


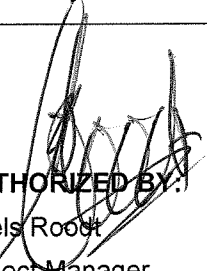


	<b>KOMATI POWER STATION PROJECT</b>	Doc No.: NCKTRS90759	Rev: 04
		Template No.: NCKTE90845	Rev: 04
		Date: September 2007	Page 1 of 6

<b>Title:</b> CENTRAL COMPRESSOR PLANT AND CONTROL AIR PIPEWORK CFG13	<b>Document type:</b> OPERATING AND CONTROL PHILOSOPHY
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Revision	Description of Revisions	Date
2	Update of the Operating Philosophy	2007-09-28

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**Control and Operating Philosophy for the Central Compressor Plant and  
Control Air and Station Air Distribution Network**

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## **1. Purpose**

The purpose of this document is to:

- Provide guidance regarding the Control and Operation of the Central Compressed Air Plant as well as Control Air Distribution Network and Station Air Distribution Network.
- Serve as a reference document for the future configuration and optimisation of the Compressed Air System.

## **2. Applicability**

This document is applicable to the Central Compressed Air Plant at Komati Power Station, located next to the Cooling Water Pump House West. It also includes all Control Air Distribution Network piping as well as Station Air Distribution piping.

## **3. References**

This document should be read in conjunction with the following drawings:

<b>Drawing Type</b>	<b>Drawing Number</b>
P&ID	33-33/18028 Sheet 1
P&ID	33-33/18028 Sheet 2
P&ID	33-33/18028 Sheet 3
P&ID	33-33/18028 Sheet 4
P&ID	33-33/18028 Sheet 5
P&ID	33-33/18028 Sheet 6
P&ID	33-33/18028 Sheet 7
P&ID	33-33/18028 Sheet 8
P&ID	33-33/18028 Sheet 9
P&ID	33-33/18028 Sheet 10

**NOTE:** *In all such cases where a drawing is utilised, the latest revision of the drawing should be used.*

#### **4. Abbreviations**

<b>Abbreviation/Unit</b>	<b>Description</b>
TIT	Temperature Indicator Transmitter
PIT	Pressure Indicator Transmitter
PI	Pressure Indicator
QA	Dewpoint Transmitter
DCS	Digital Control System
AR	Air Receiver
m <sup>3</sup> /min	Cubic Meters per Minute
kPa	Kilo Pascal (Pressure)
kW	Kilo Watt (Electrical Power)
kV	Kilo Volt (Electrical Power)

#### **5. General Information**

The Central Compressed Air Plant serves two functions critical to the Power station, namely:

- Control Air                      Used for the control (opening and closing) and regulation of all pneumatically actuated valves and dampers. It is also used for air signals for pneumatic instrumentation.
- Station Air                      Used to drive all air driven machinery and tools used for the maintenance of the plant.

#### **6. Plant Content**

The Central Compressed Air Plant and Control Air Distribution Network consists of the following operation and control related components:

- Two off                      42m<sup>3</sup>/min compressors, each equipped with a 250kW Main Drive Motor (6.6kV supply), two 6kW Cooling Fan Motors (380V supply) and a Sigma Controller.

- Three off 20.9m<sup>3</sup>/min compressors, each equipped with a 110kW Main Drive Motor (380V supply), one 11kW Cooling Fan Motor (380V supply) and a Sigma Controller.
- Three off 45m<sup>3</sup>/min desiccant drier, consisting of two drying chambers with a solenoid valve per chamber (220V supply), inlet valves, outlet valves and a Sigma Controller. Each drier has a thermocouple (TIT) and dew point transmitter (QA) downstream of the outlet for performance monitoring.
- Two off 21m<sup>3</sup>/min desiccant drier, consisting of two drying chambers with a solenoid valve per chamber (220V supply), inlet valves, outlet valves and a Sigma Controller. Each drier has a thermocouple (TIT) and dew point transmitter (QA) downstream of the outlet for performance monitoring.
- Ten off Air Receivers, certified to a working pressure of 650kPa, with Pressure Relief set to blow at 700kPa. Each receiver is equipped with a manual condensate trap and a statutory pressure gauge.
- Three off Header pipes to deliver air into the station. Each header pipe is equipped with a Pressure Transmitter (PIT). These transmitters will be used to maintain system pressure. There are two Control Air headers and one Station Air header.
- Three off Header isolation valves. The Station Air Header valve is actuated.
- Two off Tie-in points for portable compressors, each equipped with a pressure transmitter (PIT).
- Nine off Unit Control Air Manifold with isolation valves. Each manifold consists of a condensate trap, a flow meter (FIT) with transmitter and a pressure transmitter (PIT)

## 7. Plant Identification

<u>KKS Description</u>	<u>Description</u>	<u>Other</u>
0 0SCA10 AN001	CONTROL AIR COMPRESSOR 1	Control Air Compressor 1
0 0SCA10 AN001 – M01	CONTROL AIR COMPRESSOR 1 MOTOR	6.6kV, 250 kW 6.6kV Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA10 AN002	CONTROL AIR COMPRESSOR 1 COOLING FAN	Control Air Compressor 1 Cooling fans (2 off)
0 0SCA10 AN002 – M01	CONTROL AIR COMPRESSOR 1 COOLING FAN MOTOR	400V, 6.6kW ea 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA10 AT002	CONTROL AIR DRIER 1	Control Air Compressor 1 Drier
0 0SCA10 AA401 – Y01	CONTROL AIR DRIER 1 WATER TRAP DRAIN VALVE SOLENOID	220V AC 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA10 CT001	CONTROL AIR DRIER 1 OUTLET TEMPERATURE TRANSMITTER	Temperature transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA10 CQ001	CONTROL AIR DRIER 1 OUTLET DEW POINT TRANSMITTER	Dew Point transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA20 AN001	CONTROL AIR COMPRESSOR 2	Control Air Compressor 2
0 0SCA20 AN001 – M01	CONTROL AIR COMPRESSOR 2 MOTOR	6.6kV, 250 kW 6.6kV Substation Board 1 <b>SIGNAL TO DCS</b>
0 0SCA20 AN002	CONTROL AIR COMPRESSOR 2 COOLING FANS	Control Air Compressor 2 Cooling fans (2 off)
0 0SCA20 AN002 – M01	CONTROL AIR COMPRESSOR 2 COOLING FAN MOTOR	400V, 6.6kW ea 400V Substation Board 1

		<b>SIGNAL TO DCS</b>
0 0SCA20 AT002	CONTROL AIR DRIER 2	Control Air Compressor 2 Drier
0 0SCA20 AA401 – Y01	CONTROL AIR DRIER 2 WATER TRAP DRAIN VALVE SOLENOID	220V 400V Substation Board 1 <b>SIGNAL TO DCS</b>
0 0SCA20 CT001	CONTROL AIR DRIER 2 OUTLET TEMPERATURE TRANSMITTER	Temperature transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA20 CQ001	CONTROL AIR DRIER 2 OUTLET DEW POINT TRANSMITTER	Dew Point transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA30 AN001	CONTROL AIR COMPRESSOR 3	Control Air Compressor 3
0 0SCA30 AN001 – M01	CONTROL AIR COMPRESSOR 3 MOTOR	400V, 110 kW 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA30 AN002	CONTROL AIR COMPRESSOR 3 COOLING FAN	Control Air Compressor 3 Cooling fan
0 0SCA30 AN002 – M01	CONTROL AIR COMPRESSOR 3 COOLING FAN MOTOR	400V, 11kW 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA30 AT002	CONTROL AIR DRIER 3	Control Air Compressor 3 Drier
0 0SCA30 AA401 – Y01	CONTROL AIR DRIER 3 WATER TRAP DRAIN VALVE SOLENOID	220V 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA30 CT001	CONTROL AIR DRIER 3 OUTLET TEMPERATURE TRANSMITTER	Temperature transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA30 CQ001	CONTROL AIR DRIER 3 OUTLET	Dew Point transmitter for

	DEW POINT TRANSMITTER	monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA40 AN001	CONTROL AIR COMPRESSOR 4	Control Air Compressor 4
0 0SCA40 AN001 – M01	CONTROL AIR COMPRESSOR 4 MOTOR	400V, 110 kW 400V Substation Board 1 <b>SIGNAL TO DCS</b>
0 0SCA40 AN002	CONTROL AIR COMPRESSOR 4 COOLING FAN	Control Air Compressor 4 Cooling fan
0 0SCA40 AN002 – M01	CONTROL AIR COMPRESSOR 4 COOLING FAN MOTOR	400V, 11kW 400V Substation Board 1 <b>SIGNAL TO DCS</b>
0 0SCA40 AT002	CONTROL AIR DRIER 4	Control Air Compressor 4 Dryer
0 0SCA40 AA401 – Y01	CONTROL AIR DRIER 4 WATER TRAP DRAIN VALVE SOLENOID	220V 400V Substation Board 1 <b>SIGNAL TO DCS</b>
0 0SCA40 CT001	CONTROL AIR DRIER 4 OUTLET TEMPERATURE TRANSMITTER	Temperature transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA40 CQ001	CONTROL AIR DRIER 4 OUTLET DEW POINT TRANSMITTER	Dew Point transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA50 AN001	STATION AIR COMPRESSOR	Control Air Compressor 5
0 0SCA50 AN001 – M01	STATION AIR COMPRESSOR MOTOR	400V, 110 kW 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA50 AN002	STATION AIR COMPRESSOR COOLING FAN	Control Air Compressor 5 Cooling fan
0 0SCA50 AN002 – M01	STATION AIR COMPRESSOR COOLING FAN MOTOR	400V, 11kW 400V Substation Board 2



		<b>SIGNAL TO DCS</b>
0 0SCA50 AT002	STATION AIR DRIER	Control Air Compressor 5 Dryer
0 0SCA50 AA401 – Y01	STATION AIR DRIER WATER TRAP DRAIN VALVE SOLENOID	220V 400V Substation Board 2 <b>SIGNAL TO DCS</b>
0 0SCA50 CT001	STATION AIR DRIER OUTLET TEMPERATURE TRANSMITTER	Temperature transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCA50 CQ001	STATION AIR DRIER OUTLET DEW POINT TRANSMITTER	Dew Point transmitter for monitoring/performance purposes <b>SIGNAL TO DCS</b>
0 0SCC10 CP501	COMPRESSED AIR RECEIVER 1 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC11 CP501	COMPRESSED AIR RECEIVER 2 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC20 CP501	COMPRESSED AIR RECEIVER 3 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC21 CP501	COMPRESSED AIR RECEIVER 4 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC30 CP501	COMPRESSED AIR RECEIVER 5 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC31 CP501	COMPRESSED AIR RECEIVER 6 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC40 CP501	COMPRESSED AIR RECEIVER 7	Pressure indicator for

	PRESSURE GAUGE	monitoring purposes <b>Statutory Requirement</b>
0 0SCC41 CP501	COMPRESSED AIR RECEIVER 8 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC50 CP501	COMPRESSED AIR RECEIVER 9 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCC51 CP501	COMPRESSED AIR RECEIVER 10 PRESSURE GAUGE	Pressure indicator for monitoring purposes <b>Statutory Requirement</b>
0 0SCA50 CP001	PORTABLE COMPRESSED AIR SUPPLY PRESSURE TRANSMITTER	Pressure transmitter for monitoring purposes <b>SIGNAL TO DCS</b>
0 0SCB50 CP001	STATION AIR SUPPLY TO COMMON RANGE PRESSURE TRANSMITTER	Pressure transmitter for control/monitoring purposes <b>SIGNAL TO DCS</b>
0 0SCB50 CP002	PORTABLE STATION AIR SUPPLY TO COMMON RANGE PRESSURE TRANSMITTER	Pressure transmitter for monitoring purposes <b>SIGNAL TO DCS</b>
1 0QFB30 CF501	UNIT 1 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
1 0QFB30 CF001	UNIT 1 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
1 0QFB30 CP001	UNIT 1 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
2 0QFB30 CF501	UNIT 2 CONTROL AIR SUPPLY	Unitised flow meter

	FLOW METER	
2 0QFB30 CF001	UNIT 2 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
2 0QFB30 CP001	UNIT 2 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
3 0QFB30 CF501	UNIT 3 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
3 0QFB30 CF001	UNIT 3 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
3 0QFB30 CP001	UNIT 3 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
4 0QFB30 CF501	UNIT 4 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
4 0QFB30 CF001	UNIT 4 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
4 0QFB30 CP001	UNIT 4 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
5 0QFB30 CF501	UNIT 5 CONTROL AIR SUPPLY	Unitised flow meter

	FLOW METER	
5 0QFB30 CF001	UNIT 5 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
5 0QFB30 CP001	UNIT 5 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
6 0QFB30 CF501	UNIT 6 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
6 0QFB30 CF001	UNIT 6 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
6 0QFB30 CP001	UNIT 6 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
7 0QFB30 CF501	UNIT 7 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
7 0QFB30 CF001	UNIT 7 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
7 0QFB30 CP001	UNIT 7 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
8 0QFB30 CF501	UNIT 8 CONTROL AIR SUPPLY	Unitised flow meter

	FLOW METER	
8 0QFB30 CF001	UNIT 8 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
8 0QFB30 CP001	UNIT 8 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
9 0QFB30 CF501	UNIT 9 CONTROL AIR SUPPLY FLOW METER	Unitised flow meter
9 0QFB30 CF001	UNIT 9 CONTROL AIR SUPPLY FLOW TRANSMITTER	Unitised flow transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>
9 0QFB30 CP001	UNIT 9 CONTROL AIR SUPPLY PRESSURE TRANSMITTER	Unitised pressure transmitter for monitoring/control purposes <b>SIGNAL TO DCS</b>

## 8. System Availability - Overview

The Central Compressor Plant has been designed in such a manner that there will always be at least two compressors standby during normal operating conditions. A system pressure of 650kPa must be maintained at all times, where a deviation of 20Pa (+10Pa, -10Pa) is tolerated. Available generation units:

- 2 x 42m<sup>3</sup>/min
- 3 x 21m<sup>3</sup>/min

The above mentioned units each have a dedicated dryer. The drier is used to ensure that the quality of the air delivered to the station will be sufficiently dry so as not to damage any air driven valves.

As was previously stated, the Central Compressor Plant provides both Control and Station Air. Due to the critical nature of Control Air, Control Air takes preference over Station Air. As a result, should the situation arise where there is not enough air available in the Control Air Network, the Station Air Header will be shut and the air diverted to the Control Air Headers.

### **9. Main Principle of Operation: System/Network Pressure**

The main mode of Control for the Central Compressors Plant is based on the System Pressure. This pressure is monitored downstream of the receiver bank.

- The System Pressure must be monitored and maintained. Where the System Pressure changes and the demand increases/decreases, the rate of pressure decay/increase must be calculated.
- The rate of pressure decay/increase must be used to select/de-select compressors as necessary.
- This pressure decay must be converted to a flow measurement so as to ensure that the most efficient compressor is selected. *(For example, if the pressure decay indicates an increase of  $10\text{m}^3/\text{min}$  air usage, a 380V machine must be placed on idle. Similarly, if the decay indicates an increase usage of  $30\text{m}^3/\text{min}$ , the 6.6kV machine must be put on idle etc.)*
- The selection of compressors must be based on the following criteria:
  - Whether the machine is in standby, idle or running mode.
  - Whether the machine is in maintenance.
  - The number of hours run per machine.
  - Drier availability per compressor.

- Each of the three discharge headers is fitted with a PIT. These PIT's are to be used to monitor the system pressure. A voting system is to be used (two of three) to obtain the most accurate system pressure.
- Ideally, the 380V compressors are to be used for base loading whilst the 6.6kV compressors are to be used for peak consumption periods.
- Station Air will be supplied from the same Central Plant. Station Air consumption must be monitored by calculating the amount of air being used in the Station Air Network.
  - Total Air used in Station = Total Air produced in Central Plant less total air consumed per unit.
  - **This air usage must be displayed on the DCS.**

#### ***10. Sequence of Events if System Pressure Drops***

1. The system pressure must be controlled between 640kPa and 660kPa at all times (Green Zone).
2. If pressure falls between 640kPa – 620kPa read system predicted flow demand and place suitable compressor/s on idle. System warning to be displayed on Control panel (Orange Zone).
  - a. If 75% of available capacity is on idle/in service, shut off supply to Station Air Header by closing the Actuated Header Valve. Station Air Shutoff alarm to be displayed on Control Panel.
3. If pressure drops below 620kPa, place idle compressor/s on load (Red Zone).
4. At 600kPa, cut off supply to Station Air Header by closing the Actuated Header Valve, if 2.a. is not in force as yet (Red Zone). Station Air Shutoff alarm to be displayed on Control Panel.
5. If system pressure does not respond, place all available compressors (this includes compressors which may have reached maintenance hours or alarm values) in service (Emergency Zone).

6. With condition 4 and 5, display three highest air consumption Units with flow values. (Operator can now decide on corrective action by shutting off supply to the highest consumption Units or to risk total station shutdown (manual action).)

### ***11. Sequence of Events if System Pressure Rises***

1. The system pressure must be controlled between 640kPa and 660kPa at all times (Green Zone).
2. If system pressure rises between 660kPa and 680kPa read system predicted flow and place the most suitable in service compressor on idle mode (The smallest compressor to maintain system demand should be on base load).
3. If system is maintained for 30 minutes, place all idle compressors on standby.
  - a. One compressor (smallest, base load) must always be on idle if no compressors are on load.
4. Pressure relief valves on Receivers are set to blow at 700kPa.

### ***12. Compressors***

Each compressor is equipped with a Sigma Controller. This controller has the ability to control each compressor individually and monitor the condition of the compressor. The following signals are to be DCS linked:

- Remote on/off
- Remote load/idle
- Trip
- Motor running
- Air end discharge temperature
- Compressor discharge pressure



The Compressors will trip due to the following conditions:

- Motor overload
- High discharge temperature air end
- Reverse rotation
- Discharge pressure out of limits

The DCS will only display a trip alarm. The operator will need to investigate what caused the trip on the physical plant and reset the compressor on its sigma controller. At this stage, the operator can then reset the compressor on the DCS and continue operating the Plant.

The following signals must be displayed on the DCS:

- Service hours run per Compressor
- Compressor air end Temperature
- Compressor discharge Pressure

Compressor electrical supply:

- Control Air Compressor 1 Main motor power supply is delivered from Substation Board 1 (MV). Cooling fan motor supply delivered from Sub-Station Board 1 (LV )
- Control Air Compressor 2 Main motor power supply is delivered from Substation Board 2 (MV). Cooling fan motor supply delivered from Sub-Station Board 2 (LV )
  - **Consider the 6.6kV machines. Supply for the two different motors come from separate boards. As a result, logic must be implemented that should the main motor trip, the cooling fan motor must trip as well. Similarly, should the cooling fan motor trip, the main motor must trip.**
- Control Air Compressor 3 and Station Air Compressor motor supply is delivered from Sub-Station board 2 (LV).
- Control Air Compressor 4 motor supply is delivered from Sub-Station board 1 (LV).

Other considerations:

- The DCS must be used for trending purposes of the compressors. Any service history, such as hours run, faults, number of alarms and trips as well as energy usage (with respect to the motors) must be available.
- Each compressor should be in idle mode for as short a period as possible. As a result, the DCS should trend this and use this information to select compressors as necessary.

The compressors have the following maintenance regime:

- Each compressor should be serviced at between 2750 hours and 3250 hours.
- At 2750 hours, the DCS is to display a Service hours run warning.
- At 3250 hours, the DCS must trip the Compressor on Service Hours Run.
- In an emergency situation where Control Air is required and there are no other compressors available, the operator must have the option to put into service a compressor that is tripped on Service Hours. This must be avoided at all costs. It is the Operators discretion to perform this action and should be based on the possibility of tripping Station Units.

### **13. Driers**

Each drier consist of two drying chambers and is equipped with a Sigma Controller. This controller ensures that the air is diverted through the correct chamber, dependant on the condition of the desiccant. The controller activates a solenoids valve on each chamber for blow down purposes as necessary. Downstream of each drier, a TIT and QA is installed for monitoring purposes.

The following signals must be DCS linked:

- Drier fault signal (from Sigma Controller)
- TIT (Temperature transmitter)
- QA (Dew point transmitter)

#### **14. Actuated Valves**

There is one actuated valve.

- The actuated valve is situated on the Station Air Header. It is used to isolate the Station Air header from the Central Compressor Plant as necessary.
  - The Station Air Header will be isolated as specified in the Sequence of Events (points 9 and 10).

#### **15. Central Plant Instrumentation**

All of the following instrumentation, found in the Central Compressor Plant must be displayed on the DCS:

- Dew Point monitoring for each drier.
- Temperature monitoring for each drier.
- Control Air Header A and B pressure monitoring
- Station Air Header pressure monitoring
- Central Plant Portable tie-in pressure monitoring
- Service Air Portable tie-in pressure monitoring

These signals will be used for performance monitoring purposes as well as general fault finding.

## ***16. Unit Instrumentation***

Each unit is to be equipped with a PIT, a flow Meter and a FIT. These instruments will be used for monitoring purposes and must be DCS linked.

Maximum flow to each unit must be monitored:

- Leaks can be identified.
- Air usage abuse, in the case where Control Air is used for Station Air purposes.