-Course)

Items	Achievement / Present Situation	Evaluation/Problems	Sustainability/Measures to be taken
1. Input			
1.1. Japanese Experts	Long-term Expert ... 2 years, 2 people Short-term Expert ... 3 months, 4 persons Present Situation ... Short-term Expert 9 months, 1 C/P 4 (3 Sub-courses)	3 months is too short to work for short-term aspect	
1.2. C/P Trainees in Japan	Nothing	The most of organizations which receive counterpart do not have training system in Japan. And some counterpart cannot get the training that they want.	
1.3. Equipment	Nothing		
1.4. Indonesian Budget			
2. Output			
2.1. Course Implementation	Duration 3 Weeks 95 Start, 6 courses (6) = (95 - 94) 1 course (1) = (95)	Good	
No. of courses implemented, planned no. in ()			
No. of counterpart (full/part time)	6 persons (2 full/2 part)	Trainers sometimes absent from class and some trainers have not enough time to improve the training materials because of being busy with their own work.	
No. of trainees planned no. in ()	79 persons (100)		
Qualification of trainees	Engineers and Qualified Official concerned with planning or design of water treatment facilities.	Different abilities among trainees	
Budget			
2.2. Curriculum Development			
Standard technology	General information for design of water treatment facilities, Design of treatment facilities, Practice of Designing (App-)	Handout is partly theoretical not practical	To adjust the time allocation of subjects and increase more practical parts.
Appropriate technology	Case Study		
2.3. Training Materials Development	Address 75 x 100mm		
Information Sheet	0 % / 0 %	Not enough time because of making handout at last	

Session Note	0 % / 50 %			
Handout	100 % / 95 %		Necessity for revision party	To modify handout more practically
Visual Aid	0 % / 0 %			
Easy to understand				
2. 3. Subjects: Training				
Subjects		C/P training was not done. It is carried out through the national development and the discussion with Experts.	Technology transfer is not necessary	
Instruction ability	Good		Good	Although there are some revisions of handout, C/P have enough knowledge and instruction ability and there are many references concerned Planning and Design of facilities. It is possible to continue this course by C/P and other instructors.
Training in Japan				
2. 5. Course Material				
Subjects		Nothing		
2. 6. Course Material				
Application procedure				
3. Impact		3.1. Application of Technology	Trainers answered some subjects were useful such as Design practices, Design of water treatment facilities.	
		3.2. Impact to the sector		
Sustainability (overall evaluation)				
There are many references on water treatment facilities Planning and Design. And some ofp have enough knowledge on it. So this sub-course will be implemented by oip with a little improvement of training materials.				
Necessary measurement to be taken				

S-4
Sub-Course Evaluation Sheet

(Name of the Sub-Course) 1. Water Supply Management, Planning & Design 4) Distribution System Planning & Design

Items	Achievement / Present Situation	Evaluation/Problems	Sustainability/Measures to be taken
1. Inputs	Long-term Expert ... 2 year ² persons Short-term Expert ... 3 months ⁴ persons Present Situation ... Short-term Experts - 9 m ¹ p CP 4 (3 Sub-courses)	3 months is too short to work for short-term experts	
1.1. Japanese Experts		The most of organizations which receive Counterpart do not have training system in Japan. And some counterpart cannot get the training that they want.	
1.2. CP Training in Japan		There are very old type and less-capacity computers, so body maintains these com puters.	
1.3. Equipment	20 personal computers (Grant Aid)		
1.4. Indonesian Budget			
2. Outputs	3 Weeks		
2.1. Course Implementation	Duration		
	No. of courses implemented, planned no. in ()	94 start, 1 courses (3) - (91 - 94) courses (2) - (95)	
	No. of counterpart (full/part time)	CP : 4 persons (2 full/2 part)	Trainers sometimes absent from class. And some trainers have not enough time to improve the training materials because of being busy with their own works.
	No. of trainees planned no. in ()	14 persons (50)	
	Qualification of trainees	Engineers and qualified officials concerned with planning or design of water distribution system.	
	Budget		Different abilities among trainees
2.2. Curriculum Development			Curriculum will be reviewed and improved
	Standard technology	Basic knowledge for design of water distribution facilities, Design and installation of pipeline, Distribution network planning, Design of pumping facilities and water storage, Practices of designing	Curriculum is not constructed strategically. Not enough discussion. Experts and CP have not enough time to consider it because of the top priority of making headout for holding the course. Start was so late.
	Appropriate technology	Case Study	Case Study should be changed to easier model
2.3. Teacher/Counterpart	Teacher/Counterpart	Teacher/Counterpart	
	Information Sheet	0 % / 10 %	Counterparts have not enough time to develop training materials because of being busy for own job.

Session Note	0 % / 10 %				
Handout	95 % / 70 %				
Visual Aid	0 % / 0 %				
Easy to understand					
To carry out the English handout and Expert should check out it					
CP and others made Indonesian handout for implementation of class. Experts does not understand the contents of handouts in Indonesian. Some of instructors made VA by themselves but not yet authorized					
There are not enough time for discussion and a few english materials					
Subjects	CP training was not done. The technology transfer was done through the material development, and discussion with expert and trainees.				
Instruction ability	Good				Limited activity for part-time counterpart
Training in Japan					
2.3 Evaluation of Equipment					
Subjects	20 personal computers (Grant Aid) for Network Analysis				Those are very old and less-capacity. Also, there are no person to maintain PC.
2.4 Computer-Networking					
Application procedure					
3. Impact	3.1. Application of Technology				
	3.2. Impact to the sector				
The trainers advised that the subject, Design and Installation of Pipeline, Design Procedures, are useful.					
This course has been implemented only twice. And the teaching materials development is not enough. Also, the curriculum should be reconstructed systematically. The computer training materials should be review and revision. It is necessary to carry out training materials and transfer the technology of computer network analysis to Counterpart.					
Sustainability (overall evaluation)					
Necessary measurement to be taken					
Necessary to change.					
Necessary of personnel in charge of PC maintenance					

P - 1
Sub-Course Evaluation Sheet

2.1. Water Purification

(Name of the Sub-Course)

Items	Achievement / Present Situation	Evaluation / Problems	Sustainability / Measures to be taken
2. Inputs			
1.1. Japanese Experts	(91 - 95) Long-term Expert 3 persons (including Quality Control) Short-term Expert 2 persons		
1.2. O/P Training in Japan	(91 - 95) 1 persons		
1.3. Equipment	Minewater purification plant, zeta - potential meter, Sand sieve analyzer, bioassay monitoring system, Jar - Tester.		
1.4. Indonesian Budget			
2. Outputs			
2.1. Course Implementation			
Duration	(92 - 95) 3 weeks	Efficiency of course implementation is not high. There are many differences of knowledge and technique on water purification among trainees owing to the back - ground.	
No. of courses implemented, planned no. in ()	(92 - 94) = 8 times (8) 95 = 1 (1)		
No. of trainer (full/part time)	1 persons (Part time)		
No. of trainees	92 - 94 = 106 persons (110) 95 = 15 (15)		
Planned no. in ()			
Qualification of trainees	Engaging in the job for at least 5 years after graduated from University		
2.2. Curriculum Development			
Standard technology	There are opinions that the curriculum is useful for the actual job of the trainees. Water purification techniques, intake facilities, conveyance facilities, rapid sand filtration, slow sand filtration, special treatment, chemical feeding facilities, practices, discussion.	The hand out is enough well for trainees. The time of the practice is not so enough	To lengthen the time of the practice.
Appropriate technology	The small water purification plant (consists of water treatment systems, that) corresponds to the types of water purification plant of PDAM, is constructed.		
2.3. Teaching Material Development			
Information Sheet	Indonesian: English: 0 % 40 %	Will be completed by the end of this year	

Session Note	0 % 40 %	
Handout	100 % 100 %	
Visual Aid	100 % 30 %	
Easy to understand		
2.3.2.2. Energy		
Subjects	To be able to explain the principles of water purification and the operation and maintenance of the water treatment facilities to meet drinking water quality guideline.	Delay of implementing of Research on Water treatment technology. High frequency of the sub-course held.
Instruction ability	Due to the training in Japan, the knowledge and instruction ability on water purification of trainer was improved.	Self-reliant
2.3.2.3. Distribution of Equipment		
Subjects	To improve the skill of water purification facilities of trainers, trainees. Used and management of the equipment is mostly good	The frequency of using the mini plant is low. The structure or function of the mini plant (OM) does not meet the mostly structure of water purification system in Indonesia.
2.3.2.4. Course Management		
Application procedure		
3. Impact		
3.1. Application of Technology	Theory & principle of water purification, O & M of rapid sand filtration, intake facilities, and chemical feeding facilities are acquired. Handouts used in TC are utilized in the sector	O & M of special treatment facilities not be utilized The special treatment is not much used in PDAMs generally
3.2. Impact to the sector	This sub-course was opened: - 1992 fiscal year. Course management has been conducted well by trainers and outer instructor. The rate of which Japanese experts give lecture is relatively low. Due to the difference of types of water purification plant and techniques of workers among PDAM, it needs to be operated the various type of the plants	
Sustainability (overall evaluation)		
Necessary measurement to be taken		

P-2
Sub-Course Evaluation Sheet

2-2) Water Quality Control

(Name of the Sub-Course)

Items	Achievement / Present Situation	Problems / Evaluation	Sustainability / Measures to be taken
1. Inputs			
1.1. Japanese Experts	(91 - 95) Long-term Expert 3 persons (including water purification) Short-term Expert 2 persons		
1.2. C/P Training in Japan	(91 - 95) 2 persons		
1.3. Equipment	Incubator, sterilizer, dry oven, refrigerator, centrifugal, microscope, water bath, pH meter, turbidity meter, conductivity meter, ion meter, water stills, waste water treatment equipment, evaporators, drafts, superheated steam equipments, NH ₃ -distiller, phenol-distiller, GC, HPLC, TOC, AAS, viscoses, glassware, reagents, auto samplers	Difficult to get the spare parts of the analyzer like GC, HPLC, TOC, AAS in Indonesia. For the analyzers are produced in Japan. These equipment are utilized well except HPLC & GC	JICA supply the spare parts & essential a accessory of the instrument to TC continuously
1.4. Indonesian Budget			
2. Outputs			
2.1. Course Implementation			
Duration	91 - 95 = 4 Weeks		
No. of courses implemented, planned no. in ()	91 - 94 = 12 times (12) 95 = 2 (2)		
No. of trainer (full/ part time)	2 persons (Full time)		
No. of trainees planned no. in ()	91 - 94 = 107 persons 95 = 120 (23)		
Qualification of trainees	Engaging in the job for at least 10 years after graduated from High School		
2.2. Curriculum Development			
Standard technology	There are opinions that the curriculum is useful for the actual job of the trainees. Water sources water quality control, drinking water quality control, water analysis, analysis parameters, practices of water analysis, practices of water treatment, discussion.	The hand out is enough well for trainees. The practice is useful for the job. There are many PDAM that do not have equipment & reagents to conduct water analysis.	It needs to order the equipment & reagents for PDAMs through JICA
Appropriate technology			
2.3. Training Material Development	Information Sheet		
Information Sheet	0 %	40 %	

Session Note	0 %	40 %						
Handout	100 %	50 %						
Visual Aid	100 %	100 %						
Easy to understand								
2.2.3.2. Training								
Subjects	<ul style="list-style-type: none"> - Development of water analysis techniques - Improvement of water sources and drinking water quality management techniques. 		<ul style="list-style-type: none"> - The frequency of operating the analytical instruments is low because of the shortage of trainer. - It is difficult to repair the analytical instruments in Indonesia. The cost to repair the instruments in Indonesia is so expensive. There is shortage of spare parts of the instruments and chemical reagents in Indonesia. 		<ul style="list-style-type: none"> - JICA supply the spare parts & essential accessory of the instruments to TC complementarily 			
Instruction ability	<p>Due to the training in Japan, the knowledge and instruction ability on water purification of trainer was improved. Through the training in Japan, the water analysis techniques was largely improved.</p>		Self - reliant					
2.2.3.3. Evaluation of Equipment								
Subjects	<ul style="list-style-type: none"> - To improve water analysis techniques - Use and management of the equipments is mostly good (enough) 		<ul style="list-style-type: none"> - Difficult to repair the equipment in Indonesia - Shortage of the spare parts of the equipments in Indonesia and engineers in the field of water quality control 					
2.2.3.4. Course Management								
Application procedure								
3. Impact	3.1. Application of Technology (from the questionnaire)	Water quality analysis Quality control in water supply facilities, and Analytical methods of water quality are acquired Quality control in water supply facilities, practice of water quality analysis, and quality control and surveillance in water sources.	<ul style="list-style-type: none"> - Practice of water quality analysis - Analytical methods of water quality, and - Quality control & surveillance in water sources are not utilized - Equipment was not enough, budget was not enough 		<ul style="list-style-type: none"> - JICA should supply the equipments for PDAMs of participants 		<ul style="list-style-type: none"> - It need to improve the curriculum on the practice of water analysis according to the condition of PDAMs 	
	3.2. Impact to the sector	<ul style="list-style-type: none"> - This sub-course was opened at first - year of the project - Most of instructor are filled with trainers (full time) so that course management and course efficiency is very good and high, because of the practice time being so much. However, there are only two trainers who have worked at full time in TC, Bekasi - It is necessary to increase the person who change a technique of water analysis for PDAM by water quality course trainers through individual training. 						
	Sustainability (overall evaluation)							
	Necessary measurement to be taken							

control

L - 2
Sub-Course Evaluation Sheet

3-1 Pipeline Installation and Maintenance

1) Pipelaying

Name of the Sub-Course	Items	Achievement / Present Situation	Evaluation / Problems	Sustainability / Measures to be taken
1. Inputs	1.1. Japanese Experts 1.2. C/P Training in Japan 1.3. Equipment 1.4. Indonesian Budget	Long term : 3 persons (no. in 3 sub-course) Short term : 4 persons (no. in 3 sub-course) 3 persons (no. in 3 sub-course) Center budget 1992/93 H4-p47	Some institutes are not well prepared to accept C/P. However, training in Japan was effective to strengthen C/P's understanding on standard technology. The delay of equipments and materials for pipe laying practice in physical 1984 caused some negative effect on course implementation.	
2. Outputs	2.1. Course Implementation Duration No. of courses implemented, planned no. in () No. of teacher (full/part time) No. of trainees planned no. in () Qualification of trainees Budget	3 weeks (94) 91 = 94 = 2 (2) 95 = () 3 (2/1) 91 = 94 = 27 (30) 95 = (30)	Appropriate Appropriate However, they cannot spend enough time for the course preparation and implementation because of other works. Basic knowledge of participants is not enough.	
2.2. Curriculum Development	Standard technology	Planning and design, pipelaying work control, piping and jointing, service installation, field trip, presentation and group discussion.	Curriculum does not reflect Indonesian needs to strengthen construction control method, inspection and drawing map (revision of the curriculum will be done within the cooperation time). Lecture and practical work on pressure test, PVC and asbestos pipe laying are not enough. Because of lack of field experience, there may be a difficulty to conduct practical work.	
2.3. Teaching Material Development	Information Sheet	Indonesian / English 0/0	Will be completed within the cooperation time.	

	Session Note	0/0	Will be completed within the cooperation time.
	Handout	98/100	Necessary for revision from the viewpoint mentioned above but it will be completed within the cooperation time.
	Visual Aid	10/5	Will be completed but the quality is not satisfactory.
	Easy to understand		
	2.4. CIP Training		
	Subjects	The of pipe and design, method of execution, work management, service installation, making of as-built drawing.	Participants now understand how to give the lecture based on present handout.
	Instruction ability		In future implementation of course, participation of trainer who has experience of pipe laying in PDAM should be increased.
	2.5. Utilization of Equipment		
	Subjects		Utilized well
	2.6. Course Management		
	Application procedure	TC Bekasi request PDAMs to nominate applicant, based on the training needs investigation in each technical field that is carried out by the government of Indonesia	
3. Impact	3.1. Application of Technology		Most of the trainees are applying acquired technology in their work. But some trainees can not utilize it because of the lack of equipment and trained staff.
	3.2. Impact to the sector		Ibid
	Sustainability (overall evaluation)		With improvement from the viewpoint mentioned above, the course will be conducted by Indonesian side.
	Necessary measurement to be taken		

Kampis

L - 2
Sub-Course Evaluation Sheet

(Name of the Sub-Course) 3.2 Pipeline Installation & Maintenance 2) Pipeline Maintenance

Items	Advancement / Present Situation	Evaluation / Problems	Sustainability / Measures to be taken
1. Input			
1.1. Japanese Experts	Long term : 3 persons (dom. sub-course) Short term : 4 persons (dom. sub-course)		
1.2. CP Training in Japan	1 person (dom. sub-course)		
1.3. Equipment			
1.4. Indonesian Budget			
2. Output			
2.1. Course Implementation			
Duration	3 weeks (92)		
No. of courses implemented, planned no. is ()	91 - 94 = 4 (8) 95 = (0)		
No. of trainer (full/part time)	2 : 2		
No. of trainees planned no. is ()	91 - 94 = 105 (110) 95 = (0)		
Background of trainees		The basic knowledge of participants is usually not enough	
Budget			
2.2. Curriculum Development			
Standard technology	Maintenance technique of pipeline and apparatuses, Corrosion and accident, Recordkeeping and replacement of pipeline, Maintenance of service installation, Field trip, presentation and group discussion	Curriculum to transfer standard technology in Japan was almost completed.	Improvement of curriculum to develop system to evaluate the degree of trainees understanding by both Japanese experts as well as Indonesian CP
Appropriate technology		However, current curriculums include following problems. Because, Non-physical aspect is unaccounted for water (malfunction of collecting system of charge, meter reading, stealing of water, etc.) is not investigated enough, curriculum is not appropriate for trainees to analyze unaccounted for water and make plan for counter measures. Lecture and practice on management organization, leakage control and repairment activity of PVC, Asbestos pipe are not efficient. Advanced pipeline maintenance system (such as block system) should be given more simplified to help participant's understanding. Understanding level of participants is not evaluated yet by Japanese side.	Joint study on non-physical aspects of unaccounted for water with cooperation of PDAM. To combine pipeline maintenance sub-course with leakage control subcourse.
2.3. Technology Needs Development			
Information Sheet	0 % / 0 %	Will be completed by the end of this year. However, revision will be necessary according to improvement at handout.	

Session Note	0 % / 0 %	Will be completed by the end of this year. However, revision will be necessary according to improvement at handout.	Improvement of teaching materials will be hard to be completed in the period of cooperation.
Handout	100 % / 100 %	Necessary for revision from the viewpoint mentioned above.	
Visual Aid	0 % / 0 %		
Easy to understand			
2.4. Trainers Training			
Subjects	Items : Outline of Water Supply facilities, Arrangement of data, maintenance, Rehabilitation plans, Countermeasures for accidents, Management organization, Drawing management, Advanced maintenance.	CP now understood how to give the lecture based on present hand-out. CP lack the experience of practical on job training.	In future implementation of course, participation of trainer who has much experience of pipe maintenance in PDAM should be increased.
Instruction ability			
Training in Japan			
2.5. Utilization of Equipment			
Subjects			
2.6. Course Maintenance			
Application procedure	TC Betas request PDAMs to nominate applicants, based on the training needs investigation in each technical field that is carried out by the government of Indonesia.		
3. Impact			
3.1. Application of Technology		The results of questionnaire to participants shows that advanced pipeline maintenance are not applied. The reason is considered that the content in handout is a little complicated. Trainees can not utilize acquired technology in their work because of the lack of equipment and trained staff.	Participation of responsible person for pipeline maintenance is desirable.
3.2. Impact to the sector		ibid	
Sustainability (overall evaluation)			
Curriculum and training materials are based on Japanese standard technology and don't reflect the conditions and needs in Indonesia appropriately.			
Follow up is necessary. This course should be improved to be more appropriate for Indonesian situation.			
Necessary maintenance to be taken			
Implementation with linkage sub-course is recommended.			

L-3
Sub-Course Evaluation Sheet

3.3. Pipeline Installation and Maintenance 3) Leakage Control

Items	Achievement / Present Situation	Problems	Sustainability
1. Inputs	Long-term : 3 (no. in sub-course) Short-term : 4 (no. in sub-course)		
1.1. Japanese Experts	1 (no. in sub-course)		
1.2. CP Training in Japan			
1.3. Equipment			
1.4. Indonesian Budget			
2. Outputs	93 = 2 Weeks 91 = 94 = 5 (5) 95 = (1)		
3.3. Course Implementation	Duration No. of course implemented, planned no. in () No. of trainer (full/part time) No. of trainees planned no. in () Qualification of trainees Budget	The basic knowledge of participants is usually not enough.	Participation of responsible persons of pipeline maintenance is desirable.
3.3. Curriculum Development	Management of maps and drawings for leakage control program, leakage detection equipment (P), investigation of water pressure (P), investigation of underground leakage (P), Leakage survey & detection (P), Leakage confirmation (P), Pipe location work (P), Water meter and appliance (P), Case study, Field trip, presentation, and group discussion. Implementation of field investigation (local investigation) Bogor from Sep. 1994 to Jan. 1995. By measuring the minimum midnight flow and meter reading we assumed the actual leakage and the direct effect of leak survey and repair.	Leakage survey technology of Japan can not apply in Indonesia without appropriate modification, because materials of pipe is different, water pressure is sometimes low, there are few valves or hydrants for pipeline maintenance and management drawings are usually poorly provided.	For the improvement of curriculum with appropriate technology, joint study with PDAMs in actual site will be effective.
3.3. Technology/Material Development	Information Sheet 0% 90%	Will be completed by the end of this year.	But revision will be necessary based on the improvement of Hand out.

Session Note	0%	0%	Improvement of teaching material is recommended.
Handout	100%	100%	Will be completed by the end of this year But revision will be necessary based on the improvement of Hand out.
Visual Aid	0%	20%	Will be completed by the end of this year But the quality is not satisfactory
Easy to understand			
3.4. Teachers' Training			
Subjects	Operation of equipment, Planning of leakage control, Cause of leak, Planning of leak survey work.		In future implementation of course, participation of trainer who has much experience of pipe maintenance in PDAM should be increased.
Instruction ability			
Training in Japan			
3.5. Utilization of Equipment			
Subjects			
3.6. Course Management			
Apprentice procedure			TC Balai request PDAMs to nominate applicant, based on the training needs investigation in each technical field that is carried out by the government of Indonesia.
3. Impact	3.1. Application of Technology	Basic of knowledge of leak survey Equipment for leak survey Countermeasure for leakage	The participants cannot apply the acquired knowledge of leakage control into practical use in their PDAMs, because of the lack of budgets and equipment (licensing bar, leak detector) especially Equipment for leak survey
	3.2. Impact to the sector	Countermeasure for leakage	ibid
Sustainability (overall evaluation)			
Curriculum and training materials are based on Japanese standard technology, and does not reflect the conditions and needs in Indonesia appropriately.			
Necessary measurement to be taken			
Follow up is necessary.			
This course should be improved to be more appropriate for Indonesian situation			
Implementation with pipeline maintenance sub-course is recommended.			

lebar

E-1
Sub - Course Evaluation Sheet

4-1) Mechanical Installation

(Name of the Sub-Course)	Items	Achievement / Present Situation	Evaluation / Problems	Sustainability / measures to be taken
1. Inputs	1.1. Japanese Experts	'92 - '95 = Longtime expert 2 persons (including Electrical Installation & Instruction) Shorttime expert 6 persons		
	1.2. CIP Training in Japan	'92 - '95 = 4 persons		
	1.3. Equipment			
	1.4. Indonesian Budget			
2. Outputs	2.1. Course Implementation			
	Duration	'92 - '95 = 3 weeks		
	No. of courses implemented, planned no. in ()	'92 - '94 = 8 times '95 = 1 (1)		
	No. of trainer (full/part time)			
	No. of trainees planned no. in ()	'92 - '94 = 98 persons (110) '95 = 8 (17)		
	Qualification of trainees	Engaging in the job for at least 3 years after graduated from University		
	2.2. Curriculum Development			
	Standard technology	Water works and Machine, pump doing, Machine operation	Evaluation of trainees are almost well	It is necessary to review on the appropriate Technology
	Appropriate technology	Training, discussion.	Lack of case - study, not enough time for practice and training Remark: handout	
	2.3. Teaching Material Development			
Information Sheet	0 %	40 %		

Session Note	0 %	40 %	
Handout	100%	100%	
Visual Aid	0 %	40 %	
Easy to understand			
2.4: C/P Feeding			
Subjects	C/M,F technology of pump and valve, crane facilities was transferred in site	All of c/p can't attend only 2 of 5 c/p are full - time There are behind to transfer technology to c/p on teaching materials (S/N, S/N, VA), slide materials and how to handle equipment. Need further assistance	c/p should be full - time
Instruction ability			
2.5: Use and safe keeping of Equipments			
Subjects	Use and safe keeping it almost well.		
2.6: Chronic Maintenance			
Application procedure			
3. Impact	3.1. Application of Technology	Electrical motor & generator, Water pump facilities are aquired	It is necessary to review on the appropriate Technology
	3.2. Impact to the sector	Electric motor & generator, crane	ibid
Sustainability (overall evaluation)			
Since this course was started in '92 (FY), Technology transfer is almost finished. But a part of materials should be remake.			
Necessary measurement to be taken			
1) Case - study and practice on maintenance should be substantial as maintenance technology. 2) it is better to visit each PDAM and to discuss with c/p on the condition of PDAM.			

Sub - Course Evaluation Sheet

4-2) Electrical Installation and Instrumentation

(Name of the Sub-Course)

Items	Achievement / Present Situation	Evaluation / Problems	Sustainability / measures to be taken
1. Inputs	1.1. Japanese Experts '94 - '95 = Longtime expert 2 persons (including Mechanical Installation) Shorttime expert 6 persons '94 - '95 = 4 persons 1.2. CP Training in Japan 1.3. Equipment 1.4. Indonesian Budget		
2. Outputs	2.1. Course Implementation Duration '94 - '95 = 3 weeks No. of courses implemented, planned no. in () '94 = 2 times '95 = 1 (2) No. of trainer (full/part time) 3 Persons (F 2 persons/ P 3 Persons) No. of trainees '94 = 24 persons (30) '95 = 15 (34) Qualification of trainees Engaging in the job for at least 3 years after graduated from University	Stated in '94, Only 4 times are held till Project - end.	Follow - up term is necessary to transfer Technology.
2.2. Curriculum Development	Standard technology Electric 7 subjects Instrumentation 4 subjects Pump 7 subjects Appropriate technology	1) All counterpart must be able to make course material. 2) Must out transfer technology on equipment on handling 3) Each trainer has different needs.	It is necessary to review on the appropriate Technology.
2.3. Teaching Material Development	Information Sheet 0% 20%	1) Teaching materials is behind 2) Start of course was late	

Session Note	0%	0%	Training on equipment has been pernoxy.
Handout	95%	95%	
Visual Aid	0%	7%	
Easy to understand			
24. CP Field			
Subjects	OM on Electric Installation & Instrumentation.		
Instruction ability	Since in end of '94 course is held one c/p of five do not study in Japan. Studying in Japan was declined by his circumstances. 4-1) Same to Mechanical sub - course Need further assistance and need longer - term expert		
25. Operation of Equip ment			
Subjects	Use and safe keeping is almost well.		
26. Course Management			
Application procedure	Most of all trainee is a graduate of high school.		
3. Impact			
3.1. Application of Technology	Electric power facilities, Electric motor, and Generator are acquired.	Each trainee has different needs Trainees level differs depending on each PDAM	
3.2. Impact to the sector	Instrumentation, Electric power facilities, Generator	Detector & indicator and instrumentation not be utilized, as Equipment was not enough. Subjects are not relevant to the job, and Policy of the employer. Number of trained staff was not enough. Since in end of '94 course is held, there is few impact in sector.	
Sustainability (overall evaluation)			
Necessary measurement to be taken			
<p>(1) Since this course was started in end of '94 (FAC), Technology transfer is not enough to held sub-course by c/p the well.</p> <p>(2) As supplied equipment in '94 (FP) were late, c/p could not handle it yet.</p> <p>(3) Follow-up term is necessary to transfer technology on latest equipment and to finish up teaching material (incld longume expert and shorttime expert).</p> <p>(4) Electric course should be to divide (Electric / Installatoo) depends on trainees needs.</p> <p>(5) It is better to visit each PDAM, to discuss with c/p on condition.</p> <p>(6) Electric curriculum in Mechanical sub-course should shift to electric-course.</p> <p>(7) Practice and case-study should be substantial as maintenance technology</p> <p>(8) CP does not have basic know-how on electric yet, then, it bind our to technology transfer when follow-up term it must be reconstructed again.</p> <p>(9) Teaching materials development should be completed</p>			

ES-1
Sub-Course Evaluation Sheet

(Name of the Sub-Course)	5. Domestic Waste Management	1) Waste Management & Planning	As of August 1995
Items	Achievement / Present Situation	Evaluation	Problem, Caused of the Problems
1. Inputs			
1.1. Japanese Experts	Long term : 3 persons Short term : 5 persons 3 persons	Management expert was required. Well-trained, Training Program should be coordinated effectively Expected to be utilized effectively	Difficulty in coordinations among trainers
1.2. GPF Training in Japan	Weight bridge		
1.3. Equipment			
1.4. Indonesian Budget			
2. Outputs			
2.1. Course Implementation			
Duration	2 weeks		
No. of courses implemented, planned no. in ()	5 courses (10) FY 93 1 (2) FY 94 4 (4) FY 95 0 (4)	In FY 1995 the number of courses decreases	lack of budget
No. of trainer (full/part time)	3 persons (3/0)	Least of full time up	Outside instructor missing causes various problems in rescheduling
No. of trainees planned no. in ()	53 persons (56)	enough	Difficult to recruit trainees year by year
Qualification of trainees	- Completed the general course - Work for local Government and experience on SWM	Knowledge level of trainees was low	limited candidates to meet the qualification Number of general courses decreased
Budget			
2.2. Curriculum Development			
Standard technology		Difficult to be implemented	High cost technology
Appropriate technology		- Not in detail - Low consideration of regional characteristics	Shortage of data utilization
2.3. Teaching Change, Development, Transfer			
Information Sheet	30 % 50 %	Will be completed by the end of this year	Data utilization is recommended

ES-1-2-3/95/95

Source Note	30 %	50 %	30 %	needed to be revised
Handout	100 %	100 %	Revisions of some parts are required	
Visual Aid	100 %	50 %	Will be completed by the end of this year	
Easy to understand				
2.2.3.2.2.1.1. Training				
Subjects	1. Promotion of materials 2. Technical transfer by short term expert 3. Field trip 4. Research work	Course management, technology acquisition	Already transferred 70 - 80 % of base technology through various activities	Previous study not enough
Facilitator ability			Well trained so as to conduct training by themselves	
2.2.3.2.2.2.1.1. Training				
Subjects				
2.2.3.2.2.2.1.2. Training				
Subjects	Submission of candidates by local government Candidate selection by TC Bozga			
3. Impact				
3.1. Application of Technology	Law & regulation development Management principles Institutional development		More practical study will be necessary in future Solid waste management facilities Institutional development Management principles	Budget was not enough Equipment was not enough Number of trained staff was not enough Priority of SWM is low
3.2. Impact to the sector	Solid waste management policy & developing program Solid waste management facilities Management principles		May be great, but not enough Ibid	Shortage of prepared study Ibid
Sustainability (Overall evaluation)				
Training materials will be completed by the end of the project. But some materials obtained unsuitable to support training activities.				
Necessary measurement to be taken				
1. Training materials should be prepared so as to enhance managing activity on SWM. 2. Module development based on change of National Policy on SWM is recommended. 3. Training participation from private sector is recommended.				

ES-2
Sub-Course Evaluation Sheet

(Name of the Sub-Course) 5. Domestic Waste Management 2) Solid Waste Disposal As of August 1995
Measure to be taken

Items	Advancement / Present Situation	Evaluation	Problem/ Cause of the Problems	As of August 1995 Measure to be taken
1. Inputs				
1.1. Japanese Experts	Long term : 3 persons Short term : 5 persons 2 persons	enough		
1.2. CIP Training in Japan		Well - trained, Training Program should be coordinated effectively Almost all were utilized, but CIP center not operated	Difficulty in coordination among budgets No training program	
1.3. Equipment				
1.4. In-houseman Budget				
2. Outputs				
2.1. Course Implementation	Duration : 3 weeks No. of courses implemented, planned no. in () FY 91 - 94 12 (14) 95 1 (4) No. of trainer (full/part time) 2 persons 2 (2/0) No. of trainees planned so far () 115 persons (140) - Completed the general course - Work for local Government and enterprise on DWM Budget	In FY 1995 the number of courses decreased Total of full time up Knowledge level of trainees were low	Lack of budget Outside instructor causing management problem in rescheduling Difficult to recruit trainees year by year Number of general course decreased limited candidates to meet the qualification	More general course are recommended
2.2. Computer-Diagnosis		Difficult to be implemented	High cost technology	Standard technology should be low
Standard technology		- Not in detail - Low consideration of regional characteristic	- Shortage of appropriate technology	Appropriate technology should be more
Appropriate technology (Case study)				
2.3. Technology Materials Development	30 %	Will be completed by the end of this year		
Information Sheet	30 %			

Summary Note	30 %	50 %				
Headout	100 %	100 %		Some parts are required revision		
Visual Aid	100 %	50 %		Will be completed by the end of this year		
Entry to videotape						
2.2. Subjects/Technology						
Subjects	1. Provision of materials 2. Technical transfer by short term expert 3. Field trip 4. Research work			Already transferred 70 - 80 % of same technology through various activities		Practical study not enough
Instructor's ability	Course management, technology acquisition			Well trained so as to conduct training by themselves		
Training in Japan						
2.3. Collection of Equipment						
Subjects	Auxiliary equipment Landfill test soil Computer equipment			Most of equipment are used effectively Some equipment which have not been utilized		
2.4. Course Management						
Application procedure	Submission of requests by local government Candidate selection by JICA/Bureau					
3. Impact						
3.1. Application of Technology	Technical aspect of waste management Final disposal of waste Collection & transportation of waste Landfill handling			More practical study was not enough Workshop & laboratory practice Landfill handling		Budget was not enough Equipment was not enough Data was not enough Practical study is needed
3.2. Impact to the sector	Technical aspect of waste management Operation of waste disposal site Final disposal of waste			May be given, but not enough land		Shortage of practical study land
Sustainability (overall evaluation)						
Training materials will be completed by the end of the project. But review and revision of inappropriate module were needed.						
Necessity measurement to be taken						
1. More instructors are required 2. Increase numbers of general course are recommended 3. Material Development to enhance the improvement of collection/transport/disposal of sludge as well as proper maintenance activity are recommended.						

ES-3
Sub-Course Evaluation Sheet

5. Domestic Waste Management 3) Human Waste and Domestic Wastewater Disposal

Items	Activities / Present Situation	Evaluation	Problem/Cause of the Problems	Measures to be taken
1. Inputs				
1.1. Instructors	long 3 persons short 4 persons	enough		
1.2. CIP Training in Japan		good arrange, effectively done		
1.3. Equipment	oxidation ditch BOD analyzer obolabau model	not good conditions, not fully operated yet	not transferred technically	will be transferred by law expert
1.4. Indonesian Budget				
2. Outputs				
2.1. Course Implementation				
Duration	3 weeks	Lecture is not implemented completely, because Lecturer not come sometimes		It's necessary to ensure of Superior staff who is working wastewater fields and / or comparant persons, and also necessary to make plan !
No. of courses implemented, planned to, in ()	10 courses (10)		no problem	
No. of trainer (full/part time)	4 persons (3 full / 1 part)	enough, but some CIP don't work effectively	Some lecture explained wide aspect with out knowledge and experience.	- How to transfer appropriate technology - To whom - Target of achievement - Implementation terms - Course materials
No. of trainees planned to, in ()	97 persons (12%)		skilled candidates are limited	
Qualification of trainees	Person in charge of engineer of wastewater Person who graduate college and find general course	. Trainee who have not fundamental knowledge.	. Knowledge and career is not up to average (below average) . Lecture is not suitable for trainees. (most of trainee did not take on wastewater)	
Budget				
2.2. Curriculum Development				
Standard technology	Appendix-	. Curriculum is very wide technical support	Change of curriculum make budget delayed, then technical transfer was delayed	curriculum must be revised
Appropriate technology (case study)		Appropriate technology are too less	Sophisticated budget is not suitable for Indonesia, and do not triggered and / or motivate development	
2.3. Feasibility Research/Investment Information Sheet	Appendix- 25.9 % 44.1 %	Most of them did not complete		Should follow the first procedure of material development which has started this project, (very low qualification)

Session Note	25.9 %	44.1 %	Most of them did not complete	Just explain handout transfer sub, strategy, technique in the course materials is not suitable for trainees.	Very necessary to appropriate technology transfer considering present situation and needs.
Handout	63 %	100 %	Different instructor give different handout will be prepared by the end of the year		
Visual Aid	25.0 %	40.7 %	too difficult	prepared without considering present condition	
Easy to understand					
2.3. Transfer of Technology					
Subjects			laboratory, field work expensed well; module development not yet	H/O are not referred to present situation too high level knowledge	too - technical aspect should be trained
Instructor's ability			Most of lecture are Indonesian only. But don't program transfer (technology to C/P)	lack of experience	
Training in Japan			No problem		Lack of TOT (Training of Trainer)
2.4. Implementation of Technology					
Subjects	Appendix-		not operated	BOD analyzer and model (Dissolour, oxidation tank, RBC) don't work correctly since installed here	
2.5. Other Technology					
Application procedure	Submission of candidate by local government; Candidate selection by TC Bakti				
3. Impact					
3.1. Application of Technology	Planning & design of human waste & domestic wastewater disposal; Management of human waste & domestic wastewater		Concept of non-tech - aspect was spread; Concept of waste water can't be understood	Subject are not relevant to the job; Less consideration how to promote the present situation; Equipment was not enough	Education of ES
3.2. Impact to the sector	Planning & design of human waste & domestic wastewater disposal; Management of human waste & domestic wastewater; Human waste & domestic wastewater disposal technology		ibid	ibid	
Sustainability (overall evaluation)					
Transfer technology to C/P was delayed; Training curriculum is short of maintenance and institutional aspect					
Necessary measurement to be taken:					
<ol style="list-style-type: none"> 1. Review of material to meet present condition 2. Development of new material on Management and Institutional aspect. 3. Technical Transfer of appropriate technology for evaluating and promoting (O & M) 4. To develop training method based on the REPURTA VII 5. Urban change should be included 					

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