Operation and Maintenance Services

Customer Plant Support
Air Products Working With You.

Operation and Maintenance Services ................................................ 1
An introduction to Air Products, the Global Operations Division and the Customer Plant Support group and what our role is.

What we can do for you .............................................................. 2
When you choose to do business with us, you can look forward to a whole host of benefits. This section describes the advantages we bring to your operation from cost and reliability to safety and risk reduction.

Air Separation Units ............................................................... 3
What is an Air Separation Unit and how does it work? The running of a typical plant and how our business process links in with yours from operators to management levels.

Service Program .................................................................. 5
How our Operation and Maintenance Service plans work, what they include and how we can adapt them to meet your needs. Our service plans differentiate us from our competitors with the knowledge gained through years of operating experience.

Air Products Global Operations ................................................. 7
A more detailed look at our Global Operations Division and their specific areas of skill and expertise. This section covers our staff training programs and how we can benefit you by passing on our knowledge of running efficient plant installations.

Mission Statement
“To provide our customers with outstanding operation, maintenance and engineering support that will contribute to Air Products’ industry best safety and reliability record.”

Air Products was founded more than 65 years ago, it has annual sales of $10.4 billion and operations in over 40 countries. We are a market leader in the global electronics and chemical processing industries and are a longstanding innovator in core manufacturing sectors.

Air Products is both an equipment supplier and an operator. We research, design and build cryogenic plants and equipment for gas and liquid production, recovery, purification and liquefaction. We also supply industrial, specialty and medical gases to a broad variety of industries. The company distinguishes itself through its 21,100 employees around the world, who build committed relationships with their customers based on understanding, integrity and passion.

Air Products has designed and built over 2,200 plants, we own and operate over 800 plant units and have over 600 production and distribution facilities worldwide. Our Global Operations Organization consists of some 7,800 individuals and is backed by the Global Engineering Organization. The experience we have gained from years of design and operation is key to enable us to assist customers who own air separation facilities in providing services such as engineering studies, emergency services for operation or equipment repair, performance and safety audits, predictive maintenance services, plant upgrades and modifications, instrumentation services, operator training and preservation programs. CPS services can be customized to meet your plant needs and business objectives, visit our website at www.airproducts.com/cps for further details.

support around the clock and around the world. The team’s main priority is to resolve customers’ problems by providing solutions that emphasize safety, reliability and operating efficiency.

Air Products has designed and built over 2,200 plants, we own and operate over 800 plant units and have over 600 production and distribution facilities worldwide. Our Global Operations Organization consists of some 7,800 individuals and is backed by the Global Engineering Organization. The experience we have gained from years of design and operation is key to enable us to assist customers who own air separation facilities in providing services such as engineering studies, emergency services for operation or equipment repair, performance and safety audits, predictive maintenance services, plant upgrades and modifications, instrumentation services, operator training and preservation programs. CPS services can be customized to meet your plant needs and business objectives, visit our website at www.airproducts.com/cps for further details.
What we can do for you

When you choose to do business with us, you can be confident of a whole host of advantages. Depending on your service scope, you could benefit from any of the following:

Reduced Costs
- New technologies and best practices will be fed back from our own facilities to be considered for your site to provide you with the most cost-effective plant
- Air Products uses an open matrix management approach, meaning that full technical management resources will be available at all times at no extra cost
- Depth and experience of a large corporation available at a cost that is competitive with smaller, less experienced companies
- High plant on-stream factor leads to less vaporized back up liquid
- Operating contracts eliminate the need for specialized training of your own operators or air separation facility maintenance personnel

Higher Plant Reliability
- Air Products owned and operated equipment has an on-stream availability factor in excess of 99%
- Developed and proven procedures and practices from over 65 years of operating and maintenance experience
- High on-stream factor is a direct result of our Predictive Maintenance program
- Global Computerized Parts Inventory Control System means that the right parts are in inventory either on site or at one of our strategically located warehouses worldwide
- Historical tracking system to identify and categorize problem causes
- Air Products’ Global Operations Department and Maintenance Department are “on call” 24 hours per day, 365 days per year. If there is a problem, the response will be both fast and comprehensive
- Supplier established stocking programs for critical spare parts

Reduction of Major Maintenance Risk
- Simplified forecasting and budgeting
- One step design engineering, construction, start-up, testing and maintenance of equipment
- Eliminate coordinating engineering consultants, subcontractors, operators and maintenance personnel

Plant Safety
Plant safety is ingrained in the culture of Air Products and our employees. In the words of our CEO, “Nothing is more important than safety.” Plant staff will have access to all the latest safety related reports, procedures and initiatives. Ongoing operator and maintenance staff training is essential to maintain high plant safety standards. With maintenance only contracts, we can provide your operators with training targeted to your specific needs.

Air Separation Units
Air Separation Units (ASUs) are used, as the name suggests, separating air into its main components, nitrogen, oxygen and argon. The end product may be in either liquid or gaseous form. Separation is carried out in a large distillation column at the core of the plant.

Ambient air is drawn in and its pressure is increased in the compressor in order to overcome component pressure losses and to establish the correct pressure for low temperature separation. This separation process is called cryogenic distillation and causes temperatures drop as low as ~180°C. Before that is possible, the air has to be prepared so that not only is it at the correct pressure, but also at the correct temperature and free of dust, water and carbon dioxide (CO₂).

Dust is taken out by the air filters upstream of the compressor. Any water vapor and CO₂ not removed would freeze out and lead to blockages so they are therefore removed in the front-end cleanup system. This is usually a switching set of beds containing adsorbing materials which act like sponges, taking out the vaporized water and CO₂. The heat created during compression is partly removed by ambient cooling water. The required cryogenic temperatures are attained by heat transfer in the main heat exchangers, where gases exiting the distillation process are warmed up against the incoming air which loses heat as a result.

The distillation itself is a complex process which takes place in the column where liquid descending the column contacts and is thoroughly mixed with vapor flowing upwards by means of a tray or structured packing. The oxygen and nitrogen separate because these elements have different condensation temperatures. The desired end products can then be tapped off from the column. The gases are warmed up in the main heat exchanger, cooling the incoming air. When required, very cold liquid oxygen and nitrogen can be stored in liquid form. These liquids do not pass through the heat exchanger.

There are some heat losses in the process due to the large temperature difference between the working fluid and ambient conditions. These losses must be minimized to maximize the efficiency of the expander which creates a large pressure drop in the process gas, resulting in a simultaneous further decrease in temperature.

The air separation products are made available as a gas for pipeline systems to end-users or cylinder filling stations. If still in liquid state it can be transported much more easily by trucks as it occupies a far smaller volume per unit mass in this condition.

However, this is just one aspect of air separation; there are many more features making up the process than just those on a plant technical level. A Programmable Logic Controller (PLC), a Distributed Control System (DCS) and an interface for the operator are some examples of local level controls. Cooling water and electrical feed systems are other key systems within the installation.

To run the plant safely and effectively, operators trained in various maintenance disciplines are required to repair and maintain the numerous machines, instruments and electrics. Improvements and the investigation of any problems or operational deviations may require specialist engineering assistance which we are on hand to provide, along with management programs to facilitate the day to day running of the plant, should you so require.
At Air Products, our operation and maintenance activities are organized particularly efficiently with highly cost effective methods based on extensive prior operating experience. This synergy features close relationships between the plant operational and maintenance personnel and the support groups that assist in resolving issues and optimizing performance. We learn from field errors by feedback to design teams and we spend a significant amount of money on testing innovations in the field. The synergy is available to Air Products’ Clients via O&M contracts.

Ongoing support is provided by Air Products staff based at major Air Products production sites, as well as our office based personnel in the U.S., U.K., China, or Singapore. You will have access to Air Products operations specialists from our Global Operations Organization and our Global Engineering Organization via the onsite staff. The commercial management of our Operation and Maintenance Service support will be facilitated by our Customer Plant Support team.

Operational Support
We provide support for the team running the plant. We will assist and guide your operating team as necessary. General and operational safety awareness, operator skills and best practices will be brought in by formal and on-the-job training. This may be established by temporarily placing one of our head operators or operational support engineers on site.

Maintenance Program Support
Air Products will develop and provide a predictive maintenance program for your air separation plant with the same strategy that allows us to minimize cost while maximizing reliability. We will also establish and execute scheduled maintenance programs for the plant and perform a periodic turn-around (downtime), typically done every three years or as deemed operationally necessary. Additional technical services to be provided as needed for any unplanned corrective repairs. In general, Air Products will provide predictive, planned and unplanned maintenance support as it does at all of its other operating facilities.

Technical Support
Air Products provides priority access to Air Products expertise in problem solving/trouble shooting whether remotely or via site visits. The Global Operations (GO) Organization of Air Products conducts performance monitoring at regular intervals to allow them to provide a fast response to assist with any unpredictable operating issues and to provide proactive support for ongoing operations thus allowing efficient plant operation.

As part of these support services, Air Products carries out a range of activities to allow us to provide the best possible results. These activities may include any or all of the following:

Site Visits
O&M contracts include the cost of whatever site visits are required by experienced Air Products personnel in order to maintain the operational safety, reliability and efficiency of the facility as they would for any Air Products operated facility. Reports will be issued on a periodic basis summarizing our findings and listing detailed recommendations for any changes to the operating methods and/or control philosophy based on Air Products’ best experience to date. The site visit can include any of the following topics as determined by Air Products or other topics you require:
- Efficiency and Performance Audit
- Assess plant utility consumption for consistency, identify gaps in expected utility consumption and identify opportunities for power/energy savings. Assess plant operations for consistency, identify gaps in expected production/purity and opportunities to increase production/purity
- Safety Audit
- Evaluation of training, compliance with procedures, e.g. lock-out/tag-out, confined space, work permits, safety meetings and safety improvement plans
- Maintenance Audit
- Review Predictive Maintenance Program, equipment availability, turnaround planning and routine maintenance effectiveness
- Management of Change Review
- Review of changes and documentation of changes, master flowsheet, master electrical drawings and spot check installations where possible
Air Products Global Operations

Air Products Global Operations is integral to any services program that is developed. This group operates and maintains all Air Products owned and many customer owned facilities. Their experience, as shown in the following information, contributes a variety of functions in the design, safety, reliability and efficiency of all Air Products facilities. This group is key to our offering.

Plant Design Services
As standard practice in the construction of all new Air Products facilities or the modification of existing facilities, Global Operations (GO) participates in the formulation and reviewing of facility design by their own experienced line and technical personnel. This consists of the following:

1. Plant site selection
2. Review of safety and environmental conditions
3. Review of process flow sheets
4. Review of major equipment selections
5. Review of plant layout for operating and maintenance access
6. Review and recommendation of required instrumentation
7. Independent review and analysis of machinery design
8. Study and recommendations for required support facilities for maintenance, water treatment, chemicals and lubricants, storage and spare parts
9. Review of plant operating modes, turnaround alternatives, efficiency, etc.

This review procedure helps to optimize facility operation by balancing capital costs, maintenance requirements and required operator manpower levels. Through our many years of operating and maintenance experience, we have learned that the key element of the process is for those responsible for running the equipment to provide input at the design stage.

Central office based maintenance engineers are assigned to work with a group of plants to assist local plant personnel in plant turnarounds and in resolving plant machinery problems. Other central office based staff including process engineers, machinery engineers, electrical engineers, process control engineers, pressurized equipment engineers, safety personnel and material management personnel are available and assigned as needed to resolve issues that may arise in a plant.

Strategically located maintenance facilities and offices in each region are used as a base for mechanics and technicians who possess specialist skills in one or more areas of electrical, mechanical and instrumentation work. Manpower and skills are pooled and applied on a flexible basis to maintenance and operating problems at given locations within the region as required.

Regular Performance Monitoring
Our process experts will perform a regular analysis of the plant efficiency from the Remote Monitoring System and determine if there are any abnormal trends or problems. If a problem is identified, Air Products will provide an analysis of the problem and a recommended solution on a priority basis.

Remote Monitoring
Air Products can install the equipment required to allow our support team communication and access to the DCS system via telephone. The client will have access to Air Products technical representatives through the Air Products site Manager to discuss possible/ongoing plant operational issues. The client and Air Products site team will be capable of calling Air Products and allowing our technical experts to view current operating conditions. Under client direction, the team may also have the capability of making changes to the process conditions, therefore increasing on line performance. This system also allows us to conduct regular efficiency monitoring to further improve your plant performance and allows data analysis of equipment for troubleshooting and maintenance purposes.

Best Practices & Continuous Improvement Recommendations
As a result of your participation in this program, we will review all best practices and will recommend “continuous improvement” opportunities to enhance performance, efficiency, safety and reliability in all stages from design to operation and maintenance. Correspondence on safety, reliability and operations on relevant subjects related to the air separation industry will be forwarded on a regular basis. The client will automatically receive benefits from the opportunities found at our own plants. Development of proposals and projects will be provided separately.

Over many years, Air Products has developed a sophisticated program on its operating sites to reduce costs. During year 2000 over 1000 projects were executed globally with benefits in excess of U.S. $200 million in reduced operating, maintenance and distribution costs and revenues generated from plant expansions and capacity debottlenecking projects.

Spare Parts Management Services
Air Products maintains an extensive spare parts database and inventory management system currently being integrated into our SAP system, which is used to centrally manage the spare parts inventory of our fleet of over 800 plants worldwide. As an extension of our in-house system, Air Products will provide spare parts inventory management services with this program. As part of this service Air Products will develop the spare parts inventory database for the plant and integrate it into the Air Products RMS System for Global Materials Management.

Advantages include:
• Reduced cost of maintaining spare parts inventory
• Convenience of one-call parts procurement
• Assurance of having a well-maintained spare parts inventory
• Support from a highly experienced team of professional materials managers

Inventory management will be for two classes of spares, “Shared Spares” and “Dedicated Spares.” Air Products will maintain Shared Spares under our “Spare Parts Management” program within our own warehousing system and we will manage procurement and delivery of Dedicated Spares, which will be stocked at your site.

Environmental, Health and Safety (EH&S) Awareness
Our global EH&S Policy commits us to being an industry leader in Environmental, Health & Safety. As a reflection of our EH&S policy and our commitment, Air Products is consistently a top safety performer in the American Chemistry Council (ACC) and the Compressed Gas Association (CGA). To keep you informed of the latest safety information, you will receive a subscription to our Safety Newsletter and access to pertinent sections of Air Products’ Global EH&S manuals.

Manpower and Training
Air Products has the task of staffing and providing technical support to over 800 Air Products facilities at different locations in the United States, Europe, Canada and Brazil as well as liaison responsibility to joint ownership companies in Mexico, South Africa, South-East Asia, Japan and China. With this in mind, we have established Global Operations headquarters in Allentown, PA, Hershom, U.K., Shanghai, China, and Singapore. From these headquarters, Air Products GO organization co-ordinates its global activities through a network of line managers to the plant managers. Where a given facility is particularly large in size, responsibility for specific areas of production is assigned to area managers within the facility who each report to the plant manager. Plant operators report to local plant management. Major production sites in Rotterdam (serving The Netherlands and Belgium) and New Orleans, LA (serving the Gulf of Mexico area) complement the three central offices.

Maintenance planners are utilized for critical path planning of plant turnarounds. Planners confer with plant managers and engineers in order to prepare most efficient and cost effective schedules.
Good staff training is as important as the process design and plant equipment.

Control of an Operating Plant after Start-Up

The Plant Manager reports directly to a Global Operations Line Manager at headquarters, who has responsibility for a number of plants of similar operating characteristics. The Central Production and Delivery line and staff groups maintain a continuous routine check on facility operations through their control of the predictive maintenance, efficiency testing and safety monitoring. In addition, the central organization provides the necessary supplemental supervision, engineering and maintenance skills required during major plant outages and turnarounds.

The Air Products Global Operations Organization provides a central operations control system that is critical to the success of the operating plants regardless of their size and/or location. The central department concept was developed to meet the needs of a widely spread system of plants which, for the most part, are individually too small to be economically staffed with all of the required skills. Air Products has found that this system provides similar benefits even for our large chemical complexes such as the facilities at New Orleans, LA; Calvert City, KY; Houston, TX; Nanjing, China; and Rotterdam, Netherlands.

The teams within Air Products Global Operations collect routine data and other information from plants on many items which exceed the usual production-related cost performance data. The predictive maintenance program, efficiency testing program, safety reporting program and other similar lines of communication provide an ongoing audit of plant activities. Also, our central office computer system has polling access to computer-controlled plants at more than 50 plant locations, so real-time information is available. Once each day, computer-controlled plants are polled for all significant operating information such as flow rates, temperatures, pressures, product totals, power consumption and machinery and equipment data. If a plant deviates from the standard of performance previously established, it becomes quickly apparent and corrective action can be taken before it becomes a major problem. All deviations from expected standards are analyzed by sophisticated computer programs and engineers experienced in plant optimization in our central office daily, in addition to efficiency optimization programmed into the local computer system.

Air Products Global Operations has developed a rapid response to any plant problems that may develop, either in the plant equipment or the process itself. Although infrequent, when plant problems occur, experts in the required skills can be at the plant site in a matter of a few hours to assist local plant personnel with their problems. Also by working with a worldwide organization, the Central Operating Group provides the information, experience and services that are usually only available from outside consulting groups. They are able to compare performance, machinery problems, operating and maintenance techniques and other matters among facilities all over the world, to allow that any given plant is performing in an optimum manner.

Experience

The Global Operations Organization, in more than 65 years of operating various types of process plants including cryogenic and high temperature processes, has had considerable experience in the following areas:

1. Large electric motors (up to 45 MW) used in cryogenic plants.
2. Gas engines and reciprocating compressors (up to 12,000 HP) used in LNG liquefaction systems, hydrogen plants and air separation facilities.
3. Large centrifugal compressors (up to 45 MW) used in air separation and ammonia plants.
4. Large steam turbine drives (up to 20,000 HP) used in air separation and ammonia plants.
5. High-pressure steam generation (up to 1,500 psig) in ammonia plants, air separation plants and steam – methane reforming facilities.
6. Operation of reformers, catalyst beds and carbon dioxide removal systems.
8. Usage of seawater for exchanger cooling in large tonnage air separation plants.
9. MEA and Benfield cleanup systems in natural gas and gas – steam reforming systems.
10. Cold pumping equipment for liquid oxygen (LOX), liquid nitrogen (LNN), liquid hydrogen (LH2), liquid natural gas and other cryogenic liquids.
11. Both reciprocating and centrifugal expanders for air, nitrogen, hydrogen, helium and other refrigerant gases.
12. Natural gas liquefaction, storage and vaporization.
13. Compressing air, oxygen, nitrogen, hydrogen, propane, butane, methane, multi-component refrigerants, Freon, etc.
15. Cold box equipment predictive maintenance and repairs.
17. Operation of extensive pipeline distribution systems.
During this period, Global Operations has established centralized service and expertise in the following areas in response to plant requirements:

1. Maintenance Planning and Scheduling
2. Electrical and Instrument Engineering
3. Maintenance and Mechanical Engineering
4. Safety
5. Plant Process Engineering
6. Pressure Vessel Maintenance
7. Water Treating Services
8. Pipeline and Environmental Services
10. Production and Delivery Services Engineering
11. Quality Assurance

**Maintenance Procedures and Cost Controls**

In order to operate and maintain its facilities at the lowest possible cost while obtaining maximum on-stream time, Air Products has adopted some specialist procedures to achieve the desired targets. Some of the most important ones are:

1. Combined Maintenance Program – A combination centralized and decentralized maintenance program, which provides for plant personnel handling the daily routine of maintenance while high-cost, major maintenance and plant turnarounds are controlled by centralized engineering and maintenance planning and scheduling. The centralized group is composed of skilled engineering and technical personnel in electrical, instrument and mechanical fields, which can be sent to the plants as the need applies during plant turnarounds and/or emergencies. In addition, skilled mechanics from strategically located Air Products maintenance shops are made available to perform “planned and scheduled” work or to respond to emergencies.

2. Computerized Predictive Maintenance (PM) Program – A computerized PM program for each facility specifies what tasks will need to be performed in the near future and the frequency at which they must be performed. These programs are kept current and flexible on a predictive basis by deletions or additions of tasks or frequencies as conditions change. Office support staff maintain running averages of plant histories to update these programs to provide optimum life at the lowest cost. Each plant receives a monthly report for jobs to be done. This represents tasks in addition to the daily routine of running the plant, which is documented in the onsite manuals.

3. Planning and Scheduling – Major maintenance tasks such as large compressor overhauls or complete plant turnarounds are planned by critical path charting to provide the shortest outage possible by ensuring that bottlenecks do not occur because of shortage of parts, tools, or manpower. This type of major maintenance will be scheduled with input from the customer. Elimination of delays plays an important part in cost reduction.

4. Spare Parts Program – Any maintenance concept for a process plant is incomplete without a system for selection and control of spare parts. The goal of an effective spare parts program is to keep the necessary spares investment to a minimum without jeopardizing the plant on-stream time and to administer the spare parts program at the lowest possible cost. Departmental philosophy for provision of spares is to maintain not only the normal spares subject to replacement during overhauls, but also the major spares for items subject to catastrophic failures that could result in long plant outages. For an example of the latter, our general practice is to provide spare parts for all centrifugal and turbine rotors and speed increasing (or reducing) gear sets. The spare parts program at Air Products is administered on a centralized basis. The similarity of many plants and equipment allows low total spare parts investment. The Global Operations group that controls the overall plant maintenance requirement is also responsible for the initial selection of spare parts and the reorder of major spares. Initial spare parts selection is based on vendors’ recommendations, operating experience and a careful analysis of what is already in stock and its location. In order to obtain the best possible price, major spare parts for Air Products facilities are negotiated as part of the original purchase of machinery or equipment. Since spare parts handling, packaging and storage for the long term is critical and requires special knowledge, it is expedient to provide this capability at a central location. Therefore, Air Products has established strategically located spare parts warehouses and depots. It is possible to ship spare parts from this depot on short notice, 24 hours a day, seven days a week. Special transportation arrangements keep the total shipping time to a minimum, as an example, normally to less than eight hours in the continental U.S. With most major maintenance work and plant outages performed on a planned basis, actual delays in plant start-up because of central stocking of spares are rare.

5. Vibration Monitoring and Efficiency Analysis – All major centrifugal and reciprocating compression equipment has vibration monitoring and detection devices. With this equipment, Air Products can establish the general condition of the machinery by conducting a complete vibration analysis. In addition, Air Products can computerize these efficiency calculations, not only for individual items of equipment, but also for individual stages. No longer are major equipment overhauls based on time intervals alone, but vibration analyses and efficiency studies play a major part in these decisions, resulting in longer periods of operation.

“We can ship spare parts for your plant 24 hours a day, 7 days a week.”
6. Computerized Inventory Management Process (IMP) – Several years ago, Air Products recognized the need to develop computer-based “maintenance management systems,” and began to develop a comprehensive computerization program for Global Operations. This program is now referred to as “Inventory Management Process.” The intent of this program is to utilize SAP to capture, store and provide fast access to much vital information for all the central office staff groups involved in maintenance support as well as to the plant operators. This program is utilized for functions in the following areas:

- **Spare Parts Identification and Inventory Management** – The system provides for numbering, descriptive information, coding and categorizing all spare parts, materials and tools required for maintenance activities. The system maintains information on spare parts as to quantity stocked, authorized levels, current parts costs and storage location. Provisions have been made for requisitioning of spares by computer and inventory control of all material in storage.

- **Equipment Identification and History** – The computer system provides complete data on major machinery and maintains historical records of maintenance performed by PM or major overhauls. A historical record printout can be made available when needed.

- **Maintenance Cost Control** – Based on current information submitted to the computer on normal maintenance, major maintenance, labor costs, material costs, plant investments, allocations, plant locations, machinery involved, etc., various computer-generated reports are made available on monthly, annual, or other occasions for review and study for control of maintenance expenditures. Since these reports deal with current data as well as historical data, a tremendous amount of individual handwork is eliminated and proper comparisons of cost data can be made. With better information on current costs, better decisions can be made in controlling maintenance costs.

- **Predictive Maintenance** – IMP provides printout and computer input capability at the larger plant sites. The monthly work list is printed at the plant site. Other technical data is available via computer to the plant managers. Also, “completed” information is fed to the computer from the plant site to satisfy compliance and historical records.

- **Planning and Scheduling** – With the IMP system, maintenance data, maintenance procedures and critical path plans for all major equipment are stored in the computer for retrieval when needed. Planning of plant outages is simplified. Planning work hours have been reduced. Technicians and mechanics have become more proficient in doing their work.

Support Activities

A valuable asset in the successful operation of process facilities is Air Products’ capability to communicate quickly with the functional groups at the central offices, who can assist with problem solving. These functional groups include:

1. Engineering
2. Research and Development
3. Maintenance
4. Spare Parts
5. Purchasing
6. Safety
7. Machinery Applications
8. Distribution
9. Manufacturing
10. Quality Assurance

Over the years Air Products has developed a coordinated response from these various groups, which permits rapid analysis and resolution of any operating problem or emergency condition. As the situation demands, immediate activity can begin in maintenance, engineering, purchasing, manufacturing, research, or other applicable groups.

We currently conduct many different types of audit on a regular basis through these support groups. These audits are form an integral part of many of our O&M contracts and may include:

- Performance Audits
- Safety Audits
- Pressure Vessel Regulations Compliance Audits
- Reliability Studies
- Incident Root Cause Analysis
- Troubleshooting

Quality Assurance

Air Products has put into place a Quality Management System (QMS) which has resulted in our achieving ISO 9000 certification for all facets of plant design, supply, operation and maintenance. This system uses the concept of tiered documentation to communicate the Company policy, its philosophy, guidance and direction. Fundamentally this allows that the “Buyer” is getting a safe, consistent and reliable product or service each time it is requested. This system is reinforced through training of staff and routine audits performed by trained staff and our outside certifying agent, Lloyd’s Register Quality Company.

Key elements of the QMS include site work instruction manuals defined for that specific site, regular internal quality assurance audits by trained staff and well-defined training and development plans for each employee.
For More Information

Americas
Air Products and Chemicals, Inc.
7201 Hamilton Blvd.
Allentown, PA 18195-1501
Tel +1(610) 481-5319
Fax +1(610) 481-4915
Email CPSINFO@apci.com

Europe
Air Products PLC
Hersham Place
Molesey Road
Walton-on-Thames
Surrey KT12 4RZ
England
Tel +44(1932) 249665
Fax +44(1932) 258461
Email CPSINFO@apci.com

Asia
Air Products Japan, Inc.
18-19 Toranomon 3-chome
Minato-ku, Tokyo 105-0001
Japan
Tel +81 3 3432 7043
Fax +81 3 3432 7052
Email CPSINFO@apci.com
Air Products China, Inc.
Rm. 611 Beijing Silver Tower
No. 2 North Road Dong San Huan
Chaoyang District 100027 Beijing
P.R. China
Tel +86 10 64106156
Fax +86 10 64106153
Email CPSINFO@apci.com

Middle East
Air Products PLC – Qatar
9th Floor Al Wakrah Tower
P.O. Box 55294
Doha, Qatar
Tel +974 4310786/4314289
Email CPSINFO@apci.com