

PROTECTION DEVICES / RELAY COORDINATION STUDY LOAD FLOW AND FAULT STUDY FOR DAKHNI PLANT ELECTRICAL SYSTEM

PART-1. INTRODUCTION.

SITE LOCATION. DAKHNI GAS PROCESSING PLANT, OGDCL.

PART-2. STUDY OBJECT.

The existing electrical protection system was installed during the commissioning of the plant & switchgear and has performed its function more than 25 years. During the up-gradation of Ruston Gas Turbines new control and protection system was installed which is more advance and responds more quickly/accurately in sensing the faults than the already installed **electro-mechanical** protection relays.

The study will ensure the responses and coordination of protection system installed at generation end with the protection system installed at distribution/load end, and to advise the exact results / measures required for reliable protection.

We intend to conduct load flow, fault and protection devices/relay coordination study of installed relays **12 Nos. for outgoing feeders** for medium voltage motors and **04 Nos. power distribution transformers** for better communication and improve protection system with upgraded digital relays installed with **03 Nos. Gas Turbines Generator Control Panels**.

Distribution Side		Generation Side	
Type	Quantity installed	Type	Quantity installed
CTM Relays	09	SIPROTEC Relays	03
MICOM P-225 Relays	03		
CDG Relays	04		

PART-3. SCOPE OF WORK.

Qualified consultant will perform load flow, short circuit / fault study with protection system/ relay coordination system study for **03 Nos.** relays (**SIPROTEC**) installed at **Generation/** upstream and **16 Nos. Load or Distribution** / downstream of medium voltage system of Dakhni Gas Processing Plant.

The consultant will assist/perform site team with the following:

- 1) Site visit.

- 2) Review /physical Inspection of installed protection relays.
- 3) Take and verify present settings of installed relays.
- 4) Collection of any addition data required from site for load flow and short circuit /fault study.
- 5) Prepare a written report using results of, load flow study, short circuit /fault current study.
- 6) Generate a report that highlights concerns and indicate worst case scenario conditions and associated results of installed equipment protection and device coordination.
- 7) List possible corrections and adjustments of protective device settings.
- 8) Detailed report of findings and recommendations.
- 9) Preparation of BOQ for the purchase, pre bid clarification, installation and testing of new digital protection relays.
- 10) Onsite training of site team for digital protection relays.

PART-4. INPUT DATA.

1. Single line diagram of power generation and MV system of Dakhni Plant. (Attachment # 1).
2. List of medium voltage switchgear (Attachment # 2).
3. Protection relay test reports. (Shall be provided to qualified bidder/consultant at site).

PART-5. GENERAL

5.1 SUMMARY

A. The following are general requirements for protective devices /relay coordination study:

- 1) Replacement of existing installed electromechanical protection relay with suitable digital relays.
- 2) Provide Name, Brand, Make with Part No of proposed digital protection relay.
- 3) Provide estimated price of digital protection relays and total cost of project.
- 4) Wiring diagrams for proposed digital protection relays.
- 5) Modification in installed medium voltage switchgear door panels and controlled wiring.

B. The consultant shall be available at the time of installation and testing of newly procured digital protection relays and shall adjust all required protective devices settings based on the results of relay coordination study.

5.2 DELIVERABLES

The following deliverables shall be made by the consultant after protection system devices installed and relay coordination study has been completed.

- 1) Complete input data report including protective devices setting.
- 2) Coordination study report of new digital protection relays with computer generated time current characteristic curves.
- 3) Soft and hard copies of study reports.
- 4) Any other relevant report not mentioned.

5.3 EXPERIENCE OF CONSULTANT

An experience consultant firm having performed successful studies of similar installed CDG-61/SPEC8FF98G, CTM-42DF2AJ1452L, MICOM-225 Motor Protection Relay, 7UM6211**B910AA0 relays and well aware of performance, operating procedures and settings of cited relays.

1. The study shall be performed under the direct supervision and control of professional qualified consultant/engineer. Only those consultants will be consider having approved engineering firms or license of this activity.
2. The consultant/Professional team shall have a minimum of 10 years of experience in performing subject relay co-ordination studies.
3. The consultant shall also demonstrate experience with relay coordination by submitting names of at least 15 actual studies /analysis it has performed in the past years.
4. Consultant should be familiar with all regulations applicable to the work required in this study and proposal thereof.

PART-6 EXECUTION

During execution i.e. installation of digital protection relays following shall be considered.

- a) Load Consideration including starting in rush currents and frequent starting and stopping of medium voltage motors.
- b) Motor full load current, locked rotor current , service factor, starting time and types of starting we considered.
- c) Transformers characteristics including primary/other protective devices, magnetic in rush current and over load capabilities.
- d) Time current characteristic curve (TCC) of devices.
- e) Coordination study report must include device tag, CT ratios Time Dial, instantaneous pick up values, long time, short time, instantaneous settings related to circuit breakers, ground fault relay pick up and time delay settings.
- f) Coordination curves are required to be prepared for determine setting of over current protective devices to achieve selective coordination.

TYPE OF PROTECTION RELAYS INSTALLED AT
DAKHNI PLANT OGDCL.

Sr. No:	DESCRIPTION	RATING	CURRENT	PROTECTION RELAY
1	Air Conditioning Package PA-501 Relay No: 045834W CT Ratio: 50/5	336KW	39A	PROTECTION RELAY CTM 42 DF2AJ1452L
2	Air Blower(S.R.U) GA-701B CT Ratio: 50/5 Relay No: 045841W	187KW	23A	PROTECTION RELAY CTM 42 DF2AJ1452L
3	Air Blower(S.R.U) GB-701A CT Ratio: 30/5 Relay No: 045836W	187KW	23A	PROTECTION RELAY CTM 42 DF2AJ1452L
4	Lean Amine Pump GA-403-A CT Ratio: 100/5 Relay No: 045840W	755KW	89A	PROTECTION RELAY CTM 42 DF2AJ1452L
5	Lean Amine Pump GA-403-B CT Ratio: 100/5 Relay No: 045837W	755KW	89A	PROTECTION RELAY CTM 42 DF2AJ1452L
6	Hot Oil Pump 830-GA-01A Relay No: 045838W CT Ratio: 30/5	155KW	22A	PROTECTION RELAY CTM 42 DF2AJ1452L
7	Hot Oil Pump 830-GA-01B CT Ratio : 30/5 Relay No: 045839W	155KW	22A	PROTECTION RELAY CTM 42 DF2AJ1452L
8	Hot Oil Pump 830-GA-01C CT Ratio : 30/5 Relay No: 045839W	155KW	22A	PROTECTION RELAY CTM 42 DF2AJ1452L
9	Fire Water Pump 901-GA-01A CT Ratio : 30/5 Relay No: 045833W	220KW	27A	PROTECTION RELAY CTM 42 DF2AJ1452L
10	SRU-II BLOWER 1901-A CT Ratio : 30/5	250KW	27.6A	PROTECTION RELAY MICOM P225
11	SRU-II BLOWER 1901-B CT Ratio : 30/5	250KW	27.6A	PROTECTION RELAY MICOM P225
12	REFRIGERATION PACKAGE CT Ratio : 150/5	975KW	117A	PROTECTION RELAY MICOM P225
13	TRANSFORMER 1 CT Ratio 200/5	2000KVA	6KV	PROTECTION RELAY CDG 61/SPEC8FF98G
14	TRANSFORMER 2 CT Ratio 200/5	2000KVA	6KV	PROTECTION RELAY CDG 61/SPEC8FF98G
15	TRANSFORMER 3 CT Ratio 100/5	630KVA	6KV	PROTECTION RELAY CDG 61/SPEC8FF98G
16	TRANSFORMER 4 CT Ratio 200/5	2000KVA	6KV	PROTECTION RELAY CDG 61/SPEC8FF98G