

TRANSFORMER PROTECTOR

WORLD REFERENCES



**Transformer, On Load Tap Changer,
Oil Cable Boxes
Explosion and Fire Prevention**



TRANSFORMER PROTECTOR

WORLD REFERENCES

Document revisions

Ref.	Date	Done	Checked	Approved	Revision Subject	New revision applied to system id
FfTPk060728	28/07/06	DF	AM	AM	Order from Mexico	
FfTPk060809	09/08/06	DF	AM	AM	Order from Qatar	
FfTPk060831	31/08/06	DF	AM	AM	Order from Romania	

DOCUMENTS AVAILABLE ON REQUEST TO SERGI

Publications

- [1] "Development of a Magneto-Thermo Hydrodynamic Model and Design of a Transformer, On load Tap Changer and Bushing Oil Cable Box, Explosion and Fire Prevention", IEEE Publication, ref. rpiip01a dated 02/05/99.
- [2] "Comparison of the SERGI developed Magneto-Thermo Hydrodynamic Model results with measurements made on a 160KVA Transformer", IEEE Publication, ref. rpijp01a dated 29/05/00.
- [3] "Study and Design of Power Plant Transformers Explosion and Fire Prevention", Australia, TechCon 2001, ref. rpitp05a dated 19/04/01.
- [4] "Transformer Relief Valves efficiency calculations by comparison to the SERGI TRANSFORMER PROTECTOR during short-circuits", ref. rpisp01a.

Documents

- Brochure, ref. fTPq
- Adaptation on New Transformers, ref. fTPb
- Adaptation on Existing Transformers, ref. fTPc
- Conservator Shutter, ref. fTL
- System description to be used for Customer Technical Specifications, ref. fTPd
- "On Load Tap Changer Rupture Disk Testing", jointly executed in Mexico on December 4-8, 2000 with Maschinenfabrik Reinhausen, ref. eq4d.

Disclaimer

SERGI makes no express representation or warranty regarding the contents of this manual. We reserve the right to amend the manual or revise the product specifications described. The information contained in this manual is intended solely for the general use by our customers. Customers should be aware that the Transformer Protection field is subject to many patents. All of our customers should ensure their use of product does not infringe upon any patents.

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As a result of an extensive Research Programme started in 1995, a transformer explosion prevention technique was invented in 1999 and patented worldwide. Today, the TRANSFORMER PROTECTOR is the sole technology that saves transformers from explosion and fire.

The TRANSFORMER PROTECTOR has been approved by 78 companies and has been sold in 40 countries.

The TRANSFORMER PROTECTOR is commercialised since mid-2000 and the sales are considerably increasing each year. The table below shows the evolution of the orders between 2000 and 2005.

Year	TRANSFORMER PROTECTOR sold
2000	6
2001	27
2002	59
2003	65
2004	95
2005	218
2006	180
Total Sales, up to 31/08/06	650

- Figure 1, hereunder, shows the number of systems sold versus transformer power.
- Figure 2 shows the origin of orders, end user and site location.

Figure 1: TP SOLD VERSUS TRANSFORMER POWER

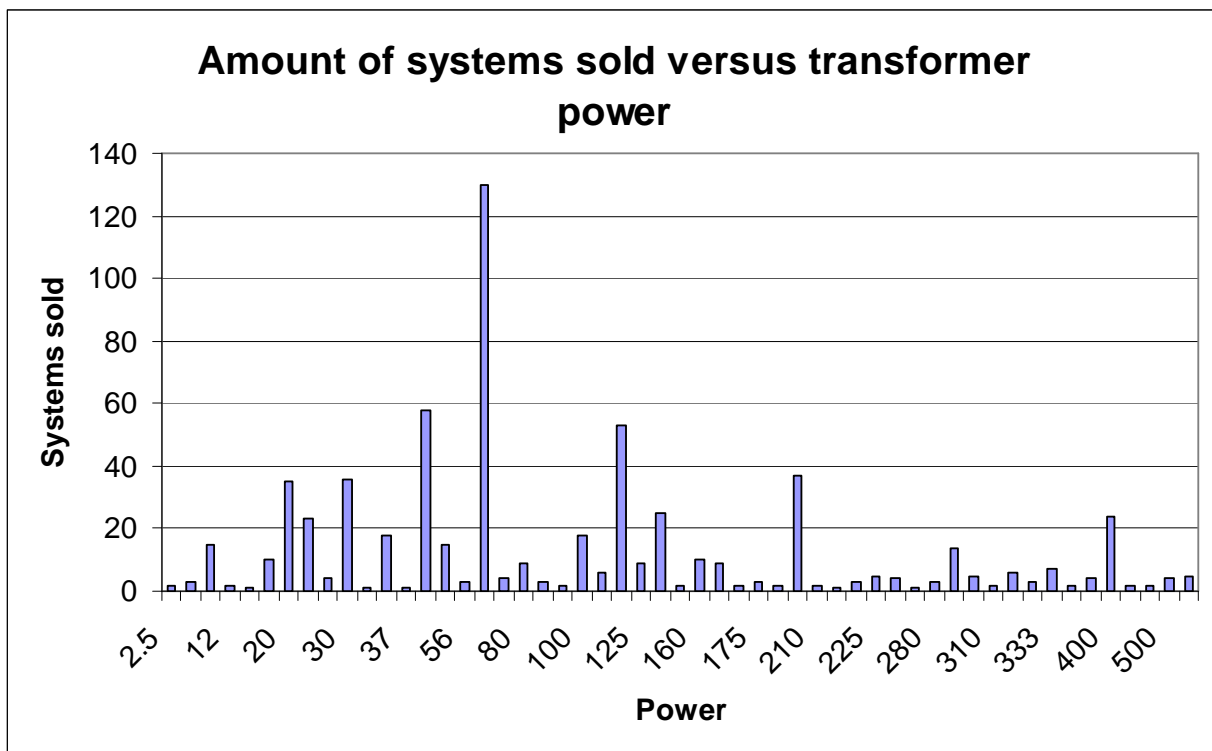


Figure 2: ORIGIN OF ORDERS

Country	Customer	End User	Site/ Project	Position	MVA	Nb	PO date
Italy	AEC EW	AEC EW	Merano Teatro	S/S	8	2	20/06/00
Spain	Siderurgica Sevillana	Siderurgica Sevillana	Sevilla	I	70	1	29/06/00
Spain	Siderurgica Sevillana	Siderurgica Sevillana	Sevilla	I	60	1	29/06/00
Spain	Siderurgica Sevillana	Siderurgica Sevillana	Sevilla	I	160	1	29/06/00
Vietnam	PT Unindo	VINAINCON	Normura Haiphong	PP	60	1	14/12/00
Thailand	MEA	MEA	Suwintawong	S/S	60	1	09/02/01
Spain	UTE SAVE	GIF	High Speed Train	T	60	16	10/04/01
Botswana	Pauwels Mechelen	Botswana Power Co	Segoditshane	S/S	125	1	06/06/01
Russia	Zaporozhtransformator	MES Centra		S/S	200	4	14/06/01
Bosnia	ELOB	Bosnia & Herzegovina Elektroprivreda		S/S	40	1	25/06/01
Khyrgyztan	Alstom		Aigul Tash	S/S	150	1	22/11/01
Khyrgyztan	Alstom		Aigul Tas	S/S	25	2	22/11/01
Azerbaijan	Siemens		Agcabedi	S/S	300	1	20/12/01
Botswana	Pauwels Mechelen	Botswana Power Co	Thamag	S/S	125	2	09/01/02
Brazil	Expansion	Isinelco	Emborcação	S/S	30	11	30/01/02
Venezuela	Lincas(Siemens)	CADAFE	Ejido	S/S	40	7	14/02/02
Mexico	Voltran	Luz y Fuerza	Partida 5	S/S	30	3	21/02/02
Guatemala	IMOCOM	INDE	Escuintla	S/S	100	1	28/02/02
Latvia	Remeks Serviss	Latvenergo	TEC-1, Riga	S/S	200	2	07/03/02
Saudi Arabia	SSEM	SEC-CRB	8011	S/S	30	1	10/03/02
Saudi Arabia	SSEM	SEC-CRB	8808	S/S	100	2	12/03/02
Namibia	Siemens	Nampower	Kuiseb	S/S	160	1	12/03/02
Namibia	Siemens	Nampower	Kuiseb	S/S	30	1	12/03/02
Taiwan	Yu San Electric	Taiwan Power Corporation	Kao Shiung	R	125	2	13/03/02
Mexico	Voltran	CFE	Guadalajara	S/S	40	2	26/03/02
Taiwan	Yu San Electric	Taiwan Water Co.	Kao Shiung	R	20	1	07/05/02
Cuba	Energoinport	UNE	La Havana y Cotorro	S/S	300	2	05/06/02
Latvia	Alstom	Plavinas Hidroelektrostacija	Plavinas	HPP	125	1	25/06/02
Spain	Drilco	Inabensa	Villaverde	S/S	30	2	08/08/02
Romania	Herbing	ABB	Constanta Nord	S/S	250	2	30/08/02
Indonesia	WNP	PT PLN	Medan	S/S	60	2	18/09/02
Mexico	Prolec	Luz y Fuerza	Partida 2	S/S	330	3	19/09/02
Mexico	Prolec	Luz y Fuerza	El Sauz	S/S	170	1	10/10/02
Saudi Arabia	Alfanar	SEC-CRB	8070, 8802, 8803	S/S	100	3	23/10/02
Estonia	Remeks Serviss	Eesti Energia	Pussy	S/S	240	1	19/11/02
Jordan	JEPCO	JEPCO		S/S	20	6	20/12/02
Kazakhstan	Zaporozhtransformator	KEGOC	Bukmtarminskaja HPP	HPP	120	1	20/01/03
Qatar	France Transfo	Qatar Petroleum		R	20	2	14/02/03
Qatar	France Transfo	Qatar Petroleum		R	30	2	14/02/03
Taiwan	Yu San Electric	Taiwan Water Co.		I	8	1	13/03/03
USA	NSTAR Boston	NSTAR Boston	492	S/S	125	2	17/03/03
Malaysia	Hyundai	TNB	Jalan Pantai	S/S	30	2	19/05/03
Malaysia	Hyundai	TNB	Jalan Pantai	S/S	90	2	19/05/03
Malaysia	Hyundai	TNB	Jalan Pantai	S/S	240	3	19/05/03
Jordan	JEPCO	JEPCO		S/S	12	2	30/05/03
Jordan	JEPCO	JEPCO		S/S	25	4	30/05/03

SERGI, Transformer, On Load Tap Changer, Oil Cable Boxes Explosion and Fire Prevention

Country	Customer	End User	Site/ Project	Position	MVA	Nb	PO date
Mexico	CFE	CFE	Region Sureste	PP	115	6	07/08/03
Mexico	CFE	CFE	Occidente	PP	210	2	20/08/03
Mexico	CFE	CFE	Occidente	PP	375	2	20/08/03
Mexico	CFE	CFE	Noroeste	PP	120	3	20/08/03
Mexico	CFE	CFE	Norte	PP	375	2	19/08/03
Mexico	CFE	CFE	Tula	PP	120	15	11/09/03
Belarus	Zaporozhtransformator	BELENERGO	Lukomlskaia	PP	160	1	01/07/03
Brazil	ISINELCO	Expansion Transmissao	Marimbondo	S/S	40	4	23/10/03
Bulgaria	Hanjiev	Varna PP	Varna	PP	32	1	05/12/02
Latvia	Alstom	Plavinas Hidroelektrostacija	Plavinas	HPP	215	1	22/11/02
Mexico	Luz y Fuerza	Luz y Fuerza	Tepexic	HPP	20	3	10/09/03
Mexico	Condumex	Luz y Fuerza	Hipodromo	S/S	20	2	07/11/03
USA	Iljin Heavy Industries	Kansas City Board of Public Utilities	Piper	S/S	56	2	11/11/03
Mexico	Condumex	Luz y Fuerza		PP	10	5	18/03/04
Mexico	Condumex	Luz y Fuerza		PP	15	3	18/03/04
Venezuela	ABB Brazil	EDELCA	SE San José	S/S	300	1	21/04/04
Spain	DRILCO	SAVE UTE	AVE Barcelona-Lerida	T	60	6	21/04/04
Afghanistan	SIEMENS	Ministry of Water & Power	Kaboul East	S/S	25	1	26/04/04
Venezuela	ABB Brazil	EDELCA	San José	S/S	300	1	06/05/04
Brazil	ISINELCO	Expansion Transmissao	Itumbiara	S/S	50	4	11/05/04
Spain	DRILCO	Inabensa/Iberinco	AVE Madrid-Valladolid	T	60	6	13/07/04
Brazil	ATE TRANSMISSORA ELETRICA	ATE TRANSMISSORA ELETRICA	Assis	S/S	33	4	23/08/04
Brazil	ATE TRANSMISSORA ELETRICA	ATE TRANSMISSORA ELETRICA	Assis	S/S	500	4	23/08/04
Brazil	ATE TRANSMISSORA ELETRICA	ATE TRANSMISSORA ELETRICA	Araraquara	S/S	27	4	23/08/04
Romania	Herbing	Transelectrica	Isalnita	S/S	200	1	02/09/04
Mexico	Comisión Federal de Electricidad	Comisión Federal de Electricidad	Mazatlan	PP	180	2	03/09/04
USA	Kansas City Board of Public Utilities	Kansas City Board of Public Utilities	Maywood North	S/S	37	1	20/09/04
South Africa	KONCAR	ESKOM	Hendrina	PP	220	3	27/09/04
USA	ABB	Kansas City Board of Public Utilities	Quindaro	S/S	170	1	01/10/04
Pakistan	SIEMENS Pakistan	WAPDA	NTDC/KESC Interconnexion	T	200	6	07/10/04
United Kingdom	ONYX	ONYX	Selchp	PP	40	1	13/10/04
USA	Kansas City Board of Public Utilities	Kansas City Board of Public Utilities	Barber	S/S	80	1	18/10/04

SERGI, Transformer, On Load Tap Changer, Oil Cable Boxes Explosion and Fire Prevention

Country	Customer	End User	Site/ Project	Position	MVA	Nb	PO date
Mexico	Ferranti	CFE	Central Térmica Tuxpan	PP	400	1	21/10/04
Jordan	JEPCO	JEPCO		S/S	10	2	07/11/04
Jordan	JEPCO	JEPCO		S/S	20	4	07/11/04
Kazakhstan	TOO MANYZ	KEGOC		S/S	60	3	08/11/04
Kazakhstan	TOO MANYZ	KEGOC		PP	250	1	08/11/04
USA	KC BPU	KC BPU	Quindaro	PP	14	1	23/11/04
Czech Republic	HESIA	PRE	Praha stred	PP	60	4	26/11/04
Mexico	CFE	CFE	Zimapan	PP	60	6	28/10/04
Mexico	CFE	CFE	Lerma	PP	50	4	25/11/04
Mexico	CFE	CFE	Chicoasen	PP	120	9	25/11/04
Mexico	CFE	CFE	Angostura	PP	225	5	25/11/04
Russia	Zaporozhtransformator	FSK	Mashuk	S/S	200	1	17/12/04
Kazakhstan	Zaporozhtransformator	KEGOC	Bukhtarminkaia	S/S	120	1	06/01/05
Venezuela	ELECNOR	CADAFE	Calabozo	S/S	100	2	03/02/05
Syria	SHIMBAR	GOLD	El Bab & Tadeif	S/S	2.5	2	15/02/05
Syria	SHIMBAR	GOLD	EL Bab & Tadeif	S/S	10	4	15/02/05
Indonesia	Meta Epsi	PLN	Musi	HPP	84.5	3	19/02/05
Paraguay	Trafo Brazil	ANDE	Estacion Pte Franco	S/S	50	1	14/02/05
Mexico	ABB Mexico	PEMEX	Cactus	S/S	56	1	04/02/05
Indonesia	PT Tehate	PLN	Binjai	S/S	60	1	30/03/05
Russia	ZTR	FSK	Aluminievaia	S/S	167	7	30/03/05
USA	Pauwels Canada	KC BPU	Nearman Creek	S/S	100	1	14/04/05
Romania	Areva	Transelectrica	Sibiu Sud	S/S	250	1	11/04/05
Romania	ABB	Transelectrica	Gutinas	S/S	400	2	22/04/05
Romania	ABB	Transelectrica	Gutinas	S/S	100	1	22/04/05
Romania	Vatech	Transelectrica	Fundeni	S/S	400	2	18/02/05
Romania	Vatech	Transelectrica	Fundeni	S/S	100	1	18/02/05
Romania	Vatech	Transelectrica	Iernut	S/S	200	1	18/02/05
Russia	Elektrozavod	FSK	Barnaulskaia S/S	S/S	60	4	02/05/05
USA	KC BPU	KC BPU	Nearman Creek	S/S	40	1	02/05/05
Russia	Elektrozavod	FSK	Kluchiki	S/S	125	1	06/05/05
Russia	Elektrozavod	FSK	Novoanjerskaia	S/S	60	3	06/05/05
Paraguay	Toshiba	ANDE	Santa Clara	S/S	25	6	21/04/05
Mexico	CFE	CFE	Salamanca	TPP	120	3	12/05/05
Romania	Koncar	Transelectrica			400	3	12/05/05
Mexico	Siemens Mexico	CFE	Tuzania	S/S	60	1	07/09/04
Mexico	Siemens Mexico	CFE	San Martin	S/S	60	1	07/09/04
Mexico	Siemens Mexico	CFE	Sector Juarez	S/S	60	2	07/09/04
Romania	Electroputere	Transelectrica		S/S	200	7	01/07/05
Jordan	JEPCO	JEPCO		S/S	25	6	19/07/05
Brazil	ATE II Transmissora de Energia S.A	ATE II Transmissora de Energia S.A	Colinas	S/S	60	4	22/07/05
Brazil	ATE II Transmissora de Energia S.A	ATE II Transmissora de Energia S.A	Ribeiro Goncalves	S/S	60	14	22/07/05
Brazil	ATE II Transmissora de Energia S.A	ATE II Transmissora de Energia S.A	Sao Joao do Piaui	S/S	60	4	22/07/05
Brazil	ATE II Transmissora de Energia S.A	ATE II Transmissora de Energia S.A	Sao Joao do Piaui	S/S	33	7	22/07/05

SERGI, Transformer, On Load Tap Changer, Oil Cable Boxes Explosion and Fire Prevention

Country	Customer	End User	Site/ Project	Position	MVA	Nb	PO date
Brazil	ATE II Transmissora de Energia S.A	ATE II Transmissora de Energia S.A	Sobradinho	S/S	33	7	22/07/05
Namibia	NAMPOWER	NAMPOWER	Ruacana	HPP	40	2	27/07/05
Namibia	NAMPOWER	NAMPOWER	Ruacana	HPP	60	2	27/07/05
Namibia	NAMPOWER	NAMPOWER	Van Eck	S/S	160	1	27/07/05
Namibia	NAMPOWER	NAMPOWER	Omburu	S/S	315	2	27/07/05
Mexico	CFE	CFE	Petalcalco	PP	400	6	16/08/05
Mexico	CFE	CFE	Aguamilpa	PP	140	9	16/08/05
Mexico	CFE	CFE	Manzanillo	PP	120	12	16/08/05
Mexico	CFE	CFE	Villa de Reyes	PP	400	2	16/08/05
Kazakhstan	ZTR	ZTR	Pavlodar Aluminium	I	167	2	16/08/05
Mexico	AREVA	CFE	Las Fesas	S/S	140	4	26/08/05
Mexico	AREVA	CFE	Santa Maria	S/S	140	4	26/08/05
Bulgaria	Handjiev	NEK		S/S	250	8	22/08/05
Bulgaria	Handjiev	NEK		S/S	200	1	22/08/05
Russia	Zaporozhtransformator	FSK	Leningradskaya	S/S	200	1	29/08/05
Spain	APLEIN	GIF	AVE Cordoba-Malaga	S/S	60	6	31/08/05
Namibia	NAMPOWER	NAMPOWER	Auas	S/S	315	2	01/09/05
Namibia	NAMPOWER	NAMPOWER	Kokerboom	S/S	315	2	01/09/05
Mexico	PROLEC	CFE	Baja Sur California	S/S	60	1	05/09/05
Saudi Arabia	ALFANAR	SEC	8812	S/S	100	1	08/09/05
Mexico	Energ Power	CFE	El Cajon	S/S	160	6	28/09/05
Mexico	CFE	CFE	Merida	PP	120	8	31/10/05
Mexico	CFE	CFE	Tuxpan	PP	400	4	31/10/05
Mexico	CFE	CFE	Altamira	PP	450	2	31/10/05
Kazakhstan	ZTR	ZTR	Bukhtarminskaia	HPP	120	1	07/11/05
Russia	Elektrovod	FSK	Novoanjerskaya	SS	60	7	10/11/05
South Africa	VATECH	ESKOM	Matimba	PP	750	2	15/11/05
South Africa	VATECH	ESKOM	Drakensberg	HPP	310	1	07/12/05
Kazakhstan	ZTR	ZTR	Novaya	SS	40	2	17/11/05
Kazakhstan	ZTR	ZTR	Ust-Kamenogorsk	HPP	40	1	18/11/05
Russia	ZTR	ZTR	Leningradskaya	SS	333	3	17/11/05
Romania	Koncar	Transelectrica	Bucuresti Sud	SS	400	2	29/09/05
Romania	Koncar	Transelectrica	Bucuresti Sud	SS	200	2	29/09/05
Philippines	Siemens	TRANSCO	Ormoc	SS	150	1	07/12/05
Mexico	Siemens	CFE	Guemez	SS	30	7	26/10/05
Mexico	Siemens	CFE	Ascension II	SS	40	4	26/10/05
Mexico	PROLEC	IEM	Cerro Blanco	SS	30	4	16/01/06
Pakistan	AREVA	NESPAK	DHA Creek City	SS	40	1	14/12/05
Jordan	JEPCO	JEPCO		SS	20	8	15/12/05
Mexico	IBERDROLA	CFE	El Palmar	SS	40	7	02/01/06
Mexico	IBERDROLA	CFE	Cabo San Lucas II	SS	30	1	02/01/06
Mexico	IBERDROLA	CFE	La Venta	PP	40	4	02/01/06
Pakistan	TBEA	WAPDA	Gazi Barotha Dam	PP	200	3	23/01/06
Pakistan	SIEMENS	KESC	KESC-2480-02	SS	250	2	28/11/05
Pakistan	SIEMENS	KESC	KESC-2480-02	SS	40	8	28/11/05
Spain	Aplein	ADIF	AVE Madrid-Valladolid	SS	15	4	18/01/06
Mexico	ABB	CFE	Cruz Azul	SS	50	2	27/02/06

SERGI, Transformer, On Load Tap Changer, Oil Cable Boxes Explosion and Fire Prevention

Country	Customer	End User	Site/ Project	Position	MVA	Nb	PO date
Cuba	ABB Germany	UNE		PP	70	3	09/02/06
Slovak Rep.	VUJE	SE	Krizovany	S/S	350	2	14/03/06
Portugal	Aplein	EDP	Queluz	S/S	20	2	22/03/06
Romania	Herbing	CNE	Cernavoda	NPP	440	2	06/04/06
Romania	ABB Germany	Transelectrica	Sibiu South	S/S	400	2	21/04/06
Qatar	Siemens India	Kharamaa	High Rise Buildings Towers	S/S	200	6	06/04/06
Qatar	Siemens India	Kharamaa	High Rise Buildings Towers	S/S	60	4	06/04/06
Qatar	Siemens India	Kharamaa	High Rise Buildings Towers	S/S	40	9	06/04/06
Brazil	Siemens Brazil	Eletronorte	Sao Luis II	S/S	50	4	07/04/06
Azerbaijan	Siemens Germany	Azerenergi	Agcabedi	S/S	280	1	13/04/06
Taiwan	Yu San Electric	China Petroleum Co.		S/S	30	2	08/05/06
Mexico	Siemens Mexico	CFE	Nopala	S/S	100	4	27/02/06
Mali	Norelec	SOGEM	Poste de Manantali	S/S	40	1	05/04/06
Mali	Norelec	SOGEM	Poste de Manantali	S/S	20	1	05/04/06
Mexico	CFE	CFE	CT Valle de Mexico	PP	175	3	01/06/06
Ukraine	ZTR	Ukrenergo	Kievskaya	S/S	333	4	01/06/06
Brazil	Eletropaulo	Eletropaulo	Projet USP	S/S	20	1	26/05/06
South Africa	Siemens South Africa	ESKOM	Matimba	PP	750	3	05/05/06
South Africa	Siemens South Africa	ESKOM	Drakensberg	HPP	310	1	05/05/06
Syria	Pauwels	SYSACCO	Queres	S/S	15	1	29/05/06
Brazil	AREVA	Eletronorte	Vila do Conde	S/S	250	1	23/06/06
Indonesia	PT Arya Sada Perkasa	PT PLN	IBRD Loan 4712-IND, Lot 5B	S/S	100	1	05/07/06
Indonesia	PT Arya Sada Perkasa	PT PLN	IBRD Loan 4712-IND, Lot 5B	S/S	60	16	05/07/06
Syria	Lenker	GOLD	Al Balikh	PS	20	2	13/07/06
Mexico	Iberdrola	CFE	Puerto Altamira	S/S	140	4	25/04/06
Mexico	Iberdrola	CFE	Llano Grande	S/S	80	4	25/04/06
Mexico	Iberdrola	CFE	Arroyo del Coyote Bco 3	S/S	140	4	25/04/06
Mexico	Iberdrola	CFE	Arroyo del Coyote Bco 3	S/S	25	4	25/04/06
Cuba	ABB Canada	UNE	Camaguey	S/S	15	2	17/07/06
Cuba	ABB Canada	UNE	Camaguey	S/S	20	3	17/07/06
Mexico	CFE	CFE	Los Alamos	S/S	100	1	20/07/06
Mexico	CFE	CFE	Los Alamos	S/S	60	2	20/07/06
Mexico	AREVA	CFE	Jilotepec	S/S	80	4	25/07/06
Mexico	AREVA	CFE	Santa Lucia	S/S	10	4	25/07/06
Mexico	Isolux	CFE	Xul-Ha SS	S/S	40	3	01/06/06
Qatar	TATA	Kharamaa	The Pearl Island	S/S	280	2	04/08/06
Qatar	TATA	Kharamaa	The Pearl Island	S/S	60	10	04/08/06
Romania	Herbing	Transelectrica	Sardanesti	S/S	200	2	31/08/06
Total						650	

T: Transmission
I: Industry
R: Refinery
S/S: Substation
PP: Power Plant
HPP: Hydro Power Plant
TPP: Thermal Power Plant
NPP: Nuclear Power Plant
PS: Pumping Station



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