

HAZOP GUIDEWORDS

FOR

ELECTRICAL SYSTEMS

(INCLUDING ELECTRICAL)

HAZOP GUIDEWORDS - ELECTRICAL

<u>DEVIATION</u>	<u>CAUSES</u>	<u>DEVIATION</u>	<u>CAUSES</u>
HIGH CURRENT	ONE SUPPLY, TWO SUPPLIES SHORT CIRCUIT LEAKAGE TO GROUND REQUIRED LOAD EXCEEDS SUPPLY OR DESIGN OVERLOAD SETTING TOO HIGH	FREQUENCY	TOO HIGH? TOO LOW?
LOW CURRENT	FAULTY LOAD SHEDDING REDUCED GENERATOR CAPACITY PHASE IMBALANCE	PHASE	LEAD/LAG LOSS OF INDUCTIVE/CAPACITIVE SYNCHRONISING
NO CURRENT	DISTRIBUTION BOARD COMPONENT FAILURE CONNECTION FAILURE FAULT IN OVERLOAD PROTECTION TRIP ISOLATION ERROR (HUMAN)	START UP/SHUT DOWN	SWITCHING - COMMON MODE / SPURIOUS FAILURES MAINTENANCE SYNCHRONISING/SEQUENCING TESTING COMMISSIONS/SPARES CORROSION, WATER INGRESS, INTERFERENCE, FIRE, EXPLOSION TOO FAST, TOO SLOW, NEVER, PARTIAL, ERRATIC, TOO LATE, TOO SOON, ACCESS, ISOLATION, PROCEDURES, INTERLOCKS RESPONSIBILITIES
REVERSE CURRENT	WRONG CONNECTIONS AFTER MAINTENANCE SUPPLY GRID AND GENERATOR IMBALANCE	INCREASED TEMPERATURE	RESISTANCE TO FIRE SITUATION, EFFECT OF AMBIENT CHANGES, OVERHEATING OF DISTRIBUTION BOARD COMPONENTS, (HOW DETECTED), DETECTION OF ELECTRICAL FIRES - SWITCH ROOM ETC. FAILURE OF PROTECTION SYSTEMS, CABLE ROUTING

<u>DEVIATION</u>	<u>CAUSE</u>	<u>DEVIATION</u>	<u>CAUSE</u>
VOLTAGE CHANGES	HIGH LOW REVERSE POTENTIAL DIFFERENCE - TOO GREAT, TOO LITTLE NONE SURGES, SPIKES, TRANSIENTS, FLASH-OVER, VOLTAGE DIPS, FLUCTUATIONS, BACK EMF, CONNECTING ERRORS, HIGH IMPEDANCE, LOW IMPEDANCE.	REDUCED TEMPERATURE	WINTER CONDITIONS, SUB-ZERO TEMPERATURES, ICE FORMATION AROUND ELECTRICAL COMPONENTS
CONTAMINATION	INGRESS OF FLAMMABLE ATMOSPHERE INTO ELECTRICAL DISTRIBUTION ROOMS, CERTIFIED FOR THE HAZARDOUS AREA CLASSIFICATION, INTERNAL DAMAGE BY ANIMALS/INSECTS/MECHANICAL AND WATER DAMAGE	INSTRUMENTS	SET POINTS FOR MAX OVERLOAD CONDITION (HOW TESTED AND ADJUSTED), LOAD SHEDDING ARRANGEMENTS,(HOW CONTROLLED), GROUND LEAKAGE DETECTION
ELECTRICAL INTERFERENCE	AC ON DC, DC ON AC, TRANSIENTS, LIGHTENING, EARTH FAULTS, INSULATION FAULTS, CORROSION, ELECTRO-CHEMICAL, MAGNETIC FIELDS		
EMERGENCIES	POWER FAILURE - EMERGENCY LIGHTING - EMERGENCY DRIVES - ALARMS - BATTERY FAILURE - UPS SYSTEMS COMMUNICATIONS - EMERGENCY GENERATION		
GROUNDING	CATHODIC PROTECTION EARTH POTENTIALS		