



## **BHEL – INDUSTRIAL SYSTEMS GROUP REFERENCE LIST**

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## 1. METALLURGICAL INDUSTRY

## 1.1 ROLLING MILL

| Sl. No. | Customer   | Project Description  | Year of Completion/ Commissioning |
|---------|--|--|-----------------------------------|
| 1.      | Rashtriya Ispat Nigam Ltd.,<br>Visakhapatnam Steel Project,<br>Visakhapatnam | Light Medium Merchant Mill<br>Upgradation of Automation System consisting of programmable logic controllers, MMI Stations, UPS Systems, etc.                       | 2006                              |
| 2.      | Rashtriya Ispat Nigam Ltd.,<br>Visakhapatnam Steel Project,<br>Visakhapatnam | Medium Merchant & Structural Mill and Wire Rod Mill Upgradation of Automation System consisting of programmable logic controllers, MMI Stations, UPS Systems, etc. | 2004                              |
| 3.      | KYCR,<br>Bangladesh  | Single Stand Reversing Mill<br>Complete Electrics & Automation for the mill.   | 2002                              |
| 4.      | ISSCO, Burnpur   | Bar & Rod Mill<br>Cobble & crop shear controls   | 2000                              |
| 5.      | Salem Steel Plant<br>Salem   | 20Hi Sendzimir Mill<br>Complete replacement of Analog drive controllers by Digital Drive controllers and Mill Automation system                                    | 2000                              |
| 6.      | Shamon Ispat Ltd.,<br># Mecon Ranchi   | 4 Hi-Cold Rolling Mill<br>Hydraulic AGC  | 1999                              |
| 7.      | Bhilai Steel Plant,<br>Bhilai  | Digital drives for Roller Table<br>2sets, 750 Amps, 250 volts, Thyristor Converter with digital regulator.   | 1999                              |
| 8.      | Durgapur Steel<br>Plant  | Bar & Rod Mill<br>Shear Drive motor & control  | 1999                              |

| Sl. No. | Customer                           | Project Description   | Year of Completion/ Commissioning |
|---------|------------------------------------|---|-----------------------------------|
| 9.      | Indian Ordnance Factory, Ambernath | Cold Rolling Mill # Mecon<br>10 sets, 40 A to 2660A Thyristor Converters for breakdown mill, 4 sets. 178A to 1640A Thyristor Converters for finishing mill. 3 Nos. 900 KVA to 1250 KVA converter transformers, switchgears, PLCs and alarm annunciation.  | 1997                              |
| 10.     | Bhilai Steel Plant, Bhilai         | Merchant Mill<br>2 nos. Thyristor Converters for 160 KW Pusher drives for pre-heating furnace.  | 1997                              |
| 11.     | Bhilai Steel Plant, Bhilai         | Merchant Mill<br>75 Amps. Field converters for Stands 4, 7 & 11.  | 1997                              |
| 12.     | Salem Steel Plant Salem            | Steckel Mill<br>Cropshear optimisation<br>1 no. Vision control system   | 1996                              |
| 13.     | Bokaro Steel Plant Bokaro          | Modernisation of Coiler & Shear Drive of HSM<br>3 sets 800 A. Thyristor Converters with DS286 DC motors regulation for coiler drive, 1 set, 1200 A, Thyristor Converters with DS286 DC regulation for shear drive, DIPAS automation system for automatic head and tail end cutting & PC based MMI system. | 1995                              |

| Sl. No. | Customer                        | Project Description   | Year of Completion/ Commissioning |
|---------|---------------------------------|---|-----------------------------------|
| 14.     | Salem Steel Plant.<br>Salem     | Hot Rolling Steckel Mill<br>6 Nos. 900 KW to 4500 KW DC motors, 6 Nos., 160 KW to 750 KW DC motors, 263 Nos., 0.5KW to 220 KW mill duty DC motors. 3 Nos. 3.3 KV, 850 KW AC Motors. 280 sets Thyristor Converter panels with max. current rating of 650 KVA for Roller Table Motors. HT/LT switchgear equipments. PLC's, Pulpits, Ventilation and air conditioning system, cabling. | 1995                              |
| 15.     | Bokaro Steel Plant<br>Bokaro    | Hot Strip Mill<br>Crop shear optimisation<br>1 No. Vision System & 1 No. Optimisation Computer.   | 1995                              |
| 16.     | Bokaro Steel Plant<br>Bokaro    | GTO-IMD Systems for scraffing<br>Exhauster Drive of Slabbing Mill<br>1 set, 800 KW, 6.6 KV GTO inverter,<br>1 No. 1200 KVA, 11 KV/2.6 KV transformer,<br>1 no. 1100 KVA, 2.3/6.82 KVA transformer, DC link reactors, switch gears, mimic panel and PLC.   | 1995                              |
| 17.     | Rajinder Steels<br>through ABIL | Hot Strip Mill<br>6 sets, 4800 A. 1100V Thyristor Converters for finishing stands, 1 set, 7200 A, 1000 V Thyristor Converter for roughing mill and 1 set, 2250 A. 500 V Thyristor Converter for vertical edger. DC motors reactors, Busbars & Cabling   | 1995                              |

| Sl. No. | Customer   | Project Description  | Year of Completion/ Commissioning |
|---------|--|--|-----------------------------------|
| 18.     | Rashtriya Ispat Nigam Ltd.,<br>Visakhapatnam Steel Project,<br>Visakhapatnam | Medium Merchant and Structural Mill<br>104 Nos. 3.5 KW to 1700 KW DC motors, 90 Nos. Thyristor Converters of 95A to 2450A, with tension controls 27 Nos. thyristor transformers of 725 KVA to 2920 KVA, programmable logic controllers, process control computers, CCTVs, inter-communications, UPS Systems, Isolators, PCC's, MCC's, Reactors, Air Conditioning equipment, fire detection/alarm system etc. | 1995                              |
| 19.     | Bhilai Steel Plant,<br>Bhilai  | Blooming /Mill /Rail & Structural Mill<br>Supply of equipment for 132 KV Switchyard & MSDS-1,<br>civil work etc.   | 1995                              |
| 20.     | Bhilai Steel Plant,<br>Bhilai  | Rail & Structural Mill<br>MG set replacement for Roughing stand - 4000 K.W.<br>Intermediate stand - 4000 KW,<br>Finishing Stand - 1800 KW by Thyristor Converters comprising of 2 nos. 12 pulse, 14 KA, Reversible and 1 no. 6 pulse, 6 KA, Reversible converters, Transformers, High speed breakers, reactors, ventilation system, DAS and civil works.   | 1995                              |
| 21.     | Rourkela Steel Plant,<br>Rourkela  | Tandem Cold Mill<br>MAR replacement by Thyristor Converters of 5400 Amps.<br>Reversible with high speed breakers for Stand 1 & 2.  | 1995                              |



| Sl. No. | Customer                          | Project Description   | Year of Completion/ Commissioning |
|---------|-----------------------------------|---|-----------------------------------|
| 22.     | Rourkela Steel Plant,<br>Rourkela | Tandem Cold Mill<br>MAR replacement by Thyristor Converters of rating 675 Amps, 460 Volts (reversible) for screw down drive motors rated 55 Kw/110 Kw for all five Stands.  | 1995                              |
| 23.     | Bhilai Steel Plant,<br>Bhilai     | Rail & Structural Mill<br>1 set of Addl. Thyristor Bridges for augmentation of Roughing Stand Thyristor Converter from 4 MW to 7 MW including HSDCCB and DC motors Reactor.   | 1995                              |
| 24.     | Bhilai Steel Plant,<br>Bhilai     | Rail & Structural Mill<br>Intermediate stand Thyristor Converter upgradation to 7 MW from 4 MW<br>2 Nos. 4100 A Thyristor converters. 2 Nos. 4020 A DC motors reactors, 3 Nos. 6000 A DC motors High speed circuit breakers. PLC, fire detection alarm equipment.                       | 1994                              |
| 25.     | Bhilai Steel Plant,<br>Bhilai     | Blooming Mill<br>8 MW Main Drive MG set replacement<br>2 sets, 20.5 KA, 930 V DC Thyristor Converters with PLC, 2 Nos. 12.25 MVA, 11 KV/875-875V Transformers. 4 Nos 11 KV, 1250 A VCB Panels, 4 Nos.,5000 A High speed circuit breakers. 4 Nos., 4600 A DC reactors, Busbars & Cabling | 1994                              |

| Sl. No. | Customer                          | Project Description   | Year of Completion/ Commissioning |
|---------|-----------------------------------|---|-----------------------------------|
| 26.     | Bokaro Steel Plant<br>Bokaro      | Hot Strip Mill<br>MAR replacement by Thyristor Converters for shear drive of 1700 KW and 3 Nos. coiler drives of 1000 KW each. 1 No. 12 KA, 630 Volts and 3 Nos. 8 KA, 630 Volts Thyristor Converters with microprocessor based digital regulation system and VME based automation system for shear drive.  | 1994                              |
| 27.     | Rourkela Steel Plant,<br>Rourkela | Tandem Cold Mill<br>MAR replacement by 4 Nos. Thyristor Converters of rating 5400 Amps, 800 Volts (reversible) for Stand 1 & 2, DC motors rated 2240 KW and 1860 KW respectively including microprocessor based superimposed controls for mill interlocks and master reference generation.  | 1994                              |
| 28.     | Rourkela Steel Plant,<br>Rourkela | 1700mm Hot Strip Mill MG set replacement and automation for Roughing Mill stand nos. 1 & 2<br>2 sets, 7 KA Thyristor Converters for roughing stand No.1, 1 set 10 KA Thyristor Converters for roughing stand No.2, 1 set, 4 KA Thyristor Converters for edger No.2, 19 sets Thyristor Converters with current ratings from 30 A to 580 A for auxilliary drives, associated converter transformers and switchgears. PLCs for drive interlocking and mill automation functions involving rolling scheduled storage, automatic roll positioning & reversal, material tracking etc., PC based MMI systems. with associated civil works and a/c. | 1993                              |

| Sl. No. | Customer                                | Project Description   | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 29.     | Rourkela Steel Plant,<br>Rourkela       | Hot Strip Mill - Run out Table<br>9 nos. 468 KVA, VVVF inverter with 3 Nos. HT transformers.<br>Hot Strip Mill - 4th & 5th Down coiler<br>6 Nos. 230 KW - 650 KW DC motors<br>, 8 Nos. 5 KW - 39 KW DC motors, matching Thyristor Converters, 30 Nos. LT AC motors, MCCs, PCCs, 3 Nos. 468 KVA VVVF inverters programmable logic controllers, room ventilation system, battery & battery charger. | 1991<br><br>1994                  |
| 30.     | Bhilai Steel Plant,<br>Bhilai           | Billet Mill<br>MAR replacement by Thyristor Converters for 1300 KW DC drives for 11 stands and Data Acquisition System.   | 1990                              |
| 31.     | Indian Iron & Steel Co.Ltd.,<br>Burnpur | Bar & Rod Mill<br>MAR replacement by 2 nos. 800 KW Thyristor Converters for auxiliary drives.   | 1990                              |
| 32.     | Bokaro Steel Plant<br>Bokaro            | Hot Strip Mill<br>MAR replacement by thyristor Converters (reversible) for 2 x 5000 KW, 750 V DC motors for 7 Nos. finishing stands.  | 1990                              |
| 33.     | Rourkela Steel Plant,<br>Rourkela       | Tandem Cold Mill<br>Mar replacement by Thyristor Converters for Stands 3 & 4 - 5sets of Thyristor Converters of rating 5400 Amps (reversible) with high speed breakers.   | 1990                              |

| Sl. No. | Customer   | Project Description  | Year of Completion/ Commissioning |
|---------|--|--|-----------------------------------|
| 34.     | Bhilai Steel Plant, Bhilai                             | Merchant Mill<br>MAR replacement by Thyristor Converters for 1300 KW DC drives for 12 stands and Data Acquisition System.  | 1989                              |
| 35.     | Rourkela Steel Plant, Rourkela                         | Tandem Cold Mill<br>MAR replacement by Thyristor Converters for stand 5 & Reel. 4 sets of Thyristor Converters of rating 5400 Amps (reversible) with high speed breakers.  | 1989                              |
| 36.     | Sunflag Iron & Steel Cold Mill. Ltd., Bhandara, Nagpur | Bar & Section Mill<br>Main stand 18 Nos. 250-600 KW DC motors, Auxiliary drives 11 nos. 2.5 KW-65 KW DC motors, 1 No. 235 KW DC motor for shear drive, matching Thyristor Converters, 6 Nos. of 32-120 KVA variable voltage variable frequency inverters for roller table motors, programmable logic controllers, 3 Nos. Real time process computers for mill control, minimum tension control and cooling bed control along with CCTV & inter-communication system. | 1989                              |
| 37.     | Durgapur Steel Plant, Durgapur                         | Blooming Mill<br>2 nos. 300 KW & 1 no. 37.5 KW DC motors with Thyristor Converters   | 1989                              |
| 38.     | Alloy Steel plant, Durgapur                            | Billet Mill<br>MG set replacement for Manipulator Drives by 4 nos. 67 KW DC motors with associated Thyristor Converters and HT transformer.  | 1989                              |

| Sl. No. | Customer   | Project Description   | Year of Completion/ Commissioning |
|---------|--|---|-----------------------------------|
| 39.     | Bokaro Steel Plant<br>Bokaro   | Hot Strip Mill<br>MAR replacement for 13 Nos.<br>Auxiliary DC drives by 8 KA Thyristor<br>Converters  | 1989                              |
| 40.     | Mukand Iron &<br>Steel Works Ltd.,<br>Bombay                                       | Wire Rod Mill & Bar Mill<br>5 sets of Thyristor Converters of<br>3000 Amps, non-reversible along<br>with thyristor transformers.<br>2 sets of thyristor converters of 600<br>Amps. non - reversible along with<br>thyristor transformers.   | 1989<br><br>1991                  |
| 41.     | Bhilai Steel Plant,<br>Bhilai  | Wire Rod Mill<br>MAR replacement by Thyristor<br>Converters for 4 Nos. 1300 KW DC<br>motors of roughing stands.   | 1988                              |
| 42.     | Pennar Steel Ltd.,<br>Hyderabad  | 4-Hi Reversible Mill<br>Pay off Reel - 1 No. 105 KW DC<br>Motor, Main Stand - 750 KW DC<br>Motor, Delivery Tension Reel & Entry<br>Tension Reel - each 2x210 KW DC<br>motor, matching Thyristor<br>Converters, Automatic gauge control,<br>Auto slowdown & programmable<br>logic controllers for mill control.  | 1987                              |
| 43.     | Rashtriya Ispat<br>Nigam Ltd.,<br>Visakhapatnam<br>Steel Project,<br>Visakhapatnam | Wire Rod Mill<br>Main - 25 Nos. 700 KW - 2000 KW<br>DC motors , Aux - 68 Nos. 12 KW -<br>75 KW DC motors, 171 Nos. 2.2 KW<br>- 200 KW AC Motors, Associated<br>Thyristor Converter, with<br>programmable logic controller and<br>associated controls, Process &<br>Production Computers and closed<br>circuit TV, Intercom, MCC/PCC, fire<br>fighting system. | 1986                              |

| Sl. No. | Customer                              | Project Description  | Year of Completion/ Commissioning |
|---------|---------------------------------------|--|-----------------------------------|
| 44.     | Tata Iron & Steel Co.Ltd., Jamshedpur | Bar & Rod Mill<br>Main 17 Nos. 200 KW - 1950 KW,<br>Aux. 15 Nos. 15 KW - 150 KW DC motors.   | 1986                              |
| 45.     | Bokaro Steel Plant Bokaro             | Horizontal Rolls of Main Stands - Slabbing Mill<br>MAR replacement - 2 Nos. 30 KA, fully reversible converter in DSS connection with existing Inter Phase Transformer for 2 Nos. 6700 KW, 70 V DC motor with new regulation equipment.   | 1986                              |
| 46.     | Bokaro Steel Plant Bokaro             | Vertical Rolls of Main Stands - Slabbing Mill<br>MAR replacement - 2 Nos. 10 KA, fully reversible converter with DSS connection for 2 Nos. 1850 KW DC Motors.<br>Shear Drive - Slabbing Mill<br>2 Nos. 15 KA, fully reversible converter with DSS connection for 2 Nos. 2000 KW DC motors. | 1986<br>1986                      |
| 47.     | Bhilai Steel Plant, Bhilai            | Wire Rod Mill<br>MAR replacement by Thyristor Converters and controls for :<br>- 1 No. 1300 KW DC Motor of Roughing Stand<br>- 1 No. 700 KW DC Motor of Intermediate Stand<br>- 4 Nos. 300 KW DC Motor of Finishing Stand  | 1986                              |
| 48.     | Bhilai Steel Plant, Bhilai            | Wire Rod Mill<br>2 Nos. 1300 KW DC Motors of Roughening Stands.  | 1986                              |

| Sl. No. | Customer                                | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 49.     | Bokaro Steel Plant<br>Bokaro            | Hot Strip Mill<br>MAR replacement for 8 Nos. Aux.<br>DC Drive with 8 KA Thyristor<br>Converter.  | 1986                              |
| 50.     | Bhilai Steel Plant,<br>Bhilai           | Hammer Crusher in Merchant Mill<br>2 Nos. 500 KW 6.6 KV SCIM   | 1985                              |
| 51.     | Modi Steels Ltd.,<br>Modinagar,<br>U.P. | Finishing Block Drives for wire Rod<br>Mill<br>2 Nos. 900/900 KW, 800/1200 RPM,<br>750 V DC motors Tandem coupled,<br>with Thyristor Converters of 2550<br>Amp. rating for each motor and<br>associated closed loop speed<br>regulation system inclusive of loop<br>transducer and its regulation<br>controls. | 1984                              |
| 52.     | Bhilai Steel Plant,<br>Bhilai           | Blooming Mill<br>M G Set replacement by 2000 Amp.<br>710 V DC closed loop Thyristor<br>Converter for 2 nos. 300 KW DC<br>motor.  | 1984                              |
| 53.     | Bhilai Steel Plant,<br>Bhilai           | Main drive Vertical Stand in<br>Merchant Mill<br>1 No. 800 KW DC Vertical Motor  | 1984                              |
| 54.     | Nagarjuna Steel<br>Ltd.,<br>Hyderabad   | 4-Hi Cold Reversing & Skin Pass Mill<br>1 No. 750 KW, 4 Nos. 250 KW, 1 No.<br>125 KW & 2 Nos. 22-44 KW DC<br>motors, Associated Thyristor<br>Converters with Programmable logic<br>controller, Automatic gauge control,<br>Auto slowdown, thickness gauge,<br>load cells and Hydraulic Clutch<br>Coupling      | 1983                              |

| Sl. No. | Customer                      | Project Description   | Year of Completion/ Commissioning |
|---------|-------------------------------|---|-----------------------------------|
| 55.     | Bokaro Steel Plant,<br>Bokaro | Five Stand Tandem Mill - CRM II Complex<br>Pay off Reel - 2 Nos. 530 KW DC motors, Main Stand -<br>5 Nos. 2 x 2425 KW DC motors, Tension Reel - 1 No. 3 x 930 KW DC motor, Auxiliary AC & DC Drives, Thyristor Converters, Hydraulic AGC System, Regulation computer, Optimisation computer with Data logging facilities. Tension & roll force controls, Programmable logic controllers.  | 1982                              |
| 56.     | Bokaro Steel Plant,<br>Bokaro | Twin Stand Temper Mill/DCR Mill - CRM II Complex<br>Pay off Reel - 2 Nos. 530 KW DC motors, Main Stand -<br>4 Nos. 746 KW DC motors, Tension Reel - 1 No. 2 x 930 KW DC motor, Entry & Delivery Tension Slides, Top Roll - 2 Nos. 2x242 KW DC motors, Bottom Roll - 2 Nos. 242 KW DC motors, Aux. AC & DC Drives, Thyristor Converters, Automatic Gauge Control for Stand 1; Hydraulic push up control, Skew control, Constant roll force control, Extension control, Data logging, Programmable logic controllers. | 1982                              |



| Sl. No. | Customer                                  | Project Description   | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 57.     | Bokaro Steel Plant,<br>Bokaro             | Single Stand Temper Mill - CRM II Complex<br>Pay off reel - 2 Nos. 530 KW DC motors , Main Stand - 2 Nos. 672 KW DC motors, Tension Reel - 1 No. 2x930 KW DC motor, Delivery Tension Bridle - Top Roll - 1 No. 2x242 KW DC motor, Bottom Roll - 1No. 242 KW DC motor, Auxiliary AC & DC drives, Hydraulic Push -up control, Skew control, Constant roll force control, Extension control, Programmable logic controllers. | 1982                              |
| 58.     | Mukand Iron & Steel Works Ltd.,<br>Bombay | Wire & Rod Mill Finishing Block<br>2 Nos. 1500 KW 5 Nos. 5 to 70 KW DC motors, 8 Nos. Thyristor Converters and associated controls. MAR replacement for intermediate stands - 5 Nos. Thyristor Converters and associated controls.  | 1982                              |
| 59.     | Bhilai Steel Plant,<br>Bhilai             | Rail & Structural Mill<br>1 No. 2800A, 375V Reversible Thyristor Converter and associated controls for manupulator, screwdown for roller cable drives.  | 1982                              |
| 60.     | Nagarjuna Coated tubes Ltd.,<br>Hyderabad | Coated Tube Mill<br>3 Nos. 60 KW DC motors with closed loop Thyristor Converters.   | 1982                              |
| 61.     | Salem Steel Plant,<br>Salem               | 2 - Hi Skin Pass Mill<br>Main - 5 Nos. 450 KW DC motors, Aux - 3 Nos. 11.2 Kw DC motors, Thyristor Converters, extension control, Roll Force control and Tension Control.   | 1981                              |

| Sl. No. | Customer                              | Project Description  | Year of Completion/ Commissioning |
|---------|---------------------------------------|--|-----------------------------------|
| 62.     | Bhilai Steel Plant<br>Bhilai          | 4-Hi Plate Mill<br>Main - 4 Nos. 4300 to 6000 KW DC motors, Aux - 1435 Nos. 6.8 to 40 KW DC motors, Armature control by M.G. Set. All other drive controls by Thyristor Converters   | 1981                              |
| 63.     | Indore Steel & Iron Mills,<br>Indore  | Re-Rolling Mills<br>1 No. 750 KW DC motor  | 1981                              |
| 64.     | Rourkela Steel Plant,<br>Rourkela     | 4-Hi Cold Reversing Mill - CRGO Project<br>1 No. 2x1685 KW DC motors, 2 Nos. 1125 KW DC motors, 1 No. 400 KW DC motor, Associated Thyristor Converters with Programmable logic controller, Hydraulic Automatic gauge control, Auto slowdown, Strip Shape Indication & Control and Fault Printout System. | 1981                              |
| 65.     | Rourkela Steel Plant,<br>Rourkela     | Screw down of Roughing Stand - CRGO Project<br>Supply, erection and commissioning of regulation equipment.   | 1981                              |
| 66.     | Mishra Dhatu Nigam Ltd.,<br>Hyderabad | 4-Hi Cold Mill<br>Main - 1 No. 100 KW DC motor, Aux - 1 No. 28 KW DC motor, Thyristor Converters, Tension Control with tensiometer.  | 1980                              |
| 67.     | Mishra Dhatu Nigam Ltd.<br>Hyderabad  | Wire Rod Mill<br>Main - 1 No. 400 KW DC motor, Aux - 5 Nos. 7.5 to 37 KW DC & AC motors, Aux. drives, Thyristor Converters, Photocell controlled coiler.   | 1980                              |

| Sl. No. | Customer  | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 68.     | Mishra Dhatu Nigam Ltd. Hyderabad                 | Bar Mill<br>Main - 1No. 500 KW DC motor, Thyristor Converters  | 1980                              |
| 69.     | Rourkela Steel Plant, Rourkela                    | Modernisation and Revamping of Hot Strip Mill<br>MAR replacement by thyristor converters for main stand 6 Nos. 3700 KW DC motors.<br>AUX. - 17 Nos. 2.8 to 317 KW DC motors, associated Thyristor Converters, 2 Nos. 1119 KW AC Motors, Hydraulic AGC, Load Cell, Width Gauge, Isotope Thickness Gauge and Zoom Rolling Control. | 1980                              |
| 70.     | Mishra Dhatu Nigam Ltd. Hyderabad                 | Hot Strip & Hot Sheet Mills<br>Main - 1 No. 1000 KW DC motor, Aux - 7 Nos. 2.2 to 9 KW DC motors, 35 Nos. 0.75 to 55 KW AC motors, Thyristor Converters  | 1980                              |
| 71.     | Seamless Steel tube Project, BHEL, Tiruchirapalli | Hot Mill<br>Main - 13 Nos. 125 to 2000 KW DC motors, 9 Nos. 110 to 1270 KW AC motors, 3 Nos, 12 to 20 KW DC motors, 365 Nos. 0.15 to 37 KW AC motors, Thyristor Converters   | 1979                              |
| 72.     | Guest Keen Williams Ltd. Calcutta                 | Modernisation of 4-Hi Hot Reversing Billet Mill<br>Main - 1 No. 750 KW DC motor, Aux - 4 Nos. 11 to 22 KW DC motors, Thyristor Converters  | 1979                              |

| Sl. No. | Customer  | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 73.     | Steel Strips Ltd.,<br>Chandigarh                        | 4-Hi/2-Hi Cold Mill<br>Main - 1 No. 300 KW DC motor, Aux - 3 Nos. 5.6 to 112 KW DC motors , Thyristor Converters, Roll force indication, contact gauges, wrap counter and extensiometer.   | 1979                              |
| 74.     | Seamless Steel tube<br>Project, BHEL,<br>Tiruchirapalli | Cold Mill<br>Main - 4 No.125 to 315 KW DC motors , 4 Nos. 26 to 68 KW AC motors, Aux - 1 No. 11 KW DC motor, 78 Nos. 0.5 to 55 KW AC motors, Thyristor Converters  | 1978                              |
| 75.     | Nagarjuna Steels Ltd.<br>Hyderabad                      | 2-Hi/4-Hi Cold Mill<br>Main - 1 No. 300 KW DC motor, Aux - 3 Nos. 30 to 112 KW DC motors , Thyristor Converters, Roll force indication, contact gauge, wrap counter & extensiometer.   | 1977                              |
| 76.     | Ahmedabad<br>Advance Mills<br>Navsari                   | 2-Hi/4-Hi Cold Mill<br>Main - 1 No. 640 KW DC motor, Aux - 4 Nos. 170 KW DC motors , Ward Leonard Drive system with closed loop regulation incorporating cascade connected magnetic amplifiers and amplidyne, Roll force indication and contact gauge. | 1976                              |
| 77.     | Heavy Engineering Corporation,<br>Ranchi                | Bar & Billet Mill<br>Main - 1 No. 875 KW DC motor, Aux - 6 Nos. 32 KW DC motors 100 Nos. 5.6 KW AC motors, Main Armature - MG set, Field - Thyristor Converters and associated control for Hot Saw, bloom shear & AC Drives.                           | 1970                              |

UE : Under Execution

## 1.2 PROCESS LINES

| Sl. No. | Customer                     | Project Description  | Year of Completion/ Commissioning |
|---------|------------------------------|--|-----------------------------------|
| 1.      | Bokaro Steel Plant<br>Bokaro | Galvanising Line - CRM II Complex<br>68 Nos. 2.25 to 262.5 KW DC motors ,<br>Closed loop Thyristor Control, Data logging, PLC & Special Controls           | 1983                              |
| 2.      | Bokaro Steel Plant<br>Bokaro | Roll Forming Line - CRM II Complex<br>11 Nos. 3.75 to 112.5 KW DC motors ,<br>Closed loop Thyristor Control, Data logging, PLC & Special Controls          | 1983                              |
| 3.      | Bokaro Steel Plant<br>Bokaro | Galvanised Shear Line - CRM II Complex<br>14 Nos. 7.5 to 75 KW DC motors , Closed loop Thyristor Control, Data logging, PLC & Special Controls             | 1983                              |
| 4.      | Bokaro Steel Plant<br>Bokaro | Electrolytic Cleaning Line - CRM II Complex<br>47 Nos. 3.75 to 150 KW DC motors ,<br>Closed loop Thyristor Control, Data logging, PLC & Special Controls   | 1983                              |
| 5.      | Bokaro Steel Plant<br>Bokaro | Cleaning & Annealing Line - CRM II Complex<br>111 Nos. 2.25 to 112.5 KW DC motors ,<br>Closed loop Thyristor Control, Data logging, PLC & Special Controls | 1983                              |
| 6.      | Bokaro Steel Plant<br>Bokaro | Pickling Line - CRM II Complex<br>55 Nos. 3.75 to 600 KW DC motors ,<br>Closed loop Thyristor Control, Data logging, PLC & Special Controls                | 1982                              |
| 7.      | Bokaro Steel Plant<br>Bokaro | 3 Nos. Cold Rolled Shear Lines<br>57 Nos. 7.5 to 112.5 KW DC motors ,<br>Closed loop Thyristor Control, PLC & Special Controls                             | 1982                              |
| 8.      | Bokaro Steel Plant<br>Bokaro | 2 Nos. side Trimming & Slitting Lines - CRM II Complex<br>14 Nos. 11.25 to 375 KW DC motors ,<br>Closed loop Thyristor Control, PLC & Special Controls     | 1982                              |

| Sl. No. | Customer                       | Project Description  | Year of Completion/ Commissioning |
|---------|--------------------------------|--|-----------------------------------|
| 9.      | Bokaro Steel Plant, Bokaro     | Coil Handling Equipment - CRM II Complex<br>3 Nos. 7.5 to 11.25 KW DC motors, Thyristor Converters.  | 1982                              |
| 10.     | Salem Steel Plant, Salem       | Annealing & Pickling Lines - 1&2<br>87 Nos. 0.5 KW to 150 KW DC motors, 189 Nos. 0.5 to 220 KW AC Motors, Closed Loop Thyristor Controls & Special Controls.     | 1981                              |
| 11.     | Rourkela Steel Plant, Rourkela | Carlite Line - CRGO Project<br>39 Nos. 11 to 74 KW DC motors, 73 Nos. 0.37 to 30 KW AC Motors, Closed Loop Thyristor Control & Special Controls.                 | 1981                              |
| 12.     | Rourkela Steel Plant, Rourkela | Annealing & Pickling Line- CRGO Project<br>20 Nos. 11 to 150 KW DC motors, 98 Nos. 0.37 to 93.25 KW AC Motors, Closed Loop Thyristor Control & Special Controls. | 1981                              |
| 13.     | Rourkela Steel Plant, Rourkela | Decarburising Line - CRGO Project<br>30 Nos. 11 to 104 KW DC motors, 61 Nos. 0.75 to 45 KW AC Motors, Closed Loop Thyristor Control & Special Controls.          | 1981                              |
| 14.     | Rourkela Steel Plant, Rourkela | Tandem Annealing Line - CRGO Project<br>20 Nos. 11 to 104 KW DC motors, 49 Nos. 0.37 to 37.5 KW AC Motors, Closed Loop Thyristor Control & Special Controls.     | 1981                              |
| 15.     | Rourkela Steel Plant, Rourkela | 2-Slitting Lines - CRGO Project<br>8 Nos. 11 to 112 KW DC motors, Closed Loop Thyristor Control & Special Controls.  | 1981                              |
| 16.     | Rourkela Steel Plant, Rourkela | 2-Side Trimming Lines - CRGO Project<br>8 Nos. 11 to 186 KW DC motors, Closed Loop Thyristor Control & Special Controls.   | 1981                              |
| 17.     | Rourkela Steel Plant, Rourkela | Cut-to-length Line - CRGO Project<br>5 Nos. 11 KW DC motors, Closed Loop Thyristor Control & Special Controls.   | 1981                              |

| Sl. No. | Customer                              | Project Description   | Year of Completion/Commissioning |
|---------|---------------------------------------|---|----------------------------------|
| 18.     | Tinplate Co.of India Ltd., Jamshedpur | Electrolytic Tinning-cum-Chrome Plating Line<br>80 Nos. 1.5 to 75 KW DC motors, Closed Loop Thyristor Control & Special Controls. | 1978                             |



## 1.3 IRON & STEEL MAKING

| Sl. No. | Customer                   | Project Description   | Year of Completion/ Commissioning |
|---------|----------------------------|---|-----------------------------------|
| 1.      | RINL, VSP                  | 2x150T LD Converter<br>Turnkey execution of Electrics, Instrumentation, Level-I Automation, Fire Fighting System, Communication System, Ventilation & Air-conditioning System   | LD2-2013<br>LD1-2014              |
| 2.      | NINL, Duburi               | 1x110T BOF, GCP & GCP<br>Turnkey execution of Electrics, Instrumentation and Automation   | 2013                              |
| 3.      | Bhushan Steel              | 180T ConArc, LHF 1&2, HMD, RH Degasser & FES<br>Turnkey execution of Electrics, Instrumentation and Automation  | 2009                              |
| 4.      | IISCO,                     | Rebuilding of BF-2<br>Electrics & Automation  | 2008                              |
| 5.      | KMCL, Duburi               | Coke Oven Complex<br>Complete Electrics and Automation  | 2005                              |
| 6.      | NINL, Duburi               | Blast Furnace<br>Complete Electrics and Automation  | 2002                              |
| 7.      | SMS, Germany               | Caster - IMIL<br>Software Engineering for Caster computer   | 1998                              |
| 8.      | Bhilai Steel Plant, Bhilai | Oxygen Plant Expansion<br>MSDS-6 132 KV Substation equipment<br>30/50 MVA Transformers, SF-6 Circuit Breakers, Isolators, 11 KV Bus-ducts, 11 KV switchgear, emulsifier fire fighting system, earthing station, associated civil works. | 1998                              |
| 9.      | Bhilai Steel Plant, Bhilai | Sinter Plant<br>MSDS-4, 132 KV substation, 30/50 MVA Transformers, SF-6 circuit Breakers, Isolators, 11 KV bus-ducts, 11 KV switchgear, fire fighting, SCADA, associated civil works  | 1998                              |

| Sl. No. | Customer                                  | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 10.     | Rourkela Steel Plant,<br>Rourkela         | Single Stand Slab Caster in SMS-I<br>15 Nos. DC motors & 7 Nos. AC motors upto 30 KW, 8 sets Thyristor Converters rating upto 200 A, 22 Nos. Roller Table AC Motors, associated switchgear equipments. Level-1 and Level-2 automation systems involving mould level control systems. programmable logic controllers, DEIL Alpha Computer system MIM system. Electronic weighing system. Liquid steel temperature measurement system. Slab temperature measuring system and plant instrumentation.  | 1997                              |
| 11.     | Tata Iron & Steel Co. Ltd.,<br>Jamshedpur | Oxygen & Nitrogen Plant Compressors<br>2 Nos. 1700 KW, 6.3 KV SCIM.  | 1997                              |
| 12.     | Bhilai Steel Plant,<br>Bhilai             | Blast Furnace-5<br>2 nos. Thyristor Converters for 230 KW Skip Hoist drive.  | 1996                              |
| 13.     | Rourkela Steel Plant,<br>Rourkela         | 192 Sq.Mt. Sinter Plant - II with installed capacity of 1.5 MT/Year<br>8 Nos. 11 KW to 450 KW DC motors, 54 Nos., 3 KW to 160 KW LT AC Motors, 8 Nos., 450 KW to 5720 KW HT AC Motors., 4 sets 60 A to 1750 A Thyristor Converter, Power distribution involving 11 Nos. 630 KVA to 8400 KVA transformers. HTLT switchgear, Automation involving distributed control system with MMI & PLCs for burn-through point control, ignition furnace control and sinter cooler speed control, electronic weighing system, Plant instrumentation, Plant-inter communication system, Illumination system. Fire fighting and Cabling | 1996                              |

| Sl. No. | Customer                                 | Project Description  | Year of Completion/ Commissioning |
|---------|--|--|-----------------------------------|
| 14.     | Rashtriya Ispat Nigam Ltd., Visakapatnam | Thyristor Converter for Transfer CAR No.-4<br>1 set, 1000A, 230 V reversible Thyristor Converter, DC reactor and high speed DCCB. Reactors   | 1996                              |
| 15.     | Bhilai Steel Plant, Bhilai               | Electrics for straightening Machine<br>2set, 417 Amps, 400V, Thyristor Converter with digital regulator with class-1 protection.   | 1996                              |
| 16.     | Bokaro Steel Plant Bokaro                | LD Converter<br>Variable speed AC drive system consisting of Thyristor Converters and inverters (GTO), HT switchgear & transformers, DC smoothing reactors, microprocessor based regulation system, PLC & mimic panels for One No. 800 KW scarfing exhaustor drive.                          | 1996                              |
| 17.     | Bhilai Steel Plant, Bhilai               | Continuous Caster<br>1 No. 100 Amps thyristor converter for Dummy Bar Chain drive and 1 No. 320 Amps thyristor converter for Mould oscillator drive.   | 1995                              |
| 18.     | Bhilai Steel Plant, Bhilai               | LD Converters<br>Variable speed AC drive system consisting of thyristor converters and inverters (GTO), HT switchgear & transformers, high current DC line reactors, microprocessor based regulation system for One No. 1250 KW ID fan drive & One No. 600 KW reheater furnace blower drive. | 1994                              |
| 19.     | Bokaro Steel Plant Bokaro                | GTO-IMD Systems for Gas storage fan of SMS-II<br>1 set, 1000 KW, 6.6 KV GTO inverter, 1 No. 1500 KVA, 6.6 KV/2.6 KV transformer, 1 No. 1300 KVA, 2.3/6.82 KV transformer. DC Link reactors. Switchgears, mimic panel and PLC.  | 1994                              |

| Sl. No. | Customer                                 | Project Description   | Year of Completion/ Commissioning |
|---------|--|---|-----------------------------------|
| 20.     | Bhilai Steel Plant, Bhilai               | Blast Furnace-6<br>Thyristor Converters for 2 Nos. 230 KW DC motors for skip hoist drive.   | 1990                              |
| 21.     | Bhilai Steel Plant, Bhilai               | Blast Furnace-6<br>Computers for process control and management information system, distributed digital control system, programmable logic controllers, data highway system for communication, Furnace instrumentation, software for optimisation of stoves and burden distribution using mathematical model. | 1990                              |
| 22.     | Bhilai Steel Plant, Bhilai               | Blast Furnace-6<br>290 KW, 6.6KV SCIM, supervisory panel, vibration monitoring system & Controls for Fan motor.   | 1990                              |
| 23.     | Bokaro Steel Plant Bokaro                | Conversion of BF-3 Bell top to Bell less top<br>Programmable logic controllers for material charging.   | 1989                              |
| 24.     | Rashtriya Ispat Nigam Ltd., Visakapatnam | Aux. Electrics for Sinter Plant<br>2 x 5600 KW, Synchronous motors, Static excitation system, 2 sets of MOCB each comprising of 3 breakers of 11 KV rating 15 MVA auto transformers and aux. controls for Sinter plant fan.   | 1989                              |
| 25.     | Tata Iron & Steel Co. Ltd., Jamshedpur   | Sinter Plant<br>5300 KW SRIM with liquid rotor starter & control desks for exhauster fan.   | 1988                              |
| 26.     | Bhilai Steel Plant, Bhilai               | Blast Furnace-7<br>Software for optimisation of burden distribution using mathematical model on PC-AT system.   | 1988                              |

| Sl. No. | Customer                               | Project Description   | Year of Completion/ Commissioning |
|---------|--|---|-----------------------------------|
| 27.     | Bhilai Steel Plant, Bhilai             | Blast Furnace-7 Programmable Logic Controller with interfacing for Process Computer for bell less top charging equipment.   | 1986                              |
| 28.     | Bhilai Steel Plant, Bhilai             | Blast Furnace-7 4 sets of Thyristor Converters with associated control and change over pannels for skip hoist & top held drills.  | 1985                              |
| 29.     | Bhilai Steel Plant, Bhilai             | Blast Furnace-7 2 Nos. PDP 11/44 computers, Programmable Controllers, Instrumentation, Controls, Mathematical model for Stores optimisation and complete system & application software. | 1984                              |
| 30.     | Bhilai Steel Plant, Bhilai             | Blast Furnace 2&7 13 sets of Open Type Motor Control Centres  | 1984                              |
| 31.     | Bokaro Steel Plant Bokaro              | Steel Melting Shop No. 2 Exhauster Drive Motor 1 No. 1500/300 KW, 6.6 KV SCIM   | 1984                              |
| 32.     | Tata Iron & Steel Co. Ltd., Jamshedpur | Lime Kiln Plant 4 Nos. MDM 814, 2 Nos. MDM 812 DC motors  | 1983                              |
| 33.     | Tata Iron & Steel Co. Ltd., Jamshedpur | LD Converter Gas cleaning & flux changing mechanism. 8 Nos. 52 KW & 6 Nos. 112 KW DC motors, 14 Nos. Thyristor Converters, 2 Nos. 1850 KW, 6.6 KV SCIM and associated controls.         | 1982                              |
| 34.     | Bokaro Steel Plant Bokaro              | Blast Furnace Pump Drive 1 No. 1100 KW, 11KV and 1 No. 400 KW, 6.6 KV SRIM & Controls   | 1982                              |
| 35.     | Durgapur Steel Plant, Durgapur         | Constant DC Voltage Load Centre 3 Nos. 1000 KW, 460V Transformer Rectifier Sets.  | 1982                              |

| Sl. No. | Customer                               | Project Description   | Year of Completion/Commissioning |
|---------|--|---|----------------------------------|
| 36.     | Tata Iron & Steel Co. Ltd., Jamshedpur | Six-strand Continuous Casting Plant<br>12 Nos. 7.5 KW DC motors, 12 Nos. Thyristor Converters and associated controls.  | 1982                             |
| 37.     | Bokaro Steel Plant<br>Bokaro           | Two 2000 cu.m. Blast Furnace<br>2 Nos. 1.5 MW MG Sets, Ward-Leonard control system involving 470 control panels, 8 CVDC systems etc.  | 1981                             |
| 38.     | Bhilai Steel Plant,<br>Bhilai          | Oxygen Lance Raising & Lowering Mechanism<br>6 Nos. 28 KW DC motors, 6 Nos. Thyristor Converters  | 1981                             |
| 39.     | Bhilai Steel Plant,<br>Bhilai          | Two Radial Slab Casting Machines Transport & Finishing Lines<br>166 Nos. 9 to 40 KW DC motors, 137 Nos. 7 to 75 KW AC motors, 24 CVDC Sets, 33 Thyristor Converters of 32A to 1000A, 515 control panels/desk units etc. | 1981                             |
| 40.     | Bokaro Steel Plant<br>Bokaro           | Sinter Plant<br>Transformer Rectifier set for control & power supply.   | 1981                             |
| 41.     | Bhilai Steel Plant,<br>Bhilai          | LD Converter Tilting Mechanism and Hot Metal Transfer Cars<br>20 Nos. 28 to 68 KW DC motors, 6 Nos. 120 KW DC motors, 22 Thyristor Converters and associated control equipment etc.                                     | 1980                             |
| 42.     | Bokaro Steel Plant<br>Bokaro           | Steel Ladle Transporting Cars for LD Converters<br>20 Nos. 28 KW DC motors, 10 Nos. 500A Thyristor Converters and assorted CVDC systems, control equipment etc.   | 1980                             |
| 43.     | Bokaro Steel Plant<br>Bokaro           | Hot Metal Ladle Car<br>Assorted control equipment.  | 1980                             |

| Sl. No. | Customer                                  | Project Description  | Year of Completion/Commissioning |
|---------|---|--|----------------------------------|
| 44.     | Bokaro Steel Plant<br>Bokaro              | Hot Strip Mill Reheating Furnace<br>Eight reversible Thyristor Converters controlled by programmed electronic logic/sequencing circuits.<br>Ratings from 500A-2500A. Assorted control equipment. | 1979                             |
| 45.     | Indian Iron & Steel Co.Ltd.,<br>Burnpur   | Revamping of Blast Furnaces 1&2<br>93 KW DC motor of Skip Winch Drives<br>CVDC system for speed control involving control panels and other control units.  | 1979                             |
| 46.     | Tata Iron & Steel Co. Ltd.,<br>Jamshedpur | Continuous Billet Casting Machine<br>3 Nos. 11 to 40 KW DC motors, 2 Nos.20 to 40 KW DC Generators, Ward Leonard system of control, Thyristor excited generators under speed control.            | 1977                             |
| 47.     | Tata Iron & Steel Co. Ltd.,<br>Jamshedpur | Sinter Plant<br>18 Nos. 10 KW DC motors, Regulated auto-feed system of belt scales using 18 Thyristor Converters and load cell units.  | 1977                             |

UE : Under Execution



## 1.4 PELLET PLANT

Pellet Plant

| Sl. No. | Customer                        | Project Description   | Year of Completion/Commissioning |
|---------|---------------------------------|---|----------------------------------|
| 1.      | NMDC,<br>Donimalai<br>Karnataka | Electrical, Instrumentation and Automation system for 1.2 MTPA Pellet Plant on Turnkey basis. | UE                               |

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UE: Under Execution

## 1.5 STATIC EXCITATION EQUIPMENT

| Sl. No. | Customer  | Project Description  | Year of Completion/Commissioning |
|---------|---|--|----------------------------------|
| 2.      | Bhilai Steel Plant, Bhilai  | Oxygen Plant<br>2 sets of Static Excitation Equipment for 3150 KW, 11 KV Synchronous motors.   | 1996                             |
| 3.      | Rashtriya Ispat Nigam Ltd., Visakapatnam Steel Project Visakapatnam | Sinter Plant<br>2 nos. 5.6 MW synchronous motors with static excitation equipment & controls for sinter fans.  | 1996                             |
| 4.      | Bhilai Steel Plant, Bhilai  | Sinter Plant II<br>Static Excitation Unit for 2 MW, 6.6 KV synchronous motor for Exhauster-3.  | 1995                             |
| 5.      | Rourkela Steel Plant, Rourkela                                      | Oxygen Plant<br>2 nos. 4.2 MW, 11 KV, synchronous motors with Static Excitation Equipment, PLC & Controls for air compressor.  | 1994                             |
| 6.      | Bhilai Steel Plant, Bhilai  | Sinter Plant<br>2.4 MW, 6.6 KV synchronous motor with static excitation system, vibration monitoring system, PLC & controls for exhauster 4.                           | 1990                             |
| 7.      | Bokaro Steel Plant Bokaro   | Oxygen Plant<br>Synchronous motors of rating 9.5 MW & 3.1 MW with static excitation equipment & control for compressor   | 1988                             |
| 8.      | Rashtriya Ispat Nigam Ltd., Visakapatnam Steel Project Visakapatnam | Sinter Plant<br>2 Nos. 5.6 MW, solid cylindrical synchronous motor with Static Excitation Unit auto transformer starting scheme and associated controls for exhauster. | 1986                             |

| Sl. No. | Customer  | Project Description   | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 9.      | Rashtriya Ispat Nigam Ltd.,<br>Visakapatnam Steel Project<br>Visakapatnam | Oxygen Plant<br>Air compressor - 4 Nos. 11MW Syn. Motor with Static Excitation unit auto transformer starting scheme and associated controls.<br>Oxygen compressor - 6 Nos. 3.2 MW Syn. Motor with Static Excitation units and associated controls.<br>Nitrogen compressor - 6 Nos. 2.4 MW SCIM with associated control.<br>Refrigeration Unit - 6 sets of load breakswitch, motor protection panels. | 1985                              |
| 10.     | Bhilai Steel Plant,<br>Bhilai   | Blast Furnace-7<br>2 Nos. 1400 KW 11 KV Syn. Motor with Static Excitation unit and associated controls for exhauster.   | 1984                              |
| 11.     | Bhilai Steel Plant,<br>Bhilai   | Sinter Plant<br>1 No. 1000 KW, 6.6 KV Syn. Motor with static excitation unit and assorted controls for exhauster drives.  | 1983                              |
| 12.     | Rourkela Steel Plant,<br>Rourkela   | Air Compressor Station<br>1 No. 3000 KW, 6.6 KV Syn. Motor with static excitation unit and assorted control units for auxiliary drives.   | 1982                              |
| 13.     | Bhilai Steel Plant,<br>Bhilai   | Central Exhaust Ventilation System for Concast Plant<br>3 Nos. 1.4 MW & 1 No. 1.7 MW Syn. Motors.<br>4 Nos. static excitation units for automatic power factor control & assorted control units for auxiliary drives.   | 1981                              |
| 14.     | Bhilai Steel Plant,<br>Bhilai   | Air Compressor for Oxygen Plant<br>2 Nos. 12.5 MW Syn. Motors, 2 Nos. Static Excitation Units for automatic power factor control & associated control units for auxiliary drives.   | 1980                              |

## 1.6 ALUMINIUM INDUSTRY

| Sl. No. | Customer                           | Project Description   | Year of Completion/ Commissioning |
|---------|------------------------------------|---|-----------------------------------|
| 1.      | HINDALCO                           | 16KA, 950V Rectifiers & Automation for Potline  | 2012                              |
| 2.      | HINDALCO                           | 85KA, 950V Rectifiers & Automation for Potline  | 2008                              |
| 3.      | National Aluminium Co. Ltd.,       | 220 KV switch yard expansion<br>220 KV sub-station with cellular configuration including SCADA system for remote supervision and control.   | 1999-2000                         |
| 4.      | Indian Aluminium Co. Hirakud       | Aluminium Smelter<br>1 set 950 V, 16 KA water cooled thyristor converter, 1No. 18.5 MVA /11 KV/ 815-815V OFWF transformer, HT & LT switchgear, control & relay panel, Busbars & Cabling   | 1999                              |
| 5.      | Indian Aluminium Co. Ltd., Hirakud | Aluminium Smelter<br>132 KV Sub-Station Extension<br>30 MVA OFWF transformer, 4 Nos. 132 KW SF6 breakers, 12 Nos. 132 KV CTS, Lightening arrestors, 11 KV breaker, 132 & 11 KV isolators, structures, ASCR conductor system, cabling etc. | 1998                              |
| 6.      | Indian Aluminium Co. Hirakud       | Aluminium Smelter<br>1 set 900 V 16 KA Water cooled Thyristor Converters, 1 No. 16.5 MVA, 11KV/ 725-725V OFWF Transformer, HT & LT switchgears, control & relay panel. PLC, Busbars and Cabling.  | 1995                              |

| Sl. No. | Customer                           | Project Description  | Year of Completion/ Commissioning |
|---------|------------------------------------|--|-----------------------------------|
| 7.      | Pennar Aluminium Company           | Cold Rolling Mill<br>5 sets, 70 A to 2525 A Thyristor Converters , PC-based fault monitoring system, switchgears, UPS, Voice communication system and programmable logic controllers and mill automation software for Strip auto slow down at coil end<br>Automation roll changing<br>Passline shifting<br>Spindle positioning<br>Torque reference /ramp generation/speed reference fo drives and interfacing with strip guage control, strip hardness control and presetting and recording computers of M/s Achnbach Germany through high speed SINEC HI bus. | 1994                              |
| 8.      | Bharat Aluminium Co. Ltd. Korba.   | Cold Rolling Mill Modernisation<br>Thyristor Converters, thyristor transformers, MCCs, PCCs, Control desks, Automation involving programmable logic controllers, Hydraulic AGC system, Auto-slow down system.  | 1993                              |
| 9.      | Indian Aluminium Co. Ltd., Hirakud | Aluminium smelter<br>Replacement of mercury arc rectifier by 63.6 KA/ 820 V DC Thyristor Converter comprising of 6 sets of water cooled Thyristor Converters each rated for 10.6 KA/820 V DC , 6 sets of deionized water pumps and water to air heat exchangers and micro-processor based master control system.   | 1992                              |
| 10.     | Indian Aluminium Co. Ltd., Belur   | Hot Sheet Mill<br>Aux - 2 Nos. 65 KW to 200 KW DC motors, 20 Nos. 0.25 to 40 KW AC motors. Closed Loop Thyristors.   | 1981                              |



| Sl. No. | Customer                          | Project Description  | Year of Completion/ Commissioning |
|---------|-----------------------------------|--|-----------------------------------|
| 11.     | Bharat Aluminium Co. Ltd. Korba.  | 4-Hi Hot Mill<br>Main - 1 No. 4600 KW DC motor, Aux - 186 Nos. 5 KW to 850 KW DC motors, Main Armature control by MG Set (Syn. motor 9000 KW) & others by Thyristors.    | 1979                              |
| 12.     | Bharat Aluminium Co. Ltd. Korba.  | 4-Hi Cold Mill<br>Main - 2 Nos. 3000 KW DC motors, Aux - 20 Nos. 5 KW to 2400 KW DC motors, Main Armature control by MG Set (Syn. motor 9000 KW) & others by Thyristors. | 1979                              |
| 13.     | Indian Aluminium Co. Ltd., Taloja | 2-Hi Cold Mill<br>Main - 1 No. 1875 KW DC motor, Aux - 2 Nos. 262 KW DC motors, Closed Loop Thyristors.  | 1970                              |
| 14.     | Indian Aluminium Co. Ltd., Taloja | 4-Hi Hot Mill<br>Main - 2 Nos. 450 to 2250 KW DC motors, Closed Loop Thyristors, Contact gauge and AGC.  | 1970                              |

## 2. NON-METALLURGICAL INDUSTRY

## 2.1 CEMENT INDUSTRY

| Sl. No. | Customer   | Project Description  | Year of Completion/Commissioning |
|---------|--|--|----------------------------------|
| 1.      | Shah Cement Industries Limited, Bangladesh                         | LRS & Capacitor Bank for Slip Ring Motors. 1000Kw 2 Nos. and 500Kw 1 no. Liquid Rotor Starter, Capacitor Bank.   | Phase-1 2002<br>Phase-2 2003     |
| 2.      | Hira Cements / IDCOL Bardol, Bargarh (Orissa)                      | 250 - 1600 KW, 11 Nos. HT slipring motors, capacitors for pf improvement, Liquid rotor starters for the above and 181 Nos. LT induction motors in the range 1.5 - 150 KW | 1993                             |
| 3.      | Cement Corporation of Gujarat Ltd. Veraval Gujarat                 | 1 No. thyristor converter with associated controls for 500 /kw drive   | 1987                             |
| 4.      | JK Cements Nimbahara Rajasthan                                     | 2 Nos. 1250 KW & 1350 KW 3.3 KV SRIM with Controls & Capacitors<br>1 No. 1010 KW SRIM  | 1980                             |
| 5.      | Uttar Pradesh State Cement Corporation Limited Dalla Uttar Pradesh | 1 No. 600 KW 415 KV SRIM with Controls   | 1980                             |
| 6.      | Uttar Pradesh State Cement Corporation Limited Dalla Uttar Pradesh | 2 Nos. 450 KW 6.6 KV SRIM with Controls  | 1980                             |
| 7.      | Jaipur Udyog Mandal Jaipur Rajasthan                               | 1 No. 1250 KW Syn. Induction Motor & Control   | 1980                             |
| 8.      | JK Cement Wuyan Kashmir  | 2 Nos. 1500 KW 6.6 KV Syn. Induction Motor with Control 2 Nos. 260 KW 6.6 KV SRIM & Controls   | 1980                             |

| Sl. No. | Customer  | Project Description   | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 9.      | Uttar Pradesh State Cement Corporation Limited<br>Kajrahat<br>Chunar Project<br>Uttar Pradesh | 24 Nos. 250 KW - 1500 KW<br>SRIM Motor & Controls   | 1979                              |
| 10.     | Madras Cements Limited<br>Tulukkapatti<br>Tamil Nadu  | 2 Nos. 1400 HP 3.3 KV<br>750 rpm SRIM & Controls<br>1 No. 1000 HP 3.3 KV<br>SRIM with Controls &<br>Capacitor Banks   | 1979                              |
| 11.     | Kesoram Cements<br>Besant Nagar Works<br>Madhya Pradesh                                       | 3 nos 2000 KW, 3.3 KV Syn. Induction<br>Motors and controls for<br>mill drive along with auxiliary drives,<br>Capacitors<br>Control Panels for 3 Nos. 2000 HP<br>Syn. Motors 335 KW<br>SRIM with Controls | 1979                              |
| 12.     | Tamil Nadu Cements Limited<br>Ariyalur<br>Tamil Nadu  | 3 Nos. 450 KW & 2 Nos.<br>315 KW 3.3 KV SRIM with Controls &<br>Capacitors  | 1979                              |
| 13.     | JK Cements<br>Nimbahara<br>Rajasthan  | 1 No. 2000 HP 6.6 KV Syn.<br>Motor & Controls<br>4 Nos. 320 KW 3.3 KV<br>SRIM & Controls  | 1979                              |
| 14.     | Uttar Pradesh State Cement Corporation Limited<br>Dalla<br>Uttar Pradesh                      | 2 Nos. 750 KW<br>2 Nos. 439 KW<br>6.6 KV SRIM with Controls<br>and Capacitor Banks  | 1979                              |
| 15.     | Cement Corporation of India Limited<br>Rajban<br>Himachal Pradesh                             | 1 No. 168 KW 400 V<br>SRIM with LF 1000   | 1978                              |

| Sl. No. | Customer  | Project Description                               | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 16.     | Cement Corporation of India Limited<br>Rajban<br>Himachal Pradesh         | 1 No. 385 KW 400 V<br>SRIM with LF 2000           | 1978                              |
| 17.     | Cement Corporation of India Limited<br>Adilabad Project<br>Andhra Pradesh | 24 Nos. 250 KW - 1500 KW<br>SRIM Motor & Controls | 1978                              |
| 18.     | Cement Corporation of India Limited<br>Rajban<br>Himachal Pradesh         | 2 Nos. 1600 HP 11 KV Syn.<br>Motors with controls | 1977                              |
| 19.     | Cement Corporation of India Limited<br>Mandhar Works<br>Madhya Pradesh    | 580 HP SRIM & Controls                            | 1977                              |
| 20.     | Cement Corporation of India Limited<br>Mandhar Works<br>Madhya Pradesh    | 2 Nos. 1500 KW 11 KV<br>SRIM & Controls           | 1977                              |
| 21.     | Associated Cement Companies Limited<br>Bombay<br>Maharashtra              | 1 No. 375 KW<br>SRIM with Controls                | 1977                              |
| 22.     | Rohtas Industries<br>Dalmianagar<br>Bihar                                 | 2000 HP Syn.<br>Motors & Controls                 | 1976                              |
| 23.     | Madras Cements Limited<br>Tulukkapatti<br>Tamil Nadu                      | 1 No. 1120 KW 11 KV<br>750 rpm SRIM & Controls    | 1976                              |

| Sl. No. | Customer   | Project Description                        | Year of Completion/ Commissioning |
|---------|--|--|-----------------------------------|
| 24.     | Associated Cement Companies Limited<br>Bombay<br>Maharashtra | 2000 HP & 800 HP Syn.<br>Motors & Controls | 1973                              |
| 25.     | Century Cements<br>Neora<br>Maharashtra                      | 6 Nos. 2000 HP Syn.<br>Motors & Controls   | 1973                              |
| 26.     | Assam Cement Limited<br>Cheerapunji                          | 2 Nos. 2000 HP 11 KV<br>SRIM & Controls    | 1971                              |

## 2.2 PAPER INDUSTRY



| Sl. No. | Customer   | Project Description   | Year of Completion/Commissioning |
|---------|--|---|----------------------------------|
| 1.      | Nepa Ltd.<br>Nepanagar, Madhya Pradesh   | Revamping of DC drives with thyristors for paper machine No.1, 2.5 KW to 530 KW - 12 Nos. with transformers HT isolators, LT PCC and digital speed and draw measuring systems Power factor correction and harmonic fitter equipment | 1989                             |
| 2.      | Hindustan Paper Corporation<br>Nowgong & Cachar Project<br>Assam                       | 34 Nos. D.C. Motors, ratings 55 KW to 424 KW Tensiometers<br>Ventilation Equipment  | 1983                             |
| 3.      | Hindustan Paper Corporation<br>Kerala News Print Project<br>News Print Nagar<br>Kerala | 3 Nos. 6500 HP Syn. Motors & Controls   | 1980                             |
| 4.      | Orient Paper Mills<br>Brijirajnagar<br>Orissa  | 320 KW MG Set with<br>Thyristor Control   | 1979                             |
| 5.      | Orient Paper Mills<br>Brijirajnagar<br>Orissa  | 60 HP DC Motor & Thyristor Control  | 1979                             |
| 6.      | Ballarpur Paper Mills<br>Ballarpur<br>Maharashtra                                      | 9 Nos. DC Motors 67-500 HP & Thyristor Converters for Sectional Drive of Paper Machine  | 1977                             |
| 7.      | Tribeni Tissues<br>Calcutta<br>West Bengal   | 1 No. 400 HP, 1 No.250 HP, 1 No. 20 HP & 1 No. 5 HP DC Motors and Thyristor Converters  | 1977                             |
| 8.      | India Paper & Pulp Company<br>Calcutta<br>West Bengal                                  | 450 HP DC Motor and Thyristor Converters  | 1976                             |

| Sl. No. | Customer   | Project Description   | Year of Completion/Commissioning |
|---------|--|---|----------------------------------|
| 9.      | Nagaland Paper & Pulp Plant<br>Nagaland                    | 1 No. 600 HP & 1 No.400 HP<br>Motors & Converters                 | 1976                             |
| 10.     | JK Paper Mills<br>Rayagada<br>Orissa                       | 2 Nos. 20 HP DC Motors,<br>MG Set & Controls                      | 1973                             |
| 11.     | West Coast Paper Mills<br>Dandeli<br>Karnataka             | 1 No. 470 HP and 2 Nos. 50 HP<br>DC Motors & Thyristor Converters | 1973                             |
| 12.     | JK Paper Mills<br>Rayagada<br>Orissa                       | 2 Nos. 20 HP DC Motors,<br>MG Set & Controls                      | 1972                             |
| 13.     | Sirpur Paper Mills<br>Sirpur Kagaz Nagar<br>Andhra Pradesh | 2 Nos. 20 HP & 1 No. 470 HP DC<br>Motors and Thyristor Converters | 1971                             |

## 2.3 RUBBER INDUSTRY

| Sl. No. | Customer   | Project Description                                    | Year of Completion/Commissioning |
|---------|--|--|----------------------------------|
| 1.      | Modi Rubber Limited<br>Modinagar<br>Uttar Pradesh              | 1100 KW SRIM 330 KW & 115 KW DC<br>Motors & Converters | 1983                             |
| 2.      | Bombay tyres<br>International Limited<br>Bombay<br>Maharashtra | 1100 KW SRIM 330 KW & 115 KW DC<br>Motors & Converters | 1983                             |
| 3.      | Modi Rubber Limited<br>Modinagar<br>Uttar Pradesh              | 180 KW DC Motor & Converters                           | 1982                             |
| 4.      | Dunlop India Limited<br>Calcutta<br>West Bengal                | 110 KW SRIM & Controls                                 | 1979                             |
| 5.      | Alfred Herbert (India)<br>Limited<br>Bangalore<br>Karnataka    | 2 Nos. 1200 HP SRIM & Controls                         | 1977                             |
| 6.      | Ceat Tyres<br>Bombay<br>Maharashtra                            | 120 and 225 HP SRIM and Controls                       | 1974                             |
| 7.      | Premier tyres Limited<br>Kalamassery<br>Kerala                 | 1500 HP SCIM and Controls                              | 1973                             |

### **3. MINING & MATERIAL HANDLING**

| Sl No. | Customer                                      | Application   | Project Description   | Year of Completion/ Commissioning |
|--------|---|---|---|-----------------------------------|
| 1.     | Damodar Valley Corporation                    | CHP & AHP for 2X 250 MW Chandrapura Thermal Power station | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 2.     | Gujarat State Electricity Corporation Limited | CHP & AHP for 2 X 250 MW - Sikka Thermal Power station    | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 3.     | Gujarat State Electricity Corporation Limited | CHP & AHP for 1 X 490 MW - Ukai Thermal Power station     | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 4.     | Tamilnadu Electricity Board                   | CHP for 2 X 600 MW – North Chennai Thermal Power Project  | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 5.     | Hinduja National Power Limited                | CHP & AHP for 2 X 520 MW- Vizag Thermal Power Plant       | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 6.     | NTPC Tamilnadu Energy Company Limited         | CHP for 3 X 500 MW – Vallur Thermal Power Project         | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 7.     | Karnataka Power Corporation Limited           | CHP & AHP for 1 X 700 MW – Bellary Thermal Power Station. | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |

| Sl No. | Customer                                  | Application   | Project Description   | Year of Completion/ Commissioning |
|--------|---|---|---|-----------------------------------|
| 8.     | Bihar State Electricity Board             | CHP & AHP for 2 X 250 MW Barauni Thermal Power Project                                      | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 9.     | Meja Urja Nigam Private Limited           | CHP for 2 X 660MW-Meja Thermal Power Project  | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 10.    | Rajasthan Rajya Vidyut Utpadan Nigam Ltd. | CHP & AHP for 2 X 660 MW Suratgarh Supercritical Thermal Power station, stage-V, Unit #7& 8 | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 11.    | Durgapur Projects Limited                 | AHP for 1 X 250 MW TPP Unit #8  | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 12.    | Damodar Valley Corporation                | AHP for 1 X 500 MW-Bokaro Thermal Power station   | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 13.    | Raichur Power Corporation Ltd.            | CHP & AHP for 2 X 800 MW-Yermarus Thermal Power Station                                     | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |
| 14.    | Neyveli Lignite Corporation Limited       | AHP for 2 X 500 MW Tuticorin Thermal Power Project  | Turnkey execution of Mechanical, Electrical and civil & structural works. | UE                                |

| Sl No. | Customer                           | Application   | Project Description   | Year of Completion/ Commissioning |
|--------|------------------------------------|---|---|-----------------------------------|
| 15.    | National Thermal Power Corporation | CHP & AHP for 3 X 660 MW North Karanpura Super Thermal Power Project  | Turnkey execution of Mechanical, Electrical and civil & structural works.   | UE                                |
| 16.    | SAIL, BSL Bokaro                   | Highline Conveyor System  | Turnkey execution of Mechanical, Electrical, Automation System  | UE                                |
| 17.    | NMDC                               | Raw Material Handling System (Pkg-01) for 3 MTPA Nagarnar Steel Plant | Turnkey execution of Mechanical, Civil & Structural, Electrics, Instrumentation, Automation System and Auxiliary System | UE                                |
| 18.    | DVC                                | Ash Handling Plant for Mejia, UNIT-4                                  | Complete Mechanical, Electrical, Civil and Structural   | UE                                |
| 19.    | Damodar Valley Corporation         | Ash Handling Plant for Durgapur Steel Thermal Power Project           | Complete Mechanical, Electrical, Civil and Structural   | 2013                              |
| 20.    | Damodar Valley Corporation         | Ash Handling Plant for Mejia Thermal Power Project unit # 7&8         | Complete Mechanical, Electrical, Civil and Structural   | 2012                              |
| 21.    | SAIL, BSL Bokaro                   | Augmentation of Coking Coal Conveyor System (Package-2)               | Turnkey execution of Mechanical, Electrical, Automation System  | 2012                              |
| 22.    | BHEL, Hyderabad                    | Automated Storage and Retrieval System (ASRS)                         | Complete mechanical, electrical equipment and software.   | 2012                              |



| Sl No. | Customer  | Application   | Project Description                                     | Year of Completion/ Commissioning |
|--------|---|---|---|-----------------------------------|
| 23.    | BHEL, Haridwar                                  | Automated Storage and Retrieval System (ASRS)                                     | Complete mechanical, electrical equipment and software. | 2012                              |
| 24.    | Gujarat Industries Power Company Limited        | Lignite Handling and Ash Handling Plant for Surat Lignite Power Plant             | Complete Mechanical, Electrical, Civil and Structural   | 2011                              |
| 25.    | Calcutta Electric Supply Company                | Coal Handling and Ash Handling Plant for Budge Budge Generating Station Extension | Complete Mechanical, Electrical, Civil and Structural   | 2011                              |
| 26.    | Tata Power Corporation Limited                  | Coal Handling Plant for Trombay Thermal Power station                             | Conveyor System   | 2010                              |
| 27.    | NTPC –SAIL Power Company Limited                | Ash handling system Bhilai Expansion Project                                      | Complete Mechanical, Electrical, Civil and Structural   | 2009                              |
| 28.    | MadhyaPradesh power Generating Company Limited. | Coal Handling Plant for Amarkantak Thermal Power station                          | Complete Mechanical, Electrical, Civil and Structural   | 2009                              |
| 29.    | Punjab State Electricity Board                  | Coal Handling and Ash Handling Plant for Guru Horigobind Thermal Power Project    | Complete Mechanical, Electrical, Civil and Structural   | 2008                              |

| Sl No. | Customer                             | Application  | Project Description   |                       | Year of Completion/ Commissioning |
|--------|--------------------------------------|--|---|-----------------------|-----------------------------------|
| 30.    | Damodar Valley Corporation           | Coal Handling Plant for Meija Thermal Power station unit # 5&6         | Complete Electrical, Structural   | Mechanical, Civil and | 2008                              |
| 31.    | Chhattisgarh State Electricity Board | Coal Handling and Ash Handling Plant for Korba Thermal Power Project   | Complete Electrical, Structural   | Mechanical, Civil and | 2008                              |
| 32.    | Karnataka Power Corporation Limited  | Coal Handling and Ash Handling Plant for Bellary Thermal Power Project | Complete Electrical, Structural   | Mechanical, Civil and | 2008                              |
| 33.    | COD, Kanpur                          | Automated Storage and Retrieval System (ASRS)                          | Complete mechanical, electrical equipment and software.                             |                       | 2008                              |
| 34.    | NTPC                                 | Coal Handling Plant for Rihand STPP                                    | Complete Electrical, Structural   | Mechanical, Civil and | 2006                              |
| 35.    | RVUNL                                | Ash Handling Plant for Kota STPS                                       | Complete Electrical, Structural   | Mechanical, Civil and | 2004                              |
| 36.    | RVUNL                                | Ash Handling Plant for Suratgharh STPS                                 | Complete Electrical, Structural   | Mechanical, Civil and | 2003                              |
| 37.    | NINL - Duburi Orissa                 | Electrics for Raw material handling plant                              | Complete electrics including transformers, switchgear, cables, PLC, automation etc. |                       | 2002                              |

| Sl No. | Customer         | Application   | Project Description  | Year of Completion/ Commissioning |
|--------|------------------|---|--|-----------------------------------|
| 38.    | BHEL Ranipet     | Automated Storage and Retrieval System (ASRS)                         | Complete mechanical, electrical equipment and software.  | 2002                              |
| 39.    | UCIL – Jaduguda  | Mine Winder   | Complete mechanical, electrical and civil winder room & foundation                                 | 2002                              |
| 40.    | BHEL Trichy      | Automated Storage and Retrieval System (ASRS)                         | Complete mechanical, electrical equipment and software.  | 2001                              |
| 41.    | HGML – Hutti     | Mine Winder   | Complete mechanical, electrical and civil winder room & foundation                                 | 2001                              |
| 42.    | EPI / NEW DELHI  | External coal handling system (ECHS) phase II of Tuticorn TPP of TNEB | Complete coal handling plant electrics   | 1999                              |
| 43.    | NLC Neyveli      | Conveyer drive head control station                                   | Skid mounted outdoor type drive head control station for 2x630 KW slipring induction motor control | 1998                              |
| 44.    | EPI/ New Delhi   | North Madras Coal handling plant                                      | Complete CHP electrics   | 1997                              |
| 45.    | NCL, Singrauli   | Open blast hole drills  | 2 nos. thy.conv.panels for open blast hole drills  | 1997                              |
| 46.    | NCL, Singrauli   | Starting reactor for 15/90 dragline                                   | One number starting reactor  | 1996                              |
| 47.    | SCCL, Kothagudam | Mine ventilation fan  | 1600 KW, Mine ventilation fan controls   | 1996                              |

| Sl No. | Customer                            | Application                                     | Project Description   | Year of Completion/ Commissioning |
|--------|-------------------------------------|---|---|-----------------------------------|
| 48.    | ABB, Germany                        | Ramagundam O/C-II project                       | Software for O/C Mine automation  | 1995                              |
| 49.    | Mahanadi coal fields Ltd. Sambalpur | Starting reactor for dragline                   | One number starting reactor for 20/90 dragline  | 1995                              |
| 50.    | SCCL/ Kothagudam                    | Ramagundam O/C Project                          | Electrics for Crusher, Spreader Tripper etc.  | 1995                              |
| 51.    | ECL/ Sonapur Bazari Project         | Sonapur Bazari Coal Handling Plant              | Complete electrics including HT/LT motors control and instrumentation cables, lighting etc. | 1995                              |
| 52.    | DSP/ Bolani Iron ore project        | Down Hill conveyors for Bolani iron ore project | Complete controls for down hill conveyors including HT/LT motors imported brakes etc.       | 1995                              |
| 53.    | NCL, Singrauli                      | Starting reactor for 12.5 cubic metre shovel    | 10 nos. starting reactor with switch gear controls  | 1995                              |
| 54.    | WCL, Nagpur                         | Starting reactor for dragline                   | One no. starting reactor for 20/90 dragline   | 1993                              |
| 55.    | NCL, Singrauli                      | Starting reactor for dragline                   | 3 nos, starting reactor for 20/90 dragline  | 1993                              |
| 56.    | NCL, Singrauli                      | Starting reactor for dragline                   | Two nos. starting reactor for 20/90 dragline  | 1992                              |
| 57.    | BCCL, Dhanbad                       | Putki Mine Project                              | Bullihari Winder Mine winder ventilation/ ducting equipment                                 | 1992                              |
| 58.    | SSL/ Madras for NCL                 | Nigahi Coal Handling Plant                      | HT Motors, PLC system and MCC for coal handling plant                                       | 1992                              |

| Sl No. | Customer  | Application                                    | Project Description  | Year of Completion/ Commissioning |
|--------|---|--|--|-----------------------------------|
| 59.    | BGML, KGF   | Satgram Ground Project                         | Under Mine<br>PLC & control desk for loading/unloading system                                    | 1991                              |
| 60.    | Burn Std, Calcutta for DESU, New Delhi            | Ash Handling Plant of TPS                      | Rajghat<br>PLC and Control Desks   | 1989                              |
| 61.    | Mahindra & Mahindra, Calcutta for WBSEB, Kolaghat | Ash Handling Plant of TPS                      | kolaghat<br>PLC and Control Desks  | 1989                              |
| 62.    | EPIL, New Delhi for WBSEB, Kolaghat               | Coal Plant of STPS                             | Handling of Kolaghat<br>Complete including HT/LT Control Instrumentation, Cables, Lighting, etc. | 1989                              |
| 63.    | ESL, Bangalore for MSEB, Khaperkheda              | Coal Plant Interconnection of Khaperkheda STPS | Handling<br>Complete including HT/LT Control Instrumentation, Cables, Lighting, etc.             | 1988                              |
| 64.    | Coal India Ltd. Calcutta                          | Starting Reactors for Dragline                 | 2 Nos. Starting Reactors for Russian Dragline  | 1988                              |
| 65.    | EPIL, New Delhi for DESU, New Delhi               | Coal Plant of TPS                              | Handling of Rajghat<br>Complete including HT/LT Control Instrumentation, Cables, Lighting, etc.  | 1987                              |
| 66.    | GRSE, Calcutta for NTPC, Vindhyachal              | Coal Plant Vindhyachal STPS                    | Handling of<br>Complete including HT/LT Control Instrumentation, Cables, Lighting, etc.          | 1986                              |

| Sl No. | Customer                                      | Application   | Project Description   | Year of Completion/ Commissioning |
|--------|---|---|---|-----------------------------------|
| 67.    | Jessop and Co. Ltd. for Vizag Steel Plant     | 6 Nos. Twin Boom Stacker,<br>8 Nos. trailer Unloaders | Complete Electrics and Controls                                       | 1986                              |
| 68.    | Hindustan Copper Ltd. Ghatsila                | 600 KW DC Mine Winder                                 | Complete Revamping including 600 KW DC Motor and Thyristor Convertor  | 1985                              |
| 69.    | Heavy Engineering Corpn. Ranchi               | 7 Nos. Open Blast Hole Drills                         | 60 KW DC Motor, 200 KW AC Motor, Thyristor Convertors, Controls, etc. | 1985                              |
| 70.    | Bharat Coking Coal Ltd. Moonidih              | Reclaimers for Coal Moonidih Washery                  | 27 KW AC Motors and Invertor Controls, etc.                           | 1985                              |
| 71.    | Bharat Coking coal Ltd. Pootki Bullihary      | 2 Nos. Skip Winder,<br>2 Nos. Cage Winder,            | 1600 KW DC Motors, Thyristor Convertors, Signalling Equipment, etc.   | 1985                              |
| 72.    | M.N. Dastur and Co.Ltd. for Vizag Steel Plant | VSP Coal Handling Plant                               | 107 Controls Boards, Control Desks, Mimic Boards, etc,                | 1985                              |
| 73.    | TISCO Jamadoba                                | 500 KW Ventilation Fan for Jamodoba Mine              | 500 KW, 3.3 kV, 8 Pole SCIM and Soft Starter Controls                 | 1985                              |
| 74.    | Hindustan Copper Ltd. Khetri                  | 400 KW AC Mine Winder                                 | Thyristor Convertor for DB control, Rotor Resistors, etc.             | 1984                              |

| Sl No. | Customer                               | Application   | Project Description  | Year of Completion/ Commissioning |
|--------|--|---|--|-----------------------------------|
| 75.    | Bharat Gold Mines Ltd. Kolar           | 30 KWDC Mine Winder   | Thyristor Convertor Controls   | 1984                              |
| 76.    | Bharat Coking coal Ltd. Moonidih       | 1 no. 1600 KW Friction Winder                                   | Thyristor Convertors   | 1982                              |
| 77.    | Hindustan Zinc Ltd. Udaipur            | Revamping 75/150/300 KW AC Mine Winder                          | Controls for 75/150/300 KW, 440 V AC Mine Winders                                  | 1981                              |
| 78.    | Heavy Engineering Corpn. (Ranchi)      | 4.6 cubic metre Excavators                                      | 24 sets Electrics and Controls   | 1980                              |
| 79.    | Coal Mines Authority of India Calcutta | 75 Nos. Drives & Controls for Ventilation and Haulage Equipment | 25 sets with 160 KW SRIM and 50 sets with 300 KW SCIM and Controls                 | 1978                              |
| 80.    | Singareni Collieries Andhra Pradesh    | 25 Nos. Haulage Drives  | 25 Nos. 115 KW SRIM and Controls   | 1978                              |
| 81.    | Singareni Collieries Andhra Pradesh    | 3 sets Ventilation Drives                                       | 3 sets of 225 KW 3.3 kV SRIM and Controls  | 1977                              |
| 82.    | TISCO Jamadoba, Bhelatand              | 2 Nos. 300 KW Friction Winders                                  | 2 Nos. 300 KW SRIM, 3.3 kV Switchgear, Liquid Controllers, DB by thyristor Control | 1974                              |

| Sl No. | Customer                         | Application                                    | Project Description   | Year of Completion/ Commissioning |
|--------|----------------------------------|--|---|-----------------------------------|
| 83.    | Indian Copper Corpn. Ghatsila    | 1 No.135 KW Drum Winder                        | 1 No. 135 KW SRIM, 3.3 kV Switchgear, Resistance Control                                  | 1974                              |
| 84.    | Bharat Coking Coal Ltd. Moonidih | 2 Nos.1600 KW Friction Winders                 | 2 Nos.1600 KW DC Motors, MG Sets, Thyristor Field Controls, Selsyn Position Control, etc. | 1973                              |
| 85.    | Hindustan Copper Ltd. Khetri     | 1 No.1600 KW Double Drum, Double Clutch Winder | 1 No.1600 KW DC Motor, MG Sets, Thyristor Field Controls, Selsyn Position Control, etc.   | 1972                              |

UE: Under Execution



#### **4. REACTIVE POWER COMPENSATION**

| Sl. No. | Customer                             | Project Description   | Year of Completion/ Commissioning |
|---------|--------------------------------------|---|-----------------------------------|
| 1.      | Uttar Pradesh Power corporation LTD. | 4 Nos., 40 MVAR, 132 KV shunt capacitors with reactors, SF6 Circuit Breaker, Isolators, current transformers, surge arrestors, control & Relay Panel  | 2001                              |
| 2.      | AP TRANSCO                           | 11KV, 60KVA, Pole mounted Capacitor Banks at 576 locations in Nalagonda district.   | 2009                              |
| 3.      | HINDALCO                             | 12 KV, 40 MVAR, Harmonic Filters for Potline-1  | 2008                              |
| 4.      | Durgapur chemicals ltd.              | 11 KV 35 MVAR capacitor Bank with Reactor, vacuum Breaker, insulator, current & Potential transformers, control & Relay Panel Structures, Busbar etc.   | 2002                              |
| 5.      | KYCR coil Industries Bangladesh      | 33 KV, 6.5MVAR capacitor Bank with Reactor, vacuum Breaker, insulator, current & Potential transformers, control & Relay panel, ACSR conductor, Structures, etc.  | 2001                              |
| 6.      | Maharashtra State Electricity Board  | Shunt Compensation system for Nasik and Kolhapur zones at the following places:<br>Malegaon –I : 30 MVAR, 132KV<br>Pathardi : 30 MVAR, 132 KV<br>Kurundha : 30 MVAR, 132 KV<br>Nasri : 30 MVAR, 132 KV  | 2000                              |
| 7.      | Baku Steel Company Azerbaijan        | Harmoni Filter Bank for Arc furnace 35KV, 15MVA, Harmonic filter Banrising comprising SF6 Circuit Breaker, Isolators, current & Potential transformers, surge Arrestor, Aluminium Bus Bar, Filter Reactors, Control & Relay Panel Structures etc. | 2000                              |

| Sl. No. | Customer                            | Project Description   | Year of Completion/ Commissioning |
|---------|-------------------------------------|---|-----------------------------------|
| 8.      | Maharashtra State Electricity Board | Shunt Compensation system for Nasik and Kolhapur zones at the following places :<br>Ahmed Nagar : 30 MVAR , 132 KV<br>Bableshwar : 30 MVAR , 132 KV<br>Kalwan : 30 MVAR , 132 KV<br>Kopergoan : 30 MVAR , 132 KV<br>Pachora : 30 MVAR , 132 KV<br>Mudshingi : 30 MVAR , 110 KV<br>Bapat camp : 30 MVAR , 110 KV<br>Miraj : 40 MVAR , 110 KV<br>Karad : 30 MVAR , 110 KV | 1999                              |
| 9.      | National Aluminium Co. Ltd., Angul  | Fixed capacitor bank system<br>12 nos. 1.5 MVAR, 6.6 KV for Unit Auxiliary system.<br>3 nos., 3 MVAR, 6.6 KV for Station Auxiliary system<br>15 MVAR, 11 KV, Harmonic filter banks for Smelter Auxiliary system for Harmonic Suppression & Power factor improvement.  | 1997                              |
| 10.     | Essar Steels Ltd. Hazira            | Harmonic Filter Bank System for Hot Strip Mill<br>67.2 MVAR, 33 KV /11 KV fixed capacitor banks for harmonic suppression and power factor improvement   | 1996                              |
| 11.     | TCIL, Jamshedpur                    | Harmonic filter banks for Cold Rolling Mill<br>6 MVAR, 6.6 KV fixed capacitor bank for harmonic suppression and power factor improvement.   | 1996                              |
| 12.     | Bhilai Steel Plant, Bhilai          | SVC for Rail & Structural Mill<br>12.5 MVAR, 11 KV Static Volt ampere reactive power compensation system comprising of capacitors, filter reactors, thyristor controlled reactors, water cooled thyristor valve with controls & 11 KV switchgear.   | 1995                              |

| Sl. No. | Customer                                  | Project Description   | Year of Completion/ Commissioning |
|---------|---|---|-----------------------------------|
| 13.     | Alloy Steel Plant,<br>Durgapur            | SVC for Arc furnace<br>35 MVAR, 33 KV static volt ampere reactive power compensation system comprising of capacitors, filter, reactors, thyristor controlled reactors, water cooled thyristor valve with controls & 33KV switchgear.                | 1995                              |
| 14.     | Tata Iron & Steel co. Ltd.,<br>Jamshedpur | SVC for Hot Strip Mill<br>50 MVAR, 33 KV static volt ampere reactive power compensation system comprising of capacitors, filter reactors, thyristor controlled reators, high power water cooled thyristor valve with controls and 33 KV switchgear. | 1995                              |
| 15.     | Rourkela Steel Plant,<br>Rourkela         | SVC for Tandem Cold Rolling Mill<br>50 MVAR, 33 KV static volt ampere reactive power compensation system comprising of cacitors, filter reactors, thristor controlled reactors, water cooled thyristor valve with controls & 33 KV switchgear.      | 1995                              |
| 16.     | Indian Aluminium Co.<br>Hirakud           | Harmonic filter bank system for Smelter Auxiliary system.<br>15.1 MVAR, 11 KV, Fixed capacitor banks for harmonic suppression and power factor improvement.   | 1994                              |
| 17.     | Tata Iron & Steel Co. Ltd.,<br>Jamshedpur | Bar & Rod Mill<br>8.832 MVAR, 6.6 KV reactive power compensation equipment  | 1988                              |
| 18.     | Modi Steels Ltd.,<br>Modinagar            | 5.964 MVAR, 11 KV fixed capacitor banks for power factor improvement.   | 1987                              |
| 19.     | CFFP,<br>BHEL,<br>Hardwar                 | 7.86 MVAR, 11 KV fixed capacitor banks for power factor improvement.  | 1987                              |

| Sl. No. | Customer                           | Project Description  | Year of Completion/ Commissioning |
|---------|------------------------------------|--|-----------------------------------|
| 20.     | Insulator Plant, BHEL, Jagadishpur | 300 KVAR, 415 Volts fixed capacitor banks for power factor improvement.<br>200 KVAR capacitor banks along with reactive power controller for Power Factor improvement.   | 1986<br>1987                      |
| 21.     | Bokaro Steel Plant Bokaro          | Dynamic Reactive Power Compensation Equipment for CRM-II Complex.<br>111 MVAR, 13.5 KV static filter bank and 43 MVAR 1.6 KV capacitor /reactor banks with Thyristor switching arrangement for dynamic compensation for harmonic suppression and for power factor improvement. | 1982                              |
| 22.     | Salem Steel Plant, Salem           | 14 MVAR, 13.2 KV fixed filter bank for harmonic suppressor & power factor improvement.   | 1982                              |

UE: Under Execution

## **5. POWER TRANSMISSION & DISTRIBUTION**

| Sl. No. | Customer                                      | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 1.      | PTCUL<br>Uttarakhand                          | Turnkey (EPC) of 132/33 KV sub-station including Civil, Structural and Electrics for five (5) numbers of sub-stations at different locations                                   | 2010                              |
| 2.      | PGCIL<br>Bihar                                | Turnkey (EPC) of 132/33 KV sub-station including Civil, Structural and Electrics for seven (7) numbers of sub-stations at different locations                                  | 2005                              |
| 3.      | PGCIL   | Turnkey (EPC) of 132/33 KV, Ziro sub-station, associated with 132 KV Ranganadi Ziro Transmission Line.   | 2003                              |
| 4.      | Manipur                                       | 6x6KV DG Set-Switchyard, 7 bay-36 MW on Turnkey.   | 2002                              |
| 5.      | Bakur steel company<br>Azerbaijan             | 1x110KV Bay extension - 110 KV SF6 circuit breaker Insulators, current & Potential transformers, control panel, equipment support structures.                                  | 2001                              |
| 6.      | Bakur steel company<br>Azerbaijan             | 1x110KV Bay comprising 110 KV SF6 circuit breaker Insulators, 80 MVA Power Transformer, current & Potential transformers, control panel, equipment support structures.         | 2000                              |
| 7.      | Fertiliser Corporation<br>Of India,<br>Sindri | 11 KV & 3.3 KV Switchgear panels, control & Relay Panel for Generators, HT & LT XLPE Cables, ACDB, DCDB Battery Charger, Fire Fighting eqpts., AVR's, for 4 x 15 MW Gen. Sets. | 1999                              |

| Sl. No. | Customer                                    | Project Description   | Year of Completion/Commissioning |
|---------|---|---|----------------------------------|
| 8.      | Kerala State Electricity Board<br>Kozhikode | 4x110KV Bays comprising SF6 circuit breaker<br>Insulators, current & Potential transformers<br>35 MVA Power Transformer, yard<br>Control cables, control panel, fire fighting eqpt., Illumination, Air conditioning system  | 1999                             |
| 9.      | Bhilai Steel Plant<br>Bhilai                | 2 x 132 KV Bays Expn. Work at MSDS-2<br>5 x 132 KV Bays Swyd at MSDS-6 including 2 x 30/50 MVA<br>Transformers 132 KV SF6 CBs, IS, LAs, CTs, CVTs, C&R Panels, AC/DC DBs, Battery, Charger 11 & 6.6 KV Swgr. Fire Fighting, Earthing, Civil & Structural works  | 1997<br>1997                     |
| 10.     | Bhilai Steel Plant<br>Bhilai                | 2 x 132 KV Bays Expn. Work at MSDS-1<br>5 x 132 KV Bays Swyd at MSDS-4 including 2 x 30/50 MVA<br>Transformers 2 x 16 MVA<br>Transformers, 132 KV SF6 CBs, IS, LAs, CVTs, CRPs, AC/DC DBs, Fire Fighting, Illumination, Earthing, Communication, SCADA, Sub-Stn. Bldgs. OH galleries, Civil & Structural works. | 1997                             |
| 11.     | NALCO, Angul                                | 1 x 220 KV Bay-SF6 CBs, CTs, PTs, LAs 11 KV Cellular Switchgear, LT PCC Battery, Charger, DCDB, Earthing Illumination, Sub-Stn. building, Civil, Structural works, fire fighting, Ventilation system etc.   | 1997                             |



| Sl. No. | Customer       | Project Description   | Year of Completion/Commissioning |
|---------|----------------|---|----------------------------------|
| 12.     | INDAL, Hirakud | 1 x 132 Kv Addl. Bay Expn. Of Existing 3 x132 KV Bays with SF6 CBs, CTs, ISs, LAs, Tabular Bus Bars, Post Insulators, Yard Structurals, asso. Civil Work etc. | 1997                             |

UE: Under Execution

## 6. OIL SECTOR

| Sl. No. | Customer                                      | Project Description  | Year of Completion/ Commissioning |
|---------|---|--|-----------------------------------|
| 1.      | ONGC  | Advanced instrumentation system for 50 Nos of Oil Rigs at various locations across India   | 2013                              |
| 2.      | IOCL , Miraj                                  | Terminal Automation System / Tank Farm Management System   | 2002                              |
| 3.      | IOCL , Nishatpur                              | Terminal Automation System / Tank Farm Management System   | 2002                              |
| 4.      | IOCL , Barauni                                | Terminal Automation System   | 2001                              |
| 5.      | IOCL , Cochin                                 | Terminal Automation System   | 2001                              |
| 6.      | HPCL, Sabarmati                               | Terminal Automation System / Tank Farm Management System   | 2001                              |
| 7.      | IOCL, Baroda through BPCL, Naini              | Two sets of barring gear arrangement for 750KW. Motor and reciprocating compressors.   | 2001                              |
| 8.      | HPCL, petronet New Delhi. Through BPCL, Naini | 3 sets of 1680 KW and 3 sets of 720 KW, 6.6KV, 3000 rpm S.Q. cage induction motors and auto transformer starters for HPCL – Petronet Mangalore – Bangalore pipe line for transportation of petro products. | 2000                              |
| 9.      | HPCL, New Delhi Through IDP, UK               | Instrumentation panels and associated equipment for extension of Jamnagar – Loni pipeline for petro products transportation.   | 2000                              |

## **7. WATER MANAGEMENT**

| Sl. No. | Customer   | Project Description   | Year of Completion/ Commissioning |
|---------|--|---|-----------------------------------|
| 10.     | CMWSSB, Nesapakkam, Chennai.                                   | 40 MLD Sewage Treatment Plant Turnkey (EPC) project consisting of Mechanical, Civil & Structural Electrical, Instrumentation & Auxiliary Systems including AMC for 10 years   | 2006<br>AMC-UE                    |
| 11.     | NTPC Rihand  | Ash Water re-circulating pumping station  | 2006                              |
| 12.     | Bangalore water supply & Sewerage Board. Bangalore Karnataka   | Water treatment plant modification & SCADA  | 2002                              |
| 13.     | Bangalore water supply & Sewerage Board. Bangalore (Karnataka) | Engg, Supply, erection testing and commissioning of 24 Nos. horizontal split casing centrifugal pumps for delivering 2400 m <sup>3</sup> / hr clear water at heads between 45m to 116m 24nos 6.6KV CACA motors rated at 1000KW to 1300KW, manifolds, motorized butterfly valves, non return valves (1500 mm to 600 mm) pressure relief valves, pipes, fittings, expansion ballows, sluice gates 2000mmx2000mm, A.C. equipment, surge protection system, fire extinguisher, 66KV outdoor substations 66KV / 6.9KV Transformers, 6.6KV switchgear, relay & control panels, cables, earthing, lightning protection system, instrumentation including ultrasonic flow, level measurement systems, pressure switches, instrument control panel, UHF communication system, SCADA & Telemetry. | 2002                              |

| Sl. No. | Customer   | Project Description   | Year of Completion/Commissioning |
|---------|--|---|----------------------------------|
| 14.     | Krishna bhagya Jala Nigam Ltd. Almatti – Karnataka | Engg, Supply, erection testing and commissioning of 250 KW 1500 rpm Diesel gensets, Batteries, Airconditioning system, Main distribution board, cables, earthing system, fire detection & Extinguishing system.   | 2000                             |
| 15.     | Krishna bhagya Jala Nigam Ltd. Almatti – Karnataka | Engg, Supply, erection testing and commissioning of permanent illumination of dam top & drainage galleries consisting of light poles, fittings, bulkheaders raising mains, surge shafts, 1400 mm butterfly valves, 6.6 KV electrical switchgear, cables, illumination & fire fighting system, earthing battery chargers, capacitor banks. | 2000                             |
| 16.     | Govt. of Rajasthan - I.G.N.P, Bikaner              | 6.6 KV HT Switch board - VCBs and Vacuum Contactors for 250 KW Pump Drives, LT MCC, Aux Transformers, DG Set, Battery Charger, Cables.  | 2000                             |

UE: Under Execution

## **8. AUTOMATION LEVEL 2 AND ABOVE**

## 7.1 DATA ACQUISITION SYSTEM



Data Acquisition System

| Sl No. | Project / Plant   | Hardware used                       | Language used                               | Functions   | Year of Completion/ Commissioning |
|--------|---|-------------------------------------|---|---|-----------------------------------|
| 1.     | BWSSB, Bangalore Water Supply                                     | Pentium PCs, RTU, Radio Modem       | MMI package, IEC 1131-3 compatible language | SCADA for Water management system   | 2002                              |
| 2.     | 132 kV/ 11kV/ 6,6kV MSDS-IV Switchyard Bhilai Steel Plant, Bhilai | Pentium PCs and RTUs                | 'C' and MMI package                         | Switchyard Data acquisition, Monitoring, Telemetry and Telecontrol              | 2002                              |
| 3.     | 220 KV/ 11 kV Switchyard, NALCO, Ankul, ORISSA                    | Pentium PCs and RTUs                | 'C' and MMI package                         | Switchyard Data acquisition, Monitoring, Telemetry and Telecontrol              | 1999                              |
| 4.     | BHEL - Hardwar  | SLC 500, Pentium PCs -3 RISC Server | Ladder Logic (RSLOGIX) Windows95 RSView     | SCADA system for acquiring and control of test bed data in Hydro Turbine Models | 1998                              |
| 5.     | BSES Ltd, Mumbai 220 KV receiving Station at Versova              | Pentium PCs                         | 'C' , Visual Basic, MMI (Intellution)       | Training Simulator for switchyard application                                   | 1998                              |

| Sl No. | Project / Plant                                   | Hardware used   | Language used                                | Functions  | Year of Completion/ Commissioning |
|--------|---|---|--|--|-----------------------------------|
| 6.     | ISRO , Master Control Facility - Hassan           | Pentium PCs and RTU   | MMI Package , PLC 1131-3 compatible language | SCADA for Auxiliary Facilities   | 1998                              |
| 7.     | Blooming Mill Bhilai                              | APACS   | Function Block Programming                   | SCADA / DCS  | 1994                              |
| 8.     | Rail & Structural Mill Bhilai Steel Plant, Bhilai | IBM-PC/AT compatible computer<br><br>AMS based Signal Processing Unit | Assembly & C                                 | Data acquisition system for monitoring the healthiness of drives and to evaluate production parameters of various sections including production shift-wise | 1994                              |

| Sl No. | Project / Plant                                | Hardware used  | Language used   | Functions  | Year of Completion/ Commissioning |
|--------|--|--|-----------------|--|-----------------------------------|
| 9.     | Merchant Mill<br>Bhilai Steel<br>Plant, Bhilai | IBM-PC/AT<br>compatible<br>computer<br><br>AMS based<br>Signal<br>Processing<br>Unit | Assembly &<br>C | Data<br>acquisition<br>system for<br>monitoring the<br>healthiness of<br>drives and to<br>evaluate<br>production<br>parameters of<br>various<br>sections<br>including<br>production<br>shift-wise  | 1993                              |
| 10.    | Billet Mill<br>Bhilai Steel<br>Plant, Bhilai   | IBM-PC/AT<br>compatible<br>computer<br><br>AMS based<br>Signal<br>Processing<br>Unit | Assembly &<br>C | Data<br>acquisition<br>system for<br>monitoring the<br>healthiness of<br>drives of<br>various<br>standards and<br>to evaluate<br>production<br>parameters<br>like tonnage,<br>cross section<br>including<br>production log<br>shift-wise | 1993                              |

| Sl No. | Project / Plant  | Hardware used  | Language used                                  | Functions  | Year of Completion/ Commissioning |
|--------|--|--|--|--|-----------------------------------|
| 11.    | BHEL, Hardwar  | 80286-based PC-AT system and remote AT node connected with LAN   | Assembly & Turbo Basic                         | Data acquisition system to acquire various electrical, physical and operating parameters during testing of 500 MW turbo-generator sets and print-out performance curves. | 1990                              |
| 12.    | NHVDC, Barsoor/Lower Sileru                                    | AMS-based signal processing unit, PC-AT for mimic display. SN -23 Real Time Computer (PDP - 11 equivalent) | Assembly & C<br><br>RSX - 11M Operating System | Sub-station monitoring and control system for power flow and study of indigenously developed 1000 KV DC line between M.P. & A.P.   | 1990                              |
| 13.    | Indian Space Research Organisation Satellite Centre, Bangalore | LAN and 3 front-end slave processing units with PID controllers  | Assembly & MBasic                              | Monitoring and control system to simulate orbit conditions on the thermo-vacuum chamber for satellite testing  | 1989                              |

| Sl No. | Project / Plant                                 | Hardware used   | Language used      | Functions   | Year of Completion/ Commissioning |
|--------|---|---|--------------------|---|-----------------------------------|
| 14.    | BHEL, Hyderabad                                 | Z80-based reference generator                         | Assembly           | Auto speed reference system for centrifugal casting machine   | 1989                              |
| 15.    | Heavy Water Board, Dept. of Atomic Energy, Kota | Z80-based signal processing unit, 8086-based computer | Assembly & Basic   | Safety monitoring & alarm annunciator system for detection of hazardous H <sub>2</sub> S pollution in the atmosphere within a radius of 3 km area                           | 1989                              |
| 16.    | BHEL, Hardwar                                   | Z80-based computer                                    | Assembly & M Basic | Data acquisition system to acquire various electrical, physical and operating parameters during testing of 210 MW turbo-generator sets and print-out of performance curves. | 1988                              |

| Sl No. | Project / Plant   | Hardware used  | Language used    | Functions  | Year of Completion/ Commissioning |
|--------|---|--|------------------|--|-----------------------------------|
| 17.    | BHEL, Ranipet   | 8086-based computer, Z80-based signal processing station     | Assembly & Basic | Data acquisition system for monitoring aerodynamic performance of fans during testing and evaluate the test results as per British Standards/Air Movement & Control Association Standards. | 1987                              |
| 18.    | Oil & Natural Gas Commission, Bombay Offshore Project, Bombay | Turbo DOS computer system and Z80-based front-end processor. | Assembly & Basic | On-line software and 16-bit computer system integrated with instrumentation system for off-shore mud logging units.  | 1986                              |
| 19.    | Regional Engineering College, Warrangal                       | Z80-based data logger  | Assembly         |  | 1986                              |

| Sl No. | Project / Plant                            | Hardware used   | Language used | Functions   | Year of Completion/ Commissioning |
|--------|--|---|---------------|---|-----------------------------------|
| 20.    | BHEL, Hyderabad                            | S-100 bus-based analog/digital input cards housed in CPM computer (Z80 - Based) | Assembly      | Computer and instrumentation system integrated to monitor hydraulic mud and drilling parameters for BHEL-manufactured oil rigs.                                     | 1986                              |
| 21.    | Indian Space Research Organisation, Hassan | Z80A-based computer   | Assembly      | Telemetry system installed at Bangalore for tracking satellite health/diagnostic parameters encoded in the signals received from master control facility at Hassan. | 1984                              |

| Sl No. | Project / Plant | Hardware used                                      | Language used | Functions  | Year of Completion/ Commissioning |
|--------|-----------------|--|---------------|--|-----------------------------------|
| 22.    | BHEL, Hyderabad | Z80-based front-end processor, Z80A-based computer | Assembly      | Data acquisition system to acquire various electrical, physical and operating parameters during testing of 210 MW turbo-generator set and print-out of performance curves. | 1983                              |

UE: Under Execution



## 7.2 IRON & STEEL MAKING

Iron & Steel Making

| Sl No. | Project / Plant   | Hardware used                                    | Language used  | Functions  | Year of Completion/ Commissioning |
|--------|---|--|--|--|-----------------------------------|
| 1.     | CSP Plant – Caster-2<br>Ispat<br>Metallics<br>Ltd<br>Dolvi,<br>Maharashtra<br>thro SMS ,<br>Germany | DEC<br>Alpha<br>System<br>and<br>Penttium<br>PCs | Open VMS<br>DEC C<br>Visual C++<br>Oracle<br>Database<br>with<br>Developer<br>2000 | Level- II<br>Automation<br>Software<br>engineering<br>and<br>Commissioning | 2003                              |
| 2.     | CSP Plant – Caster-1<br>Ispat<br>Metallics<br>Ltd<br>Dolvi,<br>Maharashtra<br>thro SMS ,<br>Germany | DEC<br>Alpha<br>System<br>and<br>Penttium<br>PCs | Open VMS<br>DEC C<br>Visual C++<br>Oracle<br>Database<br>with<br>Developer<br>2000 | Level- II<br>Automation<br>Software<br>engineering<br>and<br>Commissioning | 1998                              |

| Sl No. | Project / Plant                                     | Hardware used  | Language used                   | Functions  | Year of Completion/ Commissioning |
|--------|---|--|---------------------------------|--|-----------------------------------|
| 3.     | Sinter Plant<br>Rourkela<br>Steel Plant<br>Rourkela | Allen<br>Bradley<br>PLC-5/40<br><br>Yokogawa<br>μ XL | Ladder<br>Diagrams<br><br>BASIC | Sequencing &<br>Interlocking<br><br>Sinter Mix<br>Calculation<br>Burn through<br>point Control<br>Return Fine<br>Control<br>Sinter Mix feed<br>Control,<br>Hopper Level<br>Control, Drum<br>Speed Control<br>Sinter Mix<br>Moisture<br>Control<br>Sinter Cooler<br>Control<br>Wind box<br>Pressure<br>Control<br>Plant<br>Dedusting<br>Control<br>Waste Gas<br>Pressure<br>Control | 1996                              |

| Sl No. | Project / Plant   | Hardware used   | Language used   | Functions   | Year of Completion/ Commissioning |
|--------|---|---|---|---|-----------------------------------|
| 4.     | Slab Caster (CCP-1)<br>Rourkela Steel Plant<br>Rourkela           | Modicon (L&T)<br>PLC<br>Siemens S5 PLC<br>Industrial PC - AT<br>DEC<br>ALPHA - 3000/ 300<br>Process Computer System | Ladder Diagram<br>PANORAMA<br>Software<br>DEC 'C'<br>RdB<br>Datatriev<br>CDD<br>DEC Forms | Sequencing & Interlocking<br>Secondary Cooling Water Control<br>Process Measurements , Data Acquisition and Monitoring<br><br>Mould Level Control<br><br>Man Machine Interface for Total Plant Control<br><br>Material Tracking (Dummy Bar & Slab Tracking)<br>Cut Length Optimisation<br>Quality Data Acquisition<br>Report Generation | 1996                              |
| 5.     | Sinter Plant<br>Mideast Integrated Steels Ltd.,<br>Jajpur, Orissa | PLC-5<br>Allen Bradley  | Ladder Diagram  | Sequence & Interlocking and other controls  | 1996                              |

| Sl No. | Project / Plant                                 | Hardware used   | Language used         | Functions  | Year of Completion/ Commissioning |
|--------|---|---|-----------------------|--|-----------------------------------|
| 6.     | Blast Furnace No. 6<br>Bhilai                   | 1 * SUPER 32/30 (Norsk Data)<br>1 * TOSDIC 247s<br>1 * IBM PC/AT<br>8 * PLC 3/10                | C,<br>FORTRAN 77      | Stoves mathematical model, plant graphics and Mgmt. reports, Burden Distribution Model<br>Instrumentation and Control<br>Weighing and batching Systems<br>Interfaces to PLC, DCS, Computer | 1990                              |
| 7.     | Blast furnace No. 7<br>Bhilai                   | 2 * PDP-11/44<br>1 * PDP-11/23<br>1 * TOSDIC 247S<br>1 * IBM PC/AT<br>19 * RC 3200<br>2 * PLC 3 | CORAL 66<br><br>BASIC | Stoves mathematical model, burden charging model, plant graphics and Mgmt. reports.<br>Instrumentation and Controls<br>Weighing and Batching Systems<br>Interfaces to PLC, DCS , Computer  | 1984                              |
| 8.     | Continuous Billet Caster<br>TISCO<br>Jamshedpur | Allen Bradley PLC   | Ladder Diagram        | Sequence & Interlocking and other controls   | 1977                              |

UE: Under Execution

## **7.3 ROLLING MILL & PROCESS LINES (FLAT PRODUCTS)**

Rolling Mill & Process Lines (Flat Products)

| SI No. | Project Plant   | Hardware Used                          | Language Used   | Functions  | Year of Completion/ Commissioning |
|--------|---|--|---|--|-----------------------------------|
| 1.     | 6Hi CRM, Bangladesh   | Pentium PC, Siemens Simadyne D         | MMI package, Function Blocks                                | AGC/CVC /HS/ASD  | 2002                              |
| 2.     | 20 Hi Sendzimir Mill, Salem                                   | Automax Controllers, Pentium PC        | MMI Package, Vb6, Function Blocks                           | Retrofit – AGC/ASD/ Auto Rolling                                       | 2000                              |
| 3.     | Crop Shear Optimisation Steckel Mill Salem Steel Plant Bokaro | VME System                             | C' Language   | Optimised Crop cutting of Hot Strip before flying shear                | 1999                              |
| 4.     | Shaman Ispat  | Automax Controller                     | Function Blocks, Vb6  | AGC  | 1999                              |
| 5.     | R1-R2 Stands of Rourkela Hot Strip Mill.                      | 2 * S5 PLCs<br>2 * IBM PCAT            | STEP-5<br>SIEFLEX   | Basic Automation & Drive interlocks. MMI Functions & fault Monitoring. | 1995                              |
| 6.     | Steckel Mill Salem  | 11 * S5 PLCs<br>25 * DS286 / SIMADYN-D | STEP-5<br>PLM86 / STRUC (Graphics, Blocks, Statement Lists) | Basic Automation<br>DC Drive<br>Digital Regulation<br>Control          | 1995                              |

Rolling Mill & Process Lines (Flat Products)

| SI No. | Project Plant  | Hardware Used   | Language Used                                      | Functions  | Year of Completion/ Commissioning |
|--------|--|---|--|--|-----------------------------------|
| 7.     | Hot Strip Mill Coiler & Shear Modernisation Bokaro               | 4 * 80286 Based Controllers for Thyristor Converters regulation<br><br>VME System | PLM 86 Block Oriented                              | Shear Automation , Cut length Control  | 1995                              |
| 8.     | Crop Shear Optimisation Hot Strip Mill Bokaro Steel Plant Bokaro | VME System  | C' Language  | Optimised Crop cutting of Hot Strip before flying shear                        | 1995                              |
| 9.     | Pennar Aluminium Co. , Hyderabad                                 | 3 * S5 - PLC<br>2 * IBM PCAT  | Step - 5   | Mill Control, Auto Slow Down, Automatic Roll Changing, Fault Monitoring System | 1994                              |
| 10.    | Aluminium Cold Rolling Mill BALCO, Korba                         | P13/P42 BHEL PLCs<br>VME System<br>3 * IBM PCATs                                  | Function Block (FUPLA)<br>DIPAS<br>Function Blocks | Mill Control, Pass Schedule Storage and AGC/ASD, Basic Automation              | 1993                              |
| 11.    | Hot Strip Mill Down Coiler Rourkela                              | 1 S5 PLCs   | Ladder diagrams<br>Statements                      | Mill Aux Functions Sequencing & Interlocking                                   | 1991                              |



Rolling Mill & Process Lines (Flat Products)

| SI No. | Project Plant   | Hardware Used                      | Language Used               | Functions   | Year of Completion/ Commissioning |
|--------|---|------------------------------------|-----------------------------|---|-----------------------------------|
| 12.    | Tandem Cold Mill Rourkela   | 2 * R84H L & T Yaskawa             | Ladder Diagrams             | Mill Interlocking and Sequencing  | 1989                              |
| 13.    | Pennar Steel Ltd. Hyderabad   | Allen Bradley PLCs                 | Ladder Diagrams             | Mill Control AGC & Auto Slow Down   | 1987                              |
| 14.    | 4 - Hi Cold Reversing & Skin Pass Mill Nagarjuna Steel Ltd. Hyderabad | (ECIL-India) PLCs                  | Logic Diagrams              | Mill control AGC & Auto Slow Down   | 1983                              |
| 15.    | Process Lines Bokaro  | PLC'S for Datalogging (ECIL-India) | Statement List              | Annealing, Pickling Slitting, Shearing, Galvanising, Electrolytic Cleaning and Roll Forming | 1982                              |
| 16.    | Tandem Cold Rolling Mill Bokaro                                       | 2 * R30<br>4 * S3<br>PLCs          | ASS 300<br>FORTRAN<br>300   | Optimisation of mill and process control  | 1982                              |
| 17.    | Process Lines (CRGO) Rourkela   | 4 * 184H (Modicon)                 | Ladder Diagrams             | Process lines Control Automation Slow Down  | 1981                              |
| 18.    | Finishing Lines Rourkela  | 3 * 184H<br>2 * ECIL-<br>PLCs      | Ladder Logic Block Diagrams | Line Control Auto slow Down   | 1981                              |

Rolling Mill & Process Lines (Flat Products)

| SI No. | Project Plant                              | Hardware Used   | Language Used                    | Functions  | Year of Completion/ Commissioning |
|--------|--|---|----------------------------------|--|-----------------------------------|
| 19.    | 4 - Hi Cold Reversing Mill (CRGO) Rourkela | 1 * 184H (Modicon)<br><br>ASEA DS - 8 based on 8080 CPU | Ladder Diagrams<br><br>Assembler | Sequencing & Interlocking , Mill Control<br><br>AGC Auto slowdown, Strip Shape indication & Control , Pass Schedule Storage System | 1981                              |
| 20.    | Hot Strip Mill Rourkela                    | 2 * R20   | ASS 300                          | AGC, Material tracking, mill control and coiler control  | 1980                              |

## 7.4 WIRE ROD & MERCHANT MILL

Wire Rod & Merchant Mill

| SI No. | Project / Plant   | Hardware Used                         | Language Used                       | Functions   | Year of Completion/ Commissioning |
|--------|---|---------------------------------------|-------------------------------------|---|-----------------------------------|
| 1.     | Light Medium Merchant Mill Vizag                        | PCs, GE Fanuc PLCs                    | Cimplicity MMI Package              | Operator viewing, control. Historical data logging, Trending  | 2006                              |
| 2.     | Medium Merchant Structural Mill and Wire Rod Mill Vizag | PCs, GE Fanuc PLCs                    | Cimplicity MMI Package              | Operator viewing, control. Historical data logging, Trending  | 2004                              |
| 3.     | Medium Merchant Structural Mill Vizag                   | 5 * R30<br>1 * R10<br>24 * S5<br>PLCs | ASS 300<br>FORTRAN<br>300<br>STEP-5 | Production planning process control for cooling & batching, piling, mill control, Min.Tension Control and fault logging | 1992                              |
| 4.     | Merchant/Billet Mill, Bhilai                            | 2 * 2/30<br>Allen<br>Bradley<br>PLCs  | Ladder<br>Diagrams                  | Master Reference Generation for stand drives  | 1990                              |
| 5.     | Bar and Section Mill Sunflag Iron & Steel Nagpur        | 2 * R30<br>1 * R10<br>1 * S5 PLC      | ASS 300<br>FORTRAN<br>300           | Mill Control, cooling bed control and minimum tension control   | 1989                              |

| SI No. | Project / Plant                                 | Hardware Used                             | Language Used                                | Functions   | Year of Completion/ Commissioning |
|--------|---|---|--|---|-----------------------------------|
| 6.     | Merchant/Billet Mill<br>Bhilai                  | 1 * AMS<br>SPU<br>1 * IBM PC<br>AT        | Assembler<br>BASIC & C                       | Engineering<br>Data<br>Display,<br>Report<br>Generation           | 1989                              |
| 7.     | Wire Rod Mill<br>Bhoruka<br>Steels<br>Bangalore | Proloc<br>PLCs<br>(BHEL)                  | Ladder<br>Diagrams<br>Statements             | Mill Control<br>(Sequencing<br>&<br>Interlocking)                 | 1987                              |
| 8.     | Wire Rod Mill<br>Vizag                          | 2 * R30<br>1 * R10<br><br>18 * 55<br>PLCs | ASS 300<br>FORTRAN<br>300<br>COBOL<br>STEP-5 | Production<br>planning<br>process<br>control and<br>fault logging | 1986                              |

## 7.5 INFORMATION SYSTEM

| SI No. | Project/ Applications                 | Hardware Used                    | Language Used             | Functions   | Year of Completion/ Commissioning |
|--------|---------------------------------------|----------------------------------|---------------------------|---|-----------------------------------|
| 1.     | Integrated Project Information System | RISC Unix-Server                 | Oracle 7.1 Developer 2000 | On-line transaction processing for intra departmental transactions. | 1999                              |
| 2.     | Cash Collection System                | ICIM-DRS 300 Minicomputer System | COBOL                     | Monitoring on cash collection based on billing                      | 1992                              |
| 3.     | Advice/ Invoicing System              | ICIM-DRS 300 Minicomputer System | COBOL                     | Customer billing based on equipments despatched.                    | 1991                              |
| 4.     | Customer Enquiry Monitoring System    | ICIM-DRS 300 Minicomputer System | COBOL                     | To provide Enquiry Status and follow-up                             | 1991                              |
| 5.     | Turnover Monitoring System            | ICIM-DRS 300 Minicomputer System | COBOL                     | To monitor the order book & Turnover                                | 1990                              |
| 6.     | Project Monitoring System             | ICIM-DRS 300 Minicomputer System | COBOL                     | To evaluate the on-going contracts status                           | 1990                              |

## 7.6 INTEGRATED TEST



Integrated Test

| SI No. | Project/ Applications                  | Hardware Used   | Language Used  | Functions  | Year of Completion/ Commissioning |
|--------|--|---|----------------|--|-----------------------------------|
| 1.     | BHEL/Bhopal, SCR Block Test Facilities | VXI system, Test Instruments, Pentium PC server / clients | Oracle8, HPVEE | Automated Testing of Switchgear, Control gear and Rectifier products | 2002                              |

## 7.7 TERMINAL AUTOMATION SYSTEM

Terminal Automation System

| SI No. | Project / Plant  | Hardware Used  | Language Used              | Functions   | Year of Completion/ Commissioning |
|--------|------------------|--|----------------------------|---|-----------------------------------|
| 1.     | IOCL , Miraj     | Pentium PCs<br>Batch Controller                                | Visual Basic<br>MS Access  | Terminal Automation System /<br>Tank Farm Management System | 2002                              |
| 2.     | IOCL , Nishatpur | Pentium PCs<br>Batch Controller                                | Visual Basic<br>MS Access  | Terminal Automation System /<br>Tank Farm Management System | 2002                              |
| 3.     | IOCL , Barauni   | Pentium PCs<br>Sun-sparc W/S<br>Batch Controller<br>Integrator | Visual C++<br>Oracle RDBMS | Terminal Automation System                                  | 2001                              |
| 4.     | IOCL , Cochin    | Pentium PCs<br>Sun-sparc W/S<br>Batch Controller<br>Integrator | Visual C++<br>Oracle RDBMS | Terminal Automation System                                  | 2001                              |
| 5.     | HPCL, Sabarmati  | Pentium PCs<br>Batch Controller                                | Visual Basic<br>MS Access  | Terminal Automation System /<br>Tank Farm Management System | 2001                              |

Terminal Automation System

| <b>Sl No.</b> | <b>Project / Plant</b> | <b>Hardware Used</b>            | <b>Language Used</b>      | <b>Functions</b>   | <b>Year of Completion/ Commissioning</b> |
|---------------|------------------------|---------------------------------|---------------------------|--|--|
| 6.            | IOCL , Sanathnagar     | Pentium PCs<br>Batch Controller | Visual Basic<br>MS Access | Terminal Automation System / Tank Farm Management System | 1999                                     |

## **7.8 MINING & MATERIAL HANDLING**

Mining & Material Handling

| SI No. | Project / Plant  | Hardware Used              | Language Used          | Functions   | Year of Completion/ Commissioning |
|--------|--|----------------------------|------------------------|---|-----------------------------------|
| 1.     | RVUNL, Suratghar, Ash Handling Plant                                     | PLC Siemens S7 400 & RIO   | STEP-7                 | Sequence & Interlocking of Plant functions.   | 2003                              |
| 2.     | NINL, RMHS, Dubri  | Allen Bradley PLC MMI      | RS Logics              | Sequence & Interlocking of Plant functions. MMI functions - Alarming, Dynamic Graphic Display | 2002                              |
| 3.     | HGML, Hutti, Mine Winder   | Allen Bradley SLC Rockwell | RS Logics ABE Software | Mine Winder Control   | 2002                              |
| 4.     | UCIL, Jaduguda, Mine Winder  | Siemens S7 300 PLC         | STEP 7                 | Mine Winder Control   | 2002                              |
| 5.     | Lead -Zinc Beneficiation Plant Hindustan Zinc Limited Agucha (Rajasthan) | DCS Instrumentation        |                        | Sequence & Interlocking PID Control MMI functions   | 1998                              |
| 6.     | Open Cast Mine II Ramagundam (Software Export)                           | 7 * S5 PLCs                | STEP-5                 | Basic Automation, Sequencing & Interlocking, Safety, Annunciation                             | 1995                              |

| SI No. | Project / Plant                    | Hardware Used                                   | Language Used                       | Functions   | Year of Completion/ Commissioning |
|--------|------------------------------------|---|-------------------------------------|---|-----------------------------------|
| 7.     | Sonepur Bazari Coal Handling Plant | L&T PLC<br>IBM PC- AT                           | Ladder Diagram<br>Panorama Software | Sequence & Interlocking of Plant functions. MMI functions - Alarming, Dynamic Graphic Display | 1995                              |
| 8.     | Ash Handling Plant Kolaghat        | P13 PLCs (Procontrol) (BHEL)                    | Function Block Diagrams (FUPLA)     | Sequencing & Interlocking   | 1994                              |
| 9.     | Nighi Coal Handling Plant          | P13/P42 PLCs (Procontrol) (BHEL)<br>IBM PC - AT | PROGRESS - 2<br>Genesis Package     | Sequence & Interlocking of Plant functions. MMI functions - Alarming, Dynamic Graphic Display | 1993                              |
| 10.    | Coal Handling Plant Kolaghat       | P13/P42 PLCs (Procontrol) (BHEL)                | Function Block Diagrams (FUPLA)     | Sequencing & Interlocking of plant functions  | 1992                              |
| 11.    | Ash Handling Plant Rajghat         | P13 PLCs (Procontrol) (BHEL)                    | Function Block Diagrams (FUPLA-pkg) | Sequencing & Interlocking   | 1990                              |

Mining & Material Handling

| SI No. | Project / Plant             | Hardware Used                | Language Used                   | Functions                 | Year of Completion/ Commissioning |
|--------|-----------------------------|------------------------------|---------------------------------|---------------------------|-----------------------------------|
| 12.    | Coal Handling Plant Rajghat | P13 PLCs (Procontrol) (BHEL) | Function Block Diagrams (FUPLA) | Sequencing & Interlocking | 1989                              |



## 9. OTHER INDUSTRIES

| Sl. No. | Customer  | Project Description  | Year of Completion / Commissioning |
|---------|---|--|------------------------------------|
| 1.      | BHEL, Bhopal  | Modernization of LEM & IMM Test Plant.   | UE                                 |
| 2.      | BHEL, Bhopal  | Static Excitation System for 2x20 MVA Alternators and 1 no. 10,000 HP Syn.motor for MG set # 5 of Transformer Test Group   | UE                                 |
| 3.      | Shah cements, Bangladesh  | 6 sets of Liquid rotor starters and power factor improvement capacitor Banks for slipring motors of 2500 KW & 500 KW 6.6 KV for cement mill & sepol fan application. | UE                                 |
| 4.      | New Mangalore port trust Mangalore.<br>Through Japan Radio company, Japan | Vessel traffic management system and associated equipment.   | 2002                               |
| 5.      | HPCL, VIZAG.  | Load commutated inverter system for 4500 KW brushless Synch. Motor for Hydrogen recycle compressor (DHDS Project)  | 2000                               |
| 6.      | Ordnance factory, Bhandara  | Electrics & Instrumentation systems for nitric acid concentration plant and sulphuric acid concentration plant.  | 2000                               |
| 7.      | BHEL, Bhopal  | Thyristor Converters for 600 KW DC motors drive and field supply converters for 2x1 MVA alternators for the MG set # 4 of Transformer Test Group                     | 2000                               |
| 8.      | BHEL, Jhansi  | Thyristor Converters for 436 KW DC motor drive and field converter for alternator for MG set # 3 of Transformer Test Plant   | 2000                               |

| Sl. No. | Customer  | Project Description   | Year of Completion / Commissioning |
|---------|---|---|------------------------------------|
| 9.      | BHEL, Jhansi  | Thyristor Converters for 600 KW DC motor drive and field converter for alternator for MG set # 4 of Transformer Test Plant            | 2000                               |
| 10.     | Gas Authority of India, New Delhi, through M/s IDP, U K       | 415V, 250/220KW 5 Nos. VSD systems for vertical pumps and instrumentation system for Jamnagar Ioni pipe line for LPG transportation.  | 2000                               |
| 11.     | BHEL, Hardwar   | Thyristor Converter for pump drive motor and automation using PLCs for Cavitation Test bed for augmenting Hydroturbine Lab facilities | 1998                               |
| 12.     | ONGC, SANTAAL.  | Excitation system for 3950 KW 18 pole brushless Synch. Motors - 3 Nos.  | 1997                               |
| 13.     | Sree Rayala Seema alkalies and allied chemicals Ltd., Kurnool | 16 KA, 800 V high current rectifier for caustic soda plant.   | 1997                               |
| 14.     | Bharat Heavy Plates & Vessels Ltd. for RSP                    | 2 Nos. 11KV, 4200 KW, 1000 rpm synchronous motors for air compressors with static excitation equipment and associated controls        | 1995                               |
| 15.     | Bharat Heavy Plates & Vessels Ltd. for RSP                    | 3 Nos. 6.6 KV, 1185 KW, 490 rpm squirrel cage induction motors for oxygen compressors   | 1995                               |
| 16.     | BHEL, Bhopal  | 1 No. thyristor converter for 2000 HP, 750 volts, drive for U.H.V. Lab  | 1994                               |
| 17.     | Bharat Pumps & Compressors Ltd for IOC                        | Supply of electrics for 3 Nos, 3000 KW pressurised brushless synchronous motor for make up hydrogen compressor with auto              | 1994                               |

| Sl. No. | Customer   | Project Description   | Year of Completion / Commissioning |
|---------|--|---|------------------------------------|
|         |  | transformer starting for Gujarat Hydro Cracker Project  |                                    |
| 18.     | DGNP, Naval Dockyard<br>Bombay<br>Maharashtra          | 3 Nos. - 1000 KVA 460 V, 50-60 Hz frequency converter sets with static excitation equipment   | 1990                               |
| 19.     | BHEL, RC Puram<br>Hyderabad                            | 1 No. thyristor converter for rotor balancing tunnel drive of rating 1300 KW with accessories   | 1990                               |
| 20.     | BHEL, RC Puram<br>Hyderabad                            | Thyristor converters for 1 No. 2650 KW DC motor & 1 No. 1300 KW DC motor for electrical machine test bed with accessories                               | 1990                               |
| 21.     | BHEL, RC Puram<br>Hyderabad                            | Thyristor converters for 4 Nos. 8 KW DC & 2 Nos. 130 KW DC for modernisation of SK-125 Boring machine with accessories                                  | 1990                               |
| 22.     | Metal & Steel<br>Factory<br>Ichapore, West<br>Bengal   | Overhauling of MG sets of rating 1875 KW<br>Supply of 2 Nos. field converters for generator & motor   | 1989                               |
| 23.     | Jessop & Co. Ltd<br>Calcutta, West<br>Bengal.          | Thyristorised A.C. Controls for ladle crane   | 1987                               |
| 24.     | HMT<br>Heavy<br>Engineering<br>Corpn. Ranchi,<br>Bihar | 1 No. 90 KW DC motor & field converters for MG Set for planner machine with associated controls   | 1986                               |
| 25.     | Indian Oil<br>Corporation<br>Haldia, West<br>Bengal    | 1 No. 6.6 KV, 2.5 MW 'N' type squirrel cage induction motor with autotransformer starting and associated Protection and Controls for ammonia compressor | 1985                               |

| Sl. No. | Customer   | Project Description  | Year of Completion / Commissioning |
|---------|--|--|------------------------------------|
| 26.     | Jessop & Co. Ltd<br>Calcutta, West Bengal.                                   | Thyristorised A.C. Controls for ladle crane  | 1985                               |
| 27.     | Hindustan Photo Films Ltd.<br>Ooty<br>Tamil Nadu                             | Drives & Controls of 14 Nos. of DC drives of rating of 2 KW each with matching thristor converters & AC auxiliary drives for continuous emulsion coating plant | 1984                               |
| 28.     | Bharat Heavy Electricals Limited<br>R&D Hyderabad<br>Andhra Pradesh          | Converter for 300 KW Motor   | 1983                               |
| 29.     | Bharat Heavy Electricals Limited<br>Hyderabad<br>Andhra Pradesh              | Electric for Rotor Balancing Drive, 2 Nos. 900 KW, 700 V DC Motor with thyristor Converters  | 1983                               |
| 30.     | Oil India Ltd.<br>Duliajan<br>Assam  | Electrics for Oil Rigs<br>Thyristor Converters for 6 Nos. 550 KW<br>D.C. Motors  | 1983                               |
| 31.     | Bharat Heavy Electricals Limited<br>Hyderabad<br>Andhra Pradesh              | Modification of Rotor Balancing Dirve , Field Control Converter for MG Set rated 800 KW  | 1983                               |
| 32.     | Heavy Machine Tool Plant<br>Heavy engineering Corporation<br>Ranchi<br>Bihar | 80 KW DC Motor & Thyristor Converters  | 1983                               |
| 33.     | Bharat Heavy Electricals Limited<br>Hardwar<br>Uttar Pradesh                 | Electrics for Rotor Balancing Drive, Field Control Converter for MG Set rated 1000 KW  | 1982                               |

| Sl. No. | Customer   | Project Description  | Year of Completion / Commissioning |
|---------|--|--|------------------------------------|
| 34.     | Bharat Heavy Electricals Limited<br>Hyderabad<br>Andhra Pradesh          | Controls for 3 MW SCIM   | 1982                               |
| 35.     | Hindustan Fertilizer Corporation<br>Durgapur<br>West Bengal              | Electrics for 15 MW TG Set, Generator Protection, Instrumentation and Controls   | 1982                               |
| 36.     | Bharat Heavy Electricals Limited<br>Hyderabad R&D Unit<br>Andhra Pradesh | Electrics for Vibration Lab, 597 KW, 450 V, Armature Thyristor Converter with Main Transformer   | 1982                               |
| 37.     | Bharat Heavy Electricals Limited<br>R&D Hyderabad<br>Andhra Pradesh      | 100 KW Thyristor Converter   | 1982                               |
| 38.     | Bharat Pumps & Compressors Limited<br>Naini<br>Uttar Pradesh             | 1 No. 1000 KW DC Motor & Ventilation Equipment   | 1978                               |
| 39.     | Bharat Heavy Electricals Limited<br>Jhansi<br>Madhya Pradesh             | Test Plant Electrics for power transformer 7 MVA 11 KV, 5 MVA 11 KV Alternators 2 MVA 6.6 KV Sinewave AC Set with drive system, Controls and instrumentation | 1978                               |
| 40.     | Diesel Locomotive Works<br>Varanasi<br>Uttar Pradesh                     | 1 No. 1750 KW Alternator & Controls  | 1978                               |
| 41.     | Cooper Engineering Company   | 10 Nos. Planning Machine Electrics, 20 KW MG Set, drives with field thyristor convertor and associated   | 1977                               |

| Sl. No. | Customer  | Project Description  | Year of Completion / Commissioning |
|---------|---|--|------------------------------------|
|         | Pune<br>Maharashtra   | controls for each machine  |                                    |
| 42.     | Triveni<br>Engineering<br>Company<br>Naini<br>Uttar Pradesh | 1 No. 2000 KW & 1 No. 2500 KW,<br>Alternators & Controls                       | 1974                               |
| 43.     | Triveni<br>Engineering<br>Company<br>Naini<br>Uttar Pradesh | 4 Nos - 2500 KW, 3 Nos - 2000 KW,<br>3 Nos - 1500 KW<br>Alternators & Controls | 1973                               |

UE: Under Execution