Non-Technical Summary

for the

Kryvyi Rih Industrial Gases Complex, Kryvyi Rih, Ukraine

Date: 06 October 2020
Revision P

1.1 INTRODUCTION & SUMMARY

Kryvyi Rih Industrial Gases (KRIG), a Joint Venture with majority ownership by Air Products and Chemicals, Inc, will invest in an Industrial Gases Complex consisting of an air separation unit and local pipeline infrastructure to be located in Kryvyi Rih, on a land plot currently part of the existing ArcelorMitral Kryvyi Rih steelworks site. The unit will supply local and international industrial gases needs including those of ArcelorMittal Kryvyi Rih.

The project will employ state-of-the-art technology and manufacturing techniques and will operate with a substantially higher efficiency than local equipment that it will replace.

Air Products Ukraine, a wholly owned subsidiary of Air Products and Chemicals Inc., will provide operating and maintenance services for the air separation plant under a separate contract with KRIG.

The Project will be subject to local permitting and applicable permits obtained prior to start of construction, such as an environmental and building permit. Prior to start of Construction Air Product will finalize and implement an Environmental and Social Management Plan to cover construction phase and limit any environmental and social impacts in accordance with international industrial best practice and Ukrainian law. At all times health and safety standards will be maintained.

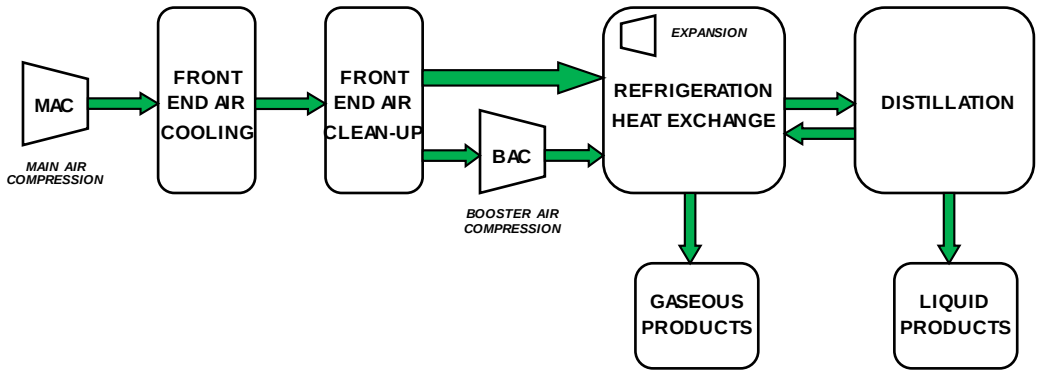
Once complete, the Project will comply with National Regulations and standards, and in addition, Air Products will apply its own Environment, Health and Safety (EH&SQ) and human resources (HR) systems to KRIG's operations at Kryvyi Rih. Environmental, Quality, Energy and occupational health and safety issues will be managed through systems certified to ISO 14001, ISO 9001, ISO 50001 and ISO 45001 standards. The necessary resources and capacities are in place to implement the aforementioned systems.

In terms of environmental performance, the proposed techniques will be amongst the best available in the sector. KRIG will operate in line with both the Ukrainian National requirements and in line with the EU European Industrial Gas Association guidelines and relevant EU Best Available Techniques (BAT) as appropriate; and will attain improved energy efficiency and lower emissions. KRIG will undertake an EIA for the investment and obtain the relevant permits from Competent Authorities prior to start of construction.

Further technical details are provided in the sections below.

1.2 PROCESS SUMMARY

A modern Air Separation Unit (ASU) is a carefully engineered, integrated and highly efficient process. A basic block diagram is shown here, with accompanying process description below. A more detailed schematic is shown in Appendix 1.



Air Separation is a physical process that produces oxygen, nitrogen and argon by cryogenic (low temperature) distillation of air. The only substantial inputs are air from the atmosphere and electricity; the only emissions from the process itself are air gases returned to the atmosphere.

MAC – Main Air Compression
Atmospheric air is drawn into the process, filtered to remove particulates and is then compressed in the Main Air Compressor.

Front End Air Cooling
After the air is compressed, it passes to the Direct Contact Aftercooler (DCAC) where it is cooled, and water is removed.

Front End Air Clean-Up
The saturated air then passes to the Temperature Swing Adsorber (TSA) Vessels where water vapour and carbon-dioxide are removed.

Refrigeration and Heat Exchange
From the TSA, the air then splits into two streams. One stream passes directly to the "Cold box", a highly insulated structure which contains the cryogenic components of the process. The second stream passes to the Booster Air Compressor (BAC) where the pressure of the air is increased, before this stream also passes to the cold box system. Some of the air feed also passes through an expander, where the pressure of the gas is reduced to create refrigeration for the distillation process.

Distillation and Product Supply

In the cold box, the compressed, dry air is split into oxygen, nitrogen and argon streams by distillation at cryogenic temperatures. Liquid oxygen is pumped to the required pressure using cryogenic pumps and is then vaporised against the air streams within the main heat exchanger and leaves the cold box as warm, gaseous oxygen at the required product pressure, to the product pipeline.

Liquid nitrogen and argon are also pumped to the required pressures and are vaporised against air streams within the main exchanger before being sent as warm gas to the product pipelines.

Liquid oxygen, nitrogen and argon products are also sent directly from the coldbox system to cryogenic storage tanks.

1.3 ENVIRONMENTAL IMPACTS

The main environmental impacts of an air separation unit arise from use of electricity, noise from machinery, use of water, and some small quantities of solid and liquid waste generated by maintenance activities. The only emissions to air are returned air gases, nitrogen, oxygen and some water vapor. These are not environmentally significant. The

project will be prepared and executed in line with the Ukrainian regulations with respect to assessment of environmental impacts.

Process Inputs are

- Air from the atmosphere

Utilities that are used are

- Electricity for the process
- Occasional use of diesel fuel to provide a heat source for the vaporiser
- Cooling water,
- Water for the fire protection system
- Potable (drinking) water
- Small quantities of calibration gases

Emission to air

- Air gases returned to the air
- Water vapour from the cooling tower
- Occasional combustion emissions from the diesel vaporizer and the backup generator

Water drainage system

The main sources of wastewater are the cooling water and the vaporizer blow down water, the latter which contains traces of water/boiler treatment chemicals and biocides which are used for bacteriological control (for the prevention of legionella and other bacteria)

Other waste waters are

- Storm water, (with any small amounts of oily water separated for separate disposal)
- Sanitary wastewater

Noise

The new ASU will be designed to comply with all local Ukrainian and Air Products noise standards, including use of acoustically insulated buildings for the compressors, and piping and vent noise attenuation measures.

2 ENVIRONMENTAL HEALTH AND SAFETY STANDARDS AND SYSTEMS

2.1 OVERVIEW

Air Products operates under a formalised Environment, Health and Safety (EH&SQ) management system covering all our businesses wherever we operate, including labour and operational standards.

This system incorporates compliance with legislative requirements including management systems requirements for the Industrial Emissions and Seveso Directives and National legislative Guidance. Our Management system is consistent with various National and International management systems standards and incorporates requirements of ISO 14001, ISO 9001, ISO 50001 and ISO 45001.

Air Products is also a member of relevant industry trade associations - including the European Industrial Gases Association (EIGA) - within which we share EH&S best practices and develop environmental guidelines.

Further details can be found on our web site
Sustainability report
Governance standards and Code of conduct
EHS management systems

2.2 LEGAL COMPLIANCE AND ALIGNMENT WITH RELEVANT EUROPEAN LEGISLATION

Air Products operates over 200 sites in Europe including over 40 Seveso-regulated sites Air Products' management systems, engineering and design standards are applied where relevant to all our facilities worldwide, subject to any additional local legal requirements.

The EU Industrial Emissions Directive (IED) does not apply to Air Separation as it is a physical not a chemical process with very few potentially harmful emissions; hence there are no applicable Best Available Techniques (BAT). However, our design and operating procedures do incorporate the European Industrial Gases Association (EIGA) guidelines, for example on managing environmental impacts and benchmarking our energy efficiency with the average performance of best 10% of plants (see contained within https://www.eiga.eu/index.php?eID=dumpFile&t=f&f=3581&token=95e8195add59162bd25aff4554cf2aa64784a1f0)

Air Products will use a safety management system and develop an emergency plan for this site, incorporating local and national legal requirements and including site specific considerations. We incorporate local legal requirements such as pressure vessel codes and national legislation by working with specialist consultants, design institutes and our own in-country specialists.

3 STAKEHOLDER ENGAGEMENT AND GRIEVANCE MECHANISM

Wherever Air Products and its affiliates operate, they pay careful attention to their obligations as good corporate citizens. Consistent with that practice, KRIG will identify stakeholders relevant to its intended operations and will put in place management mechanisms to ensure that stakeholder concerns are managed fairly and effectively. The Company will implement a grievance mechanism to ensure any concerns are dealt with in line with corporate requirements and best industry practices.

For further information please contact Volodymyr Yarmola at +38 044 489 9722 or email us on yarmolv@airproducts.com

Information on the Company can be obtained here www.airproducts.ua

APPENDIX 1 SIMPLIFIED SCHEMATIC