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CONTENTS

I. General Description

The GRAPHICS OVERVIEW SCREEN contains link buttons to all the available graphic screens installed in DCS workstation. There are five main groups of graphic screens classified according to its purpose and function. These DCS screen groups are the PLANT OVERVIEW, PROCESS GRAPHICS, UTILITY GRAPHICS, DCS SEQUENCE GRAPHICS and OTHER GRAPHICS. Refer to ***Annex 1*** for GRAPHICS OVERVIEW SCREEN.

Table 1-1: Graphics Overview Screen Link Buttons

Group Number	DCS Screen Group Name	Link Button Color	DCS Link Button
1	PLANT OVERVIEW GRAPHICS	LIGHT RED	PLANT OVERVIEW
2	PROCESS GRAPHICS	PINK	1. ORE HANDLING/SCREENING 2. ORE SLURRY THICKENING 3. HPAL OVERVIEW TRAIN 102 4. FEED SLURRY HEATING 102 5. PRESSURE LEACH 102 6. HPAL OVERVIEW TRAIN 202 7. FEED SLURRY HEATING 202 8. PRESSURE LEACH 202 9. STEAM RECOVERY 102/202, PRE NTRL 10. SEAL WATER CIRCULATION 102/202 11. VENT GAS CLEANING 102/202 12. ACID SUPPLY 13. RESIDUE WASHING STAGE 4/5 & NTRLZTN 14. RESIDUE WASHING STAGE 6/7/8/9 15. ZINC REMOVAL 16. ZnS SEPARATION 17. MS OVERVIEW 18. MS PRECIPITATION 19. SEED PREPARATION 20. PRODUCT HANDLING 21. H2S WASTE GAS TREATMNT NAOH PREPARATION 22. EFFLUENT TREATMENT 23. H2S OVERVIEW 24. H2S SULFUR HANDLING/ H2 PRODUCTION 25. H2S PRODUCTION 26. H2S PURIFICATION 27. H2S WASTE GAS TREATMENT 28. H2S UTILITY
3	UTILITY GRAPHICS	GREEN	1. LIMESTONE PREPARATION 2. FLOCCULANT PREPARATION 3. BOILER-TURBINE OVERVIEW 4. UTILITY SYSTEM

Group Number	DCS Screen Group Name	Link Button Color	DCS Link Button
4	DCS SEQUENCE GRAPHICS	ORANGE	Condition Check 1. AC AG SEAL & ACID FEED PRESS FILTER START UP 2. MS PRESS FILTER SU SEQ CHECK 3. 109KBS SEQUENCE BUTTON 109KBS900 CONDITION CHECK 4. H2S INTERLOCK CONDITION CHECK Parameter Setting 1 COMPLEX LOOP 2. H2S 3. KBS 4. SU/SD Other DCS Sequence Graphics 1. ESD MAINTENANCE BYPASS SWITCH 2. H2S MAINTENACE BYPASS SWITCH 3. MISCELLANEOUS CALCULATION 4. VALVE OPEN/CLOSE COUNTER 5. H1, H0, L0, L1 SETPOINT
5	OTHER GRAPHICS	VIOLET	1. ENVIRONMENT MONITORING 2. MS ENVIRONMENT 3. H2S ENVIRONMENT 4. CB PROCESS ALARMS A 102/202 5. CB PROCESS ALARMS B 6. CB PROCESS ALARMS H2S 109/209 7. CB UTILITY ALARMS 8. AUTO START FROM PWR FAIL RECOVERY 9. WATER BALANCE (SURGE TANK INVENTORY)

1. PLANT OVERVIEW GRAPHICS

This screen shows the actual mass/volumetric flow of the raw materials and sub-materials in the main plant. The link button is colored light red for it to be easily identified and distinguished from other link buttons.

2. PROCESS GRAPHICS

The PROCESS GRAPHICS represents the Main Plant's process sections and H2S Plant's process sections. The link buttons for the PROCESS GRAPHICS are located in the top portion of the GRAPHICS OVERVIEW screen and are colored pink for it to be easily identified and distinguished from other link buttons.

The PROCESS GRAPHICS involves the following link buttons:

1) ORE HANDLING/SCREENING

This screen contains controllers and monitoring instruments for the operation of Ore Preparation 101/201 shake-out machines, conveyors, drum washers and vibrating screens.

2) ORE SLURRY THICKENING

This screen contains controllers and monitoring instruments for the operation of Ore Preparation 101/201 ore slurry thickeners.

3) HPAL OVERVIEW TRAIN 102

This screen shows the process overview of HPAL 102. It also contains monitoring instruments for HPAL 102 operation.

4) FEED SLURRY HEATING 102

This screen contains controllers and monitoring instruments for the operation of HPAL 102 ore slurry Heaters (LT, MT, HT) and GEHO pumps.

5) PRESSURE LEACH 102

This screen contains controllers and monitoring instruments for the operation of HPAL 102 autoclave.

6) HPAL OVERVIEW TRAIN 202

This screen shows the process overview of HPAL 202. It also contains monitoring instruments for HPAL 202 operation.

7) FEED SLURRY HEATING 202

This screen contains controllers and monitoring instruments for the operation of HPAL 202 ore slurry Heaters (LT, MT, HT) and GEHO pumps.

8) PRESSURE LEACH 202

This screen contains controllers and monitoring instruments for the operation of HPAL 202 autoclave.

9) STEAM RECOVERY102/202, PRE NTRL

This screen contains controllers and monitoring instruments for the operation of HPAL 102/202 flash tanks (HP, MP, LP) and pre-neutralization tanks.

10) SEAL WATER CIRCULATION 102/202

This screen contains controllers and monitoring instruments for the operation of HPAL 102/202 agitator seal water system.

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11) VENT GAS CLEANING 102/202

This screen contains controllers and monitoring instruments for the operation of HPAL 102/202 blast spools and venture scrubbers.

12) ACID SUPPLY

This screen contains controllers and monitoring instruments for the operation of sulfuric acid tanks loading from acid tankers and acid supply to the main plant.

13) RESIDUE WASHING STAGE 4/5 & NTRLZTN

This screen contains controllers and monitoring instruments for the operation of CCD thickener 4 and 5 and neutralization tanks and thickener.

14) RESIDUE WASHING STAGE 6/7/8/9

This screen contains controllers and monitoring instruments for the operation of CCD thickener 6, 7, 8 and 9.

15) ZINC REMOVAL

This screen contains controllers and monitoring instruments for the operation of DeZn reactors.

16) ZnS SEPARATION

This screen contains controllers and monitoring instruments for the operation of DeZn polishing filters.

17) MS OVERVIEW

This screen shows the process overview of MS. It also contains monitoring instruments for MS operation.

18) MS PRECIPITATION

This screen contains controllers and monitoring instruments for the operation of MS reactors and H2S Gas Vacuum Pumps and Compressors.

19) SEED PREPARATION

This screen contains controllers and monitoring instruments for the operation of MS thickener, seed mill and H2S destruction tank.

20) PRODUCT HANDLING

This screen contains controllers and monitoring instruments for the operation of MS Pressure Filters.

21) H2S WASTEGAS TREATMNT NAOH PREPARATION

This screen contains controllers and monitoring instruments for the operation of MS scrubbers and also for caustic soda preparation.

22) EFFLUENT TREATMENT

This screen contains controllers and monitoring instruments for the operation of FNTRL tanks.

23) H2S OVERVIEW

This screen shows the process overview of H2S plant 109/209. It also contains monitoring instruments for H2S plant operation 109/209.

24) H2S SULFUR HANDLING/ H2 PRODUCTION

This screen contains controllers and monitoring instruments for the molten sulfur preparation, methanol handling and the H2 gas production.

25) H2S PRODUCTION

This screen contains controllers and monitoring instruments for the operation of H2S plant 109/209 reactors, quench columns and sulfur cooler-reflux condensers.

26) H2S PURIFICATION

This screen contains controllers and monitoring instruments for the operation of H2S plant 109/209 gas coolers, knockout drums, sulfur blowdown drums and H2S plant header.

27) H2S WASTE GAS TREATMENT

This screen contains controllers and monitoring instruments for the operation of H2S plant scrubbers.

28) H2S UTILITY

This screen contains controllers and monitoring instruments for the operation of H2S plant utility facilities supplies steam, nitrogen, cooling water, instrument air and the collection of waste water.

3. UTILITY GRAPHICS

The UTILITY GRAPHICS represents subsections of auxiliary facilities in the plant which supply utility materials (such as power, water, steam, chemicals and others) to the Main Plant and H2S Plant. The link buttons for the UTILITY GRAPHICS are located below the PROCESS GRAPHICS link buttons and are colored green for it to be easily identified and distinguished from other link buttons.

The UTILITY GRAPHICS involves the following link buttons:

1) LIMESTONE PREPARATION

This screen contains controllers and monitoring instruments for the limestone preparation operation which involves limestone conveyors, roll crusher, and ball mill.

2) FLOCCULANT PREPARATION

This screen contains controllers and monitoring instruments for the flocculant preparation operation.

3) BOILER-TURBINE OVERVIEW

This screen shows the process overview of the Power plant Boiler-Turbine system. It also contains monitoring instruments for Boiler-Turbine operation.

4) UTILITY SYSTEM

This screen shows the process overview of the Water System, Cooling Water, Seal Water Pump, Nitrogen Generator and Air Compressor System. Among the utility facilities, only the Cooling Water/Tower system and the Nitrogen Generator are operated by Production.

4. DCS SEQUENCE GRAPHICS

The DCS SEQUENCE GRAPHICS involves CONDITION CHECK, PARAMETER SETTING and other DCS control items that affect the operation of the DCS. The link buttons for the DCS SEQUENCE GRAPHICS are located on the lower right side of the GRAPHICS OVERVIEW screen and are colored orange for it to be easily identified and distinguished from other link buttons.

The DCS SEQUENCE GRAPHICS involves the following link buttons:

1) Condition Check Link Buttons

(1) AC AG SEAL & ACID FEED PRESS FILTER START UP

This screen shows condition check parameters the start-up of autoclave agitator seal system, acid feed system and MS Pressure Filter.

(2) MS PRESS FILTER SU SEQ CHECK

This screen shows the MS Pressure Filter Sequence start-up requirements and condition check.

(3) 109KBS SEQUENCE BUTTON 109KBS900 CONDITION CHECK

This screen contains the controllers for 109/209KBS900 sequence and the condition check parameters before box-in and after box-in of the H2S plant 109/209.

(4) H2S INTERLOCK CONDITION CHECK

This screen shows the H2S Interlock parameters and their values and the actual operating parameters of H2S plant 109/209.

2) Parameter Setting Link Buttons

(1) COMPLEX LOOP

These screens show complex loop parameters settings used in the operation of the main plant control system.

(2) H2S

These screens show complex loop parameters settings used in the operation of the H2S plant control system.

(3) KBS

These screens show KBS parameters settings used in the operation of the main plant control system.

(4) SU/SD

These screens show start-up and shutdown parameters settings used in the operation of the main plant control system.

3) Other DCS Sequence Graphics

(1) ESD MAINTENANCE BYPASS SWITCH

This screen shows ESD bypass switches for the main plant which should be operated only during maintenance activities involving equipment that can trigger emergency shutdown for main plant.

(2) H2S MAINTENANCE BYPASS SWITCH

This screen shows ESD bypass switches for the H2S plant which should be operated only during maintenance activities involving equipment that can trigger emergency shutdown for H2S plant.

(3) MISCELLANEOUS CALCULATION

This screen shows miscellaneous calculated values for the main plant operation.

(4) VALVE OPEN/CLOSE COUNTER

This screen shows how many times the HPAL control valves are opened and closed during HPAL operation.

(5) H1, H0, L0, L1 SETPOINT

This screen shows the H1, H0, L0, L1 settings of the level controllers and level switches of the main plant and H2S plant.

5. OTHER GRAPHICS

The OTHER GRAPHICS represents miscellaneous DCS graphics screens for different environmental monitoring alarms, process alarms, calculations, solution inventory and equipment auto start. The link buttons for the OTHER GRAPHICS are located on the lower left side of the GRAPHICS OVERVIEW screen and are colored violet for it to be easily identified and distinguished from other link buttons.

The OTHER GRAPHICS involves the following link buttons:

1) ENVIRONMENT MONITORING

This screen shows the location and actual reading of pH probes and gas detectors (H2S, CO2, O2 and Methanol) scattered around the plant which are useful for environmental monitoring.

2) MS ENVIRONMENT

This screen shows the location and actual reading of H2S gas detectors scattered around the DeZn and MS area.

3) H2S ENVIRONMENT

This screen shows the location and actual reading of gas detectors (H2S, H2 and Methanol) scattered around the H2S plant.

4) CB PROCESS ALARMS A 102/202

This screens show critical Process A (102, 202, 103, 104, 108 and 131) alarms and their present status/indication.

5) CB PROCESS ALARMS B

This screen shows critical Process B (105, 106 and 111) alarms and their present status/indication.

6) CB PROCESS ALARMS H2S 109/209

This screen shows critical H2S plant (109 and 209) alarms and their present status/indication.

7) CB UTILITY ALARMS

This screen shows critical Utility (416, 422, 513, 521, 524, 525 and 530) alarms and their present status/indication.

8) AUTO START FROM PWR FAIL RECOVERY

This screen shows the operation mode and status of all critical equipment in the main plant with AUTO START sequence during power failure.

9) WATER BALANCE (SURGE TANK INVENTORY)

This screen shows the water balance/inventory (tank level, volume, rate of increase) of all storage tanks in PROCESS and UTILITY.

II. Important Monitoring Items

None

III. Interlocks/Controls

None

IV. Control Sequences

None

V. Alarms

None

VI. DCS Emergency Shutdown

None

VII. Trend Graphs Grouping

None

Annex 1: GRAPHICS OVERVIEW DCS Graphics