



# GAS ELECTRIC PARTNERSHIP

## REDUCING COMPRESSOR STATION FUGITIVE EMISSIONS

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# What Is a Fugitive Emission?

**Per Wikipedia**

**“Fugitive emissions are emissions of gases or vapors from pressurized equipment due to leaks and other unintended or irregular releases of gases, mostly from industrial activities.”**

**Per EPA**

**Tends to describe how an emission is counted vs. how an emission occurs.**

**From a February 10, 1999 memorandum**

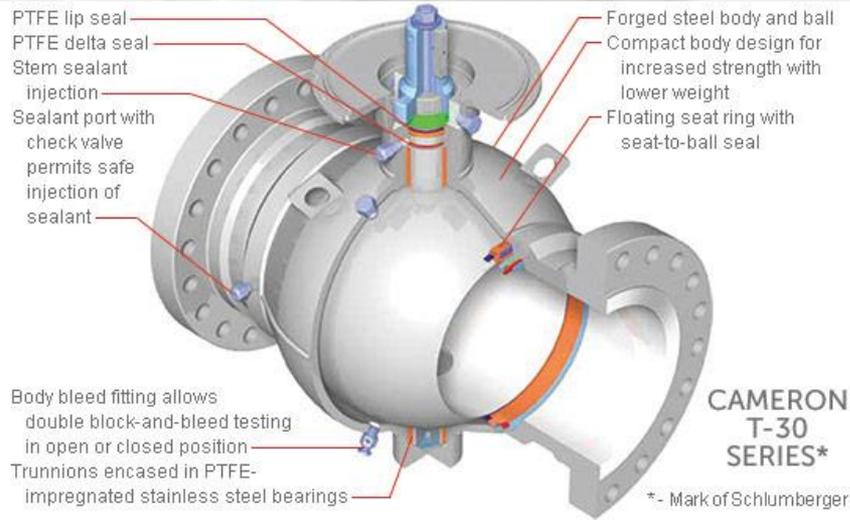
**“The EPA defines “fugitive emissions” in the regulations promulgated under title V as “those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening” (see title 40 of the Code of Federal Regulations, sections 70.2 and 71.2).”**



# MANY EMISSIONS SOURCES

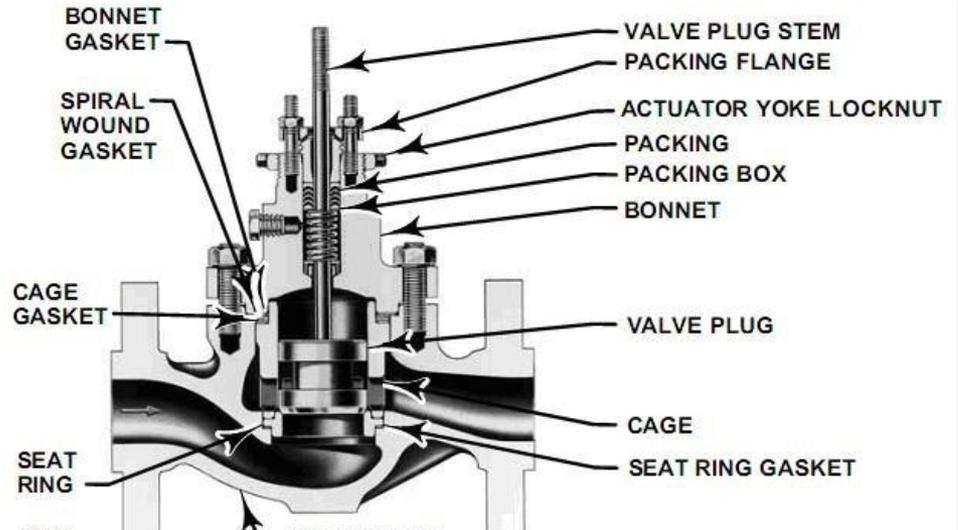


# VALVES



- **IF BEING USED AS A BLOCK VALVE ON A VENTED LINE, SEAT LEAKAGE COULD BE A FUGITIVE EMISSIONS ISSUE IF THE SEAT HAS BEEN DAMAGED FROM DIRT OR THROTTLING SERVICE**

- **CONTROL VALVE STEM LEAKAGE CAN BE AN ISSUE FROM EXCESSIVE WEAR OR IMPROPER ADJUSTMENT**



# VALVES





# VALVES

## MITIGATE BY

- **USING THE PROPER VALVE TYPE**
  - **ESPECIALLY IF BEING USED IN A THROTTLING SITUATION SUCH AS FLOW CONTROL OR LINE LOADING**
- **USE LOADING VALVES AROUND LARGE BALL VALVES WHEN VALVES ARE REQUIRED TO OPEN WITH LARGE DIFFERENTIAL PRESSURES**
- **MONITOR THE SITE UTILIZING LEAK DETECTION TECHNOLOGY**

# VALVE ACTUATORS



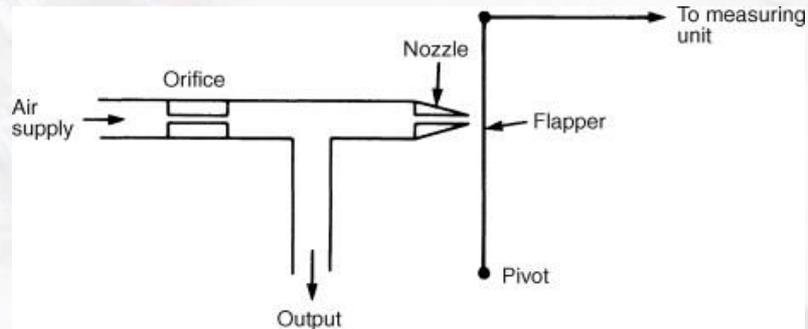


# VALVE ACTUATORS

## POSSIBLE MITIGATION

- **USING AIR INSTEAD OF POWER GAS WHEN A RELIABLE, CLEAN AND DRY SOURCE OF AIR IS AVAILABLE**
- **IF SUITABLE ELECTRICAL POWER IS AVAILABLE, CONSIDER USING ELECTRIC ACTUATORS FOR NON-CRITICAL APPLICATIONS**

# PNEUMATIC INSTRUMENTS





# PNEUMATIC INSTRUMENTS

- **ACCORDING TO AN EPA 1990-2003 INVENTORY OF OIL AND NATURAL GAS PRODUCTION, PNEUMATIC DEVICES ACCOUNTED FOR 61Bcf IN METHANE LOSSES, REPRESENTING 41% OF THE INVENTORY**
- **HIGH BLEED DEVICES ACCOUNTED FOR MOST OF THE INVENTORY**
  - **SUCH AS IN LIQUID-LEVEL AND PRESSURE CONTROLLERS AS WELL AS IN POSITIONERS AND TRANSDUCERS**
- **EPA's RECOMMENDATION WAS TO REPLACE WITH LOW BLEED DEVICES**
- **IN NEW DESIGNS CONSIDER USING INSTRUMENT AIR IN LIEU OF GAS AS THE CONTROL MEDIA**



# UNIT PIPING DESIGN

- **MITIGATION OF EMISSIONS COMES FROM REDUCING THE PIPING VOLUME TO BE DEPRESSURIZED DURING A UNIT EMERGENCY OR PLANNED BLOWDOWN EVENT**
- **LOCATE THE UNIT GAS COOLER OUTSIDE THE AUTOMATED UNIT DISCHARGE BLOCK VALVE**
- **IF THERE IS A UNIT FILTER/SEPARATOR, LOCATE IT UPSTREAM OF THE AUTOMATED UNIT SUCTION BLOCK VALVE**
- **IT WILL COST ADDITIONAL BLOCK AND BLOWDOWN VALVES TO ISOLATE THE EQUIPMENT FOR MAINTENANCE, BUT WILL SIGNIFICANTLY REDUCE EMISSIONS FROM UNIT BLOWDOWNS**



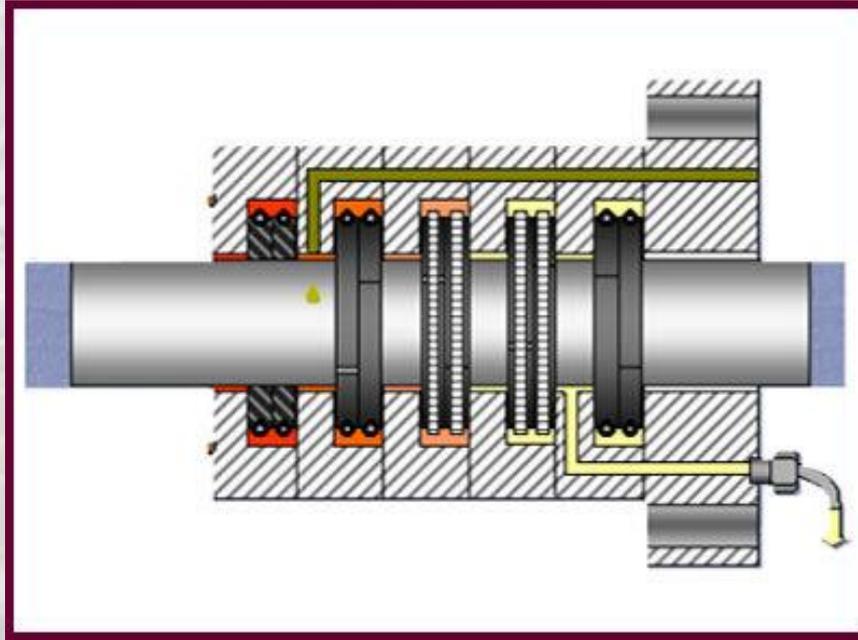
# MONITORING – LDAR LEAK DETECTION AND REPAIR

- **MITIGATION OF EMISSIONS COMES FROM MONITORING THE FACILITY FOR LEAKS AND THEN REPAIRING THE PROBLEM**
- **NSPS 0000a**
- **EFFECTIVE IN 2017**
- **FOR NEW AND MODIFIED COMPRESSOR STATIONS**
- **OPTICAL GAS IMAGING IS A MEANS OF DETECTING LEAKS**

# RECIPROCATING COMPRESSORS



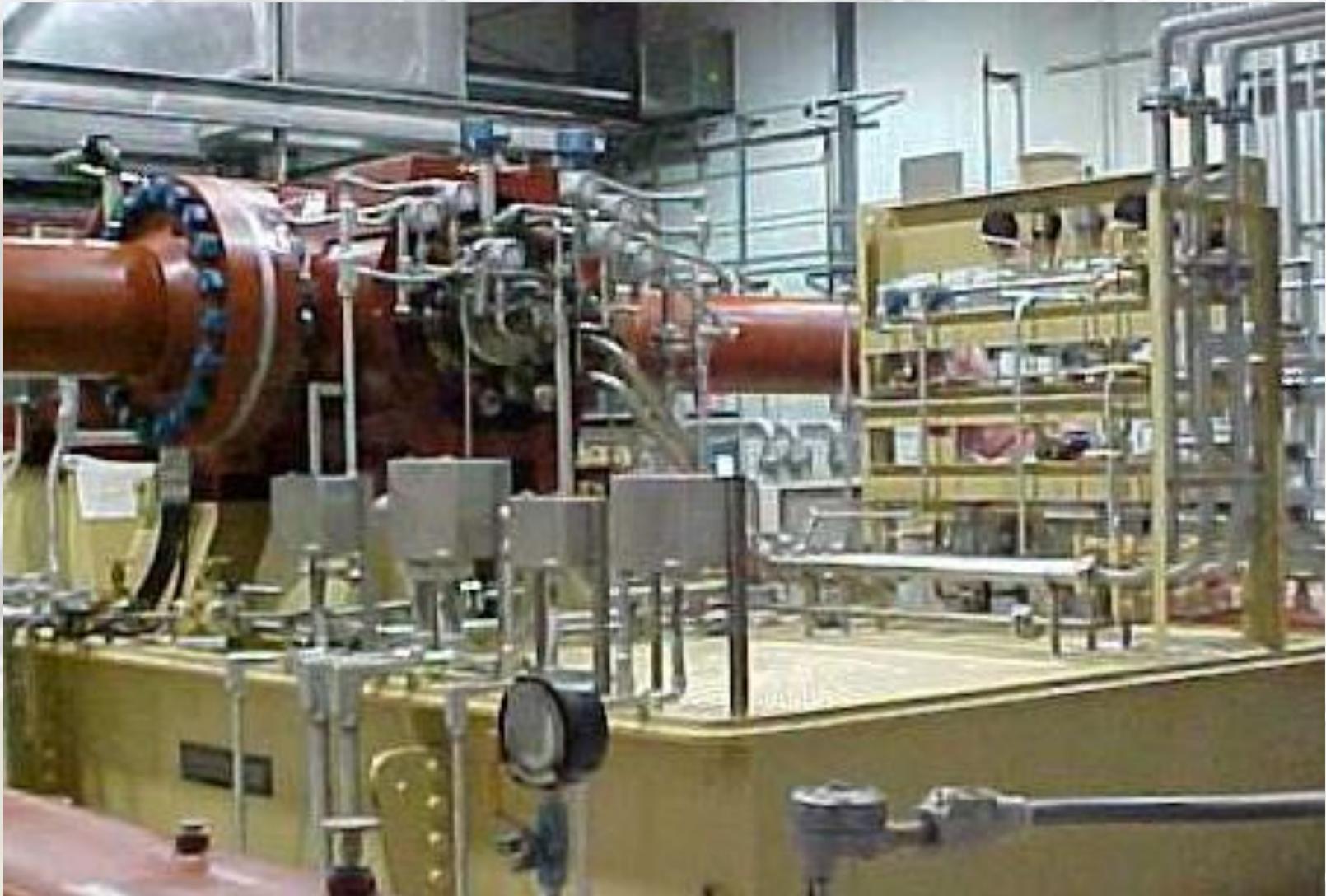
# PISTON ROD PACKING



## MINIMIZE EMISSIONS BY

- PROPER SELECTION
- PROPER INSTALLATION
- GOOD MAINTENANCE PRACTICES
- REPLACE WHEN PERFORMANCE HAS DETERIORATED

# CENTRIFUGAL COMPRESSORS





## CENTRIFUGAL COMPRESSOR DRY GAS SEALS

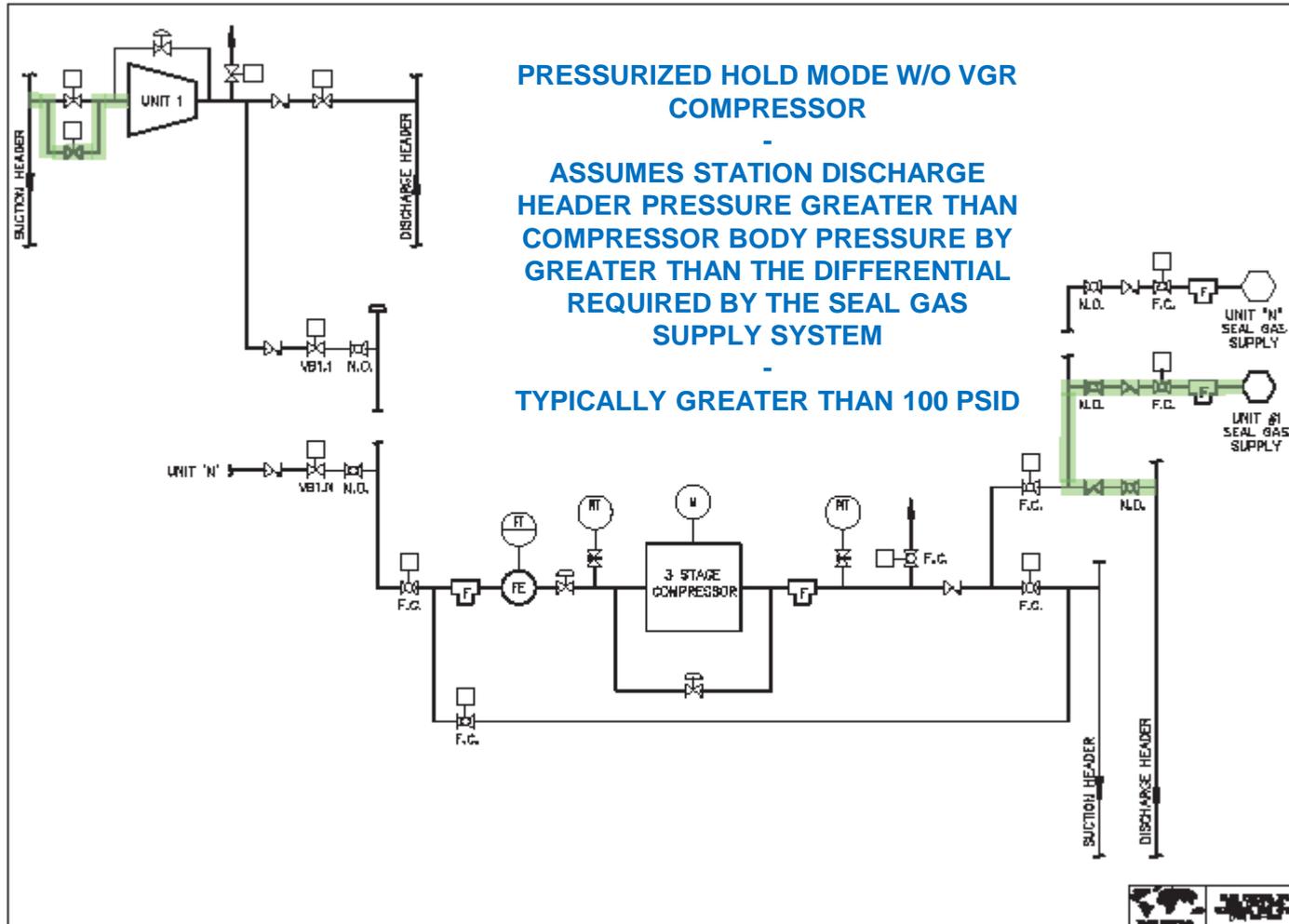


**PROBABLY THE SINGLE MOST IMPORTANT WAY TO MAINTAIN DESIGN PERFORMANCE IS TO PROVIDE CLEAN, DRY SEAL GAS TO THE COMPRESSOR SEAL GAS SYSTEM**

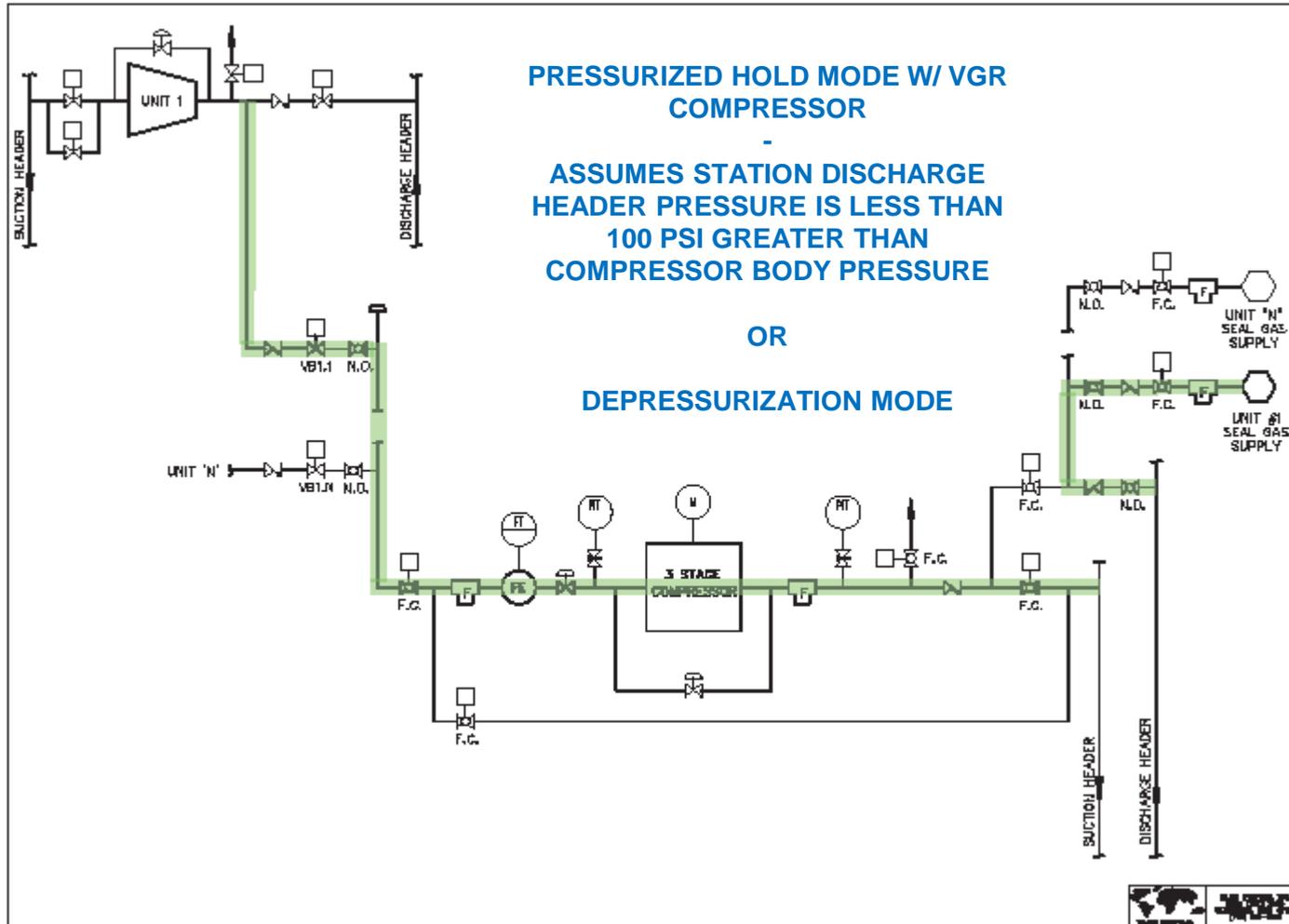
# COMPRESSOR BLOW DOWN EVENTS



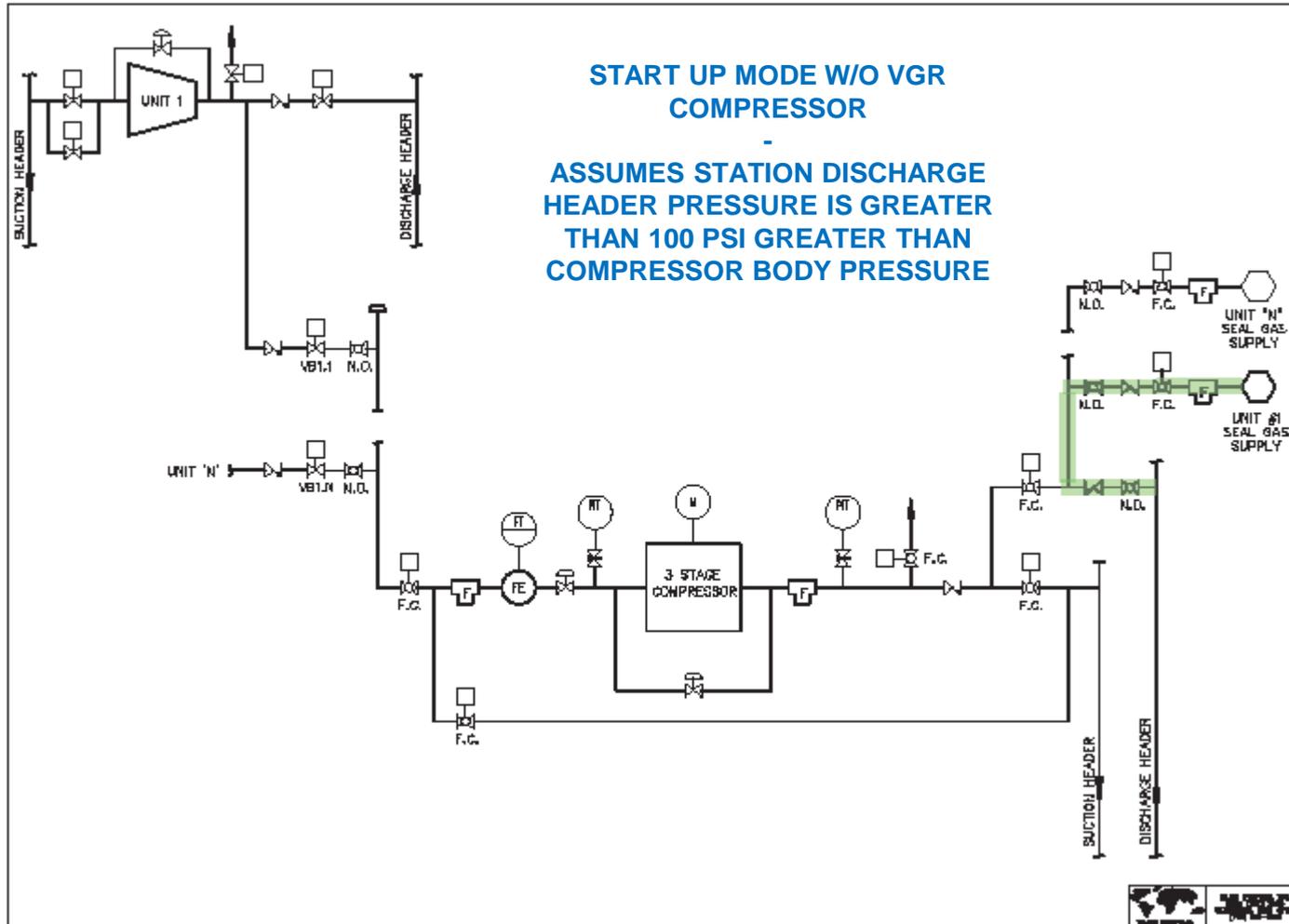
# PRESSURIZED HOLD AND VENT GAS RECOVERY



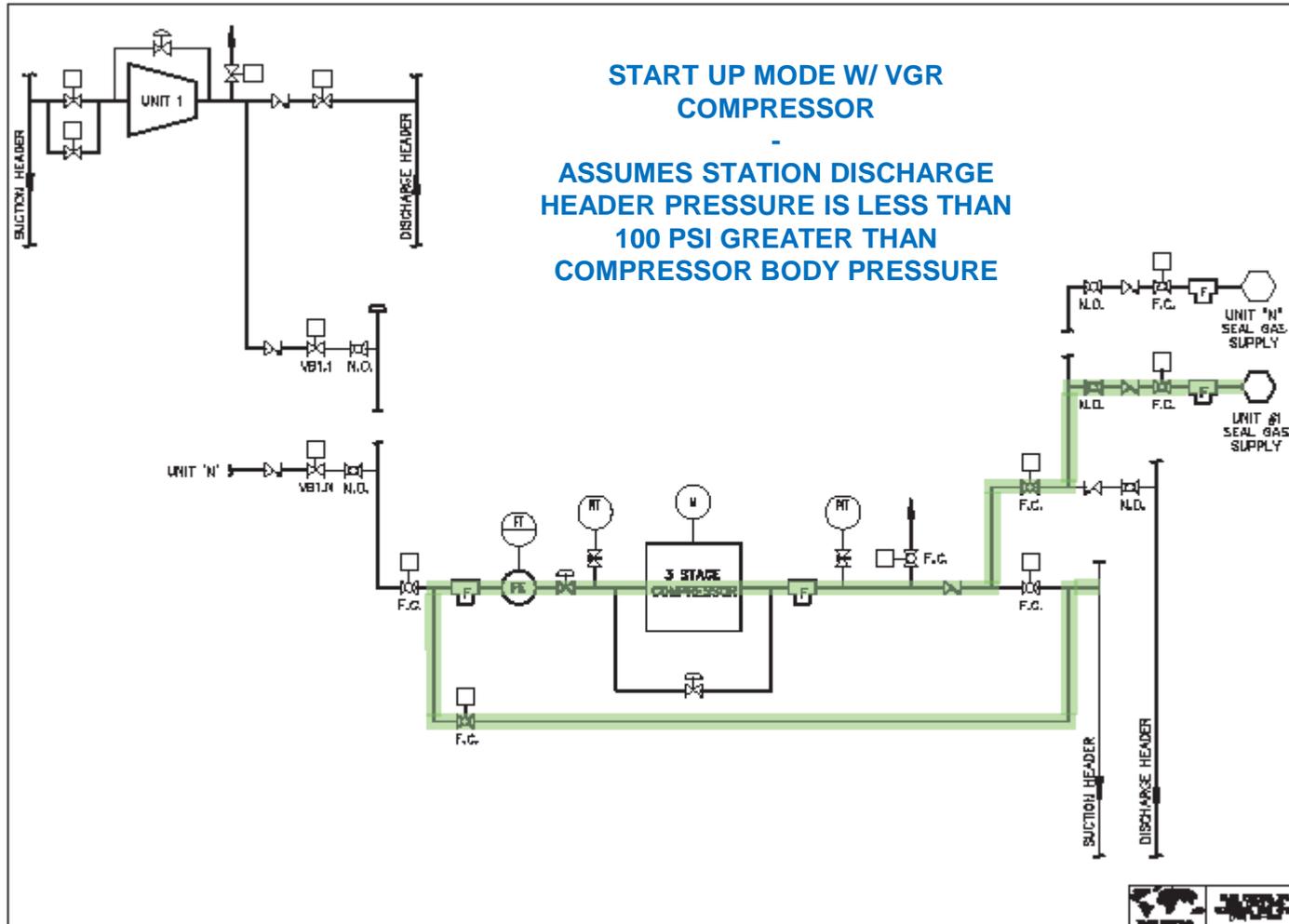
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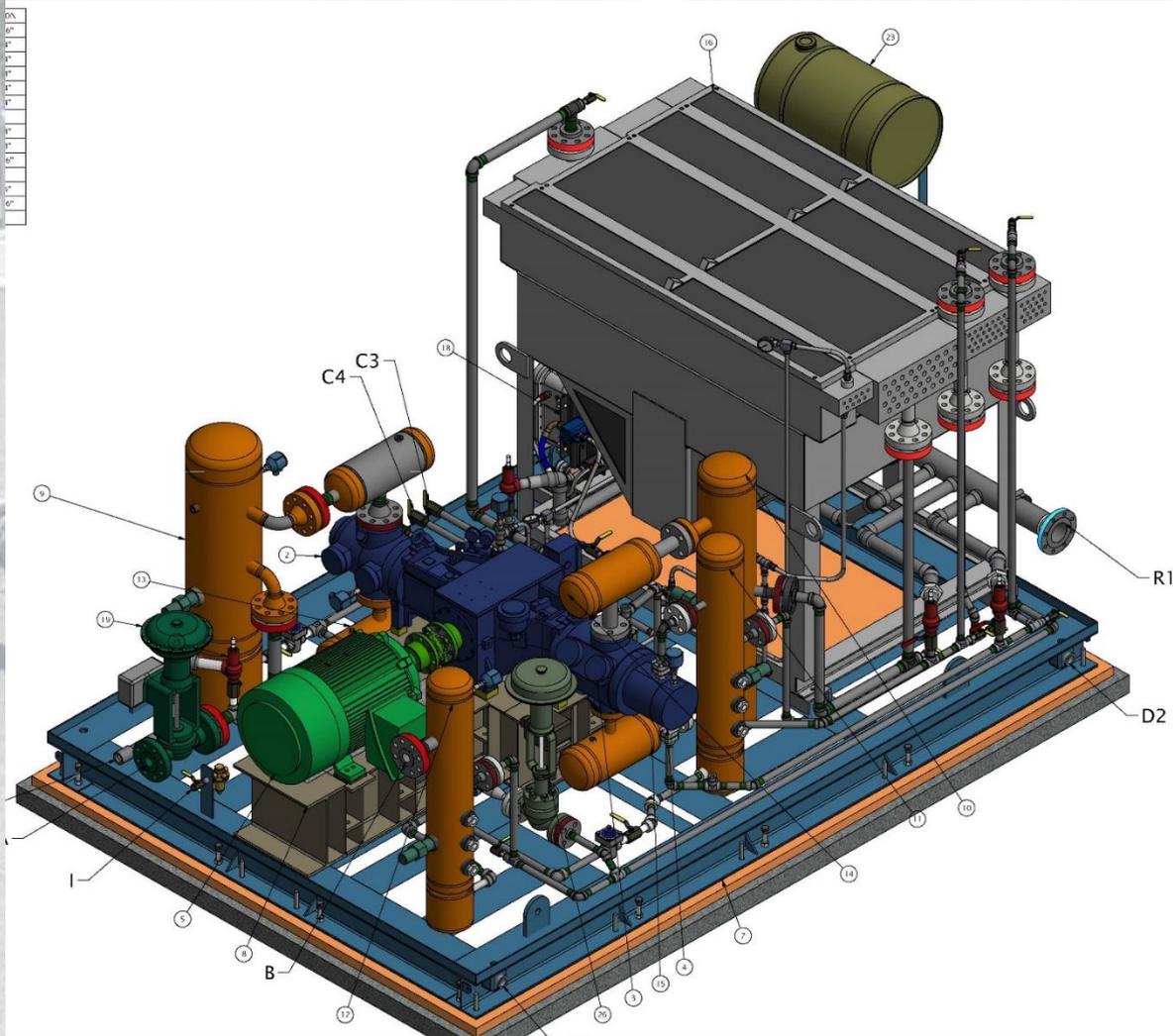
# PRESSURIZED HOLD AND VENT GAS RECOVERY



# PRESSURIZED HOLD AND VENT GAS RECOVERY



# EXAMPLE VENT GAS RECOVERY COMPRESSOR





**QUESTIONS ?**

