Executive Summary

Honeywell Process Solutions is the leading provider of complete automation solutions for alumina refining, helping to control and optimise the production of more than 50% of the world’s alumina. The unique combination of in-depth alumina processing expertise and fit-for-purpose automation technologies covering all aspects of alumina refining automation and control has enabled alumina companies to realise millions of dollars in improved profitability per year. Honeywell’s collaborative work approach has saved thousands of engineering man-hours and assisted in reducing commissioning schedules by weeks.

Honeywell promotes a ‘safety first’ culture and a recent programme implemented across six alumina refineries globally achieved over one million man-hours without any lost time injuries.

Recent Greenfield alumina projects have highlighted how Honeywell’s solutions address the cost, schedule and risk criteria associated with a new plant start-up. The world class combination of Lean Execution for Automation Projects (built on Lean Six Sigma methods), alumina-proven lifecycle simulation, virtual engineering and Experion DCS have helped to compress schedules and reduced engineering by thousands of hours. This has been recognised through the Australian Engineers Excellence Award for the Worsley Alumina Upgrade project.

Operational improvements are effected through Honeywell’s emphasis on safety, reliability and efficiency, which has provided quantifiable business benefits to alumina processes. For example, Alunorte achieved a yield improvement of over 1% through the application of advanced control for digestion. Other operations have also reported increased production with better environmental compliance and reduced energy and caustic consumption. Benefits in excess of $5 per tonne are readily achievable.

Millions of dollars profit improvement are being realised through the application of Honeywell’s alumina refinery control solutions. Honeywell is the world’s leading supplier to the alumina industry of automation solutions, which are continuously being improved in consultation with some of the major producers. Benefits are realised throughout a project’s lifecycle, from construction through to operations.

“Honeywell helped us change our operator function from reacting and adjusting the process to proactively managing process operations. With advanced process management, we get the right information at the right time and act on it as appropriate. Honeywell’s Experion combines the strengths of the automation platform, advanced applications and expert services to help us make better decisions and improve overall business performance.”

Arnold Oliver, Process Control Superintendent, Worsley Alumina

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1 Case Study: Worsley Alumina Improves Productivity with Experion and Advanced Applications
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Introduction

Alumina refining is a highly competitive industry that requires optimising every aspect of a plant's operation across all the phases of its lifecycle—from the initial design and execution of the automation project, to the commissioning and start-up of the system, through to the production process and its ongoing improvement. The different phases of an alumina refinery’s lifecycle call for distinct focuses:

- Automation project: cost, risks and schedule.
- Plant operations: safety, reliability and efficiency

Honeywell has the experience, proven technological capability and industry-specific knowledge to address all these focuses and add value to alumina refining at every level of the organisation.

This white paper describes some of the unique benefits that Honeywell can offer alumina refineries in a variety of areas:

- Experience: As the world's leading vendor of alumina automation solutions—many developed with direct input from major refiners—Honeywell can bring to bear unrivalled domain-specific expertise and resources to alumina projects.
- Project Execution: An innovative lean approach—based on a virtualised engineering platform, best-practice workflows, and sophisticated documentation and simulation tools—optimises the execution of alumina projects, minimising risks and costs and ensuring commissioning happens on schedule.
- Lifecycle Support: Once the project has been deployed, Honeywell’s lifecycle support services help sustain the benefits of the installed automation solutions well into the future.
- Pricing: Honeywell has the global reach to meet the cost constraints of the highly competitive alumina market, coupled with the expertise to guarantee the most optimised and fit-for-purpose solutions.
- Distributed Control System: Honeywell has decades of experience in the application of DCS technology to alumina refining, and offers an array of solutions to enable optimal and flexible control of the process facility with ease of expansion.
- Wireless: Honeywell has already helped alumina refineries achieve notable cost savings through the deployment of wireless for non-critical functions and instrumentation.
- Advanced Solutions: The application of Honeywell’s advanced process control, optimisation, and information management tools has enabled alumina refineries to realise significant increases in profitability.
- Safety, fire and gas: An integrated approach to safety delivers valuable results in terms of incident prevention, asset health, and overall plant performance.
Experience

Honeywell provides automation solutions to more alumina refiners than do all other automation vendors combined. All of the major global alumina producers take advantage of the benefits offered by Honeywell’s solutions.

The solutions deployed for the alumina industry span all levels of automation—from instrumentation through control, to advanced control and information systems. It is this depth and breadth of alumina-proven technologies and project experience that ensures success, and has enabled Honeywell to become a trusted advisor to alumina refiners.

“With Honeywell we were able to benefit from a service provider that knows our business, our culture, our needs and abilities, and thus tailors solutions that enhance customer satisfaction but minimise overhead. The portfolio of products and services available from Honeywell allows Aughinish to operate at the bleeding edge of alumina refinery operations.”

George Troy, DCS Team Leader, Aughinish Alumina

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2 Success Story: Aughinish Alumina Relies on Experion for Competitive Advantage
Project Execution

Traditionally, projects are executed sequentially with large-cost items taking priority. Although automation accounts for a small part of the overall project budget, it often lies on the critical path—and can have a major impact on a project’s schedule, start-up and commissioning. Honeywell overcomes this hurdle by applying an innovative Lean Execution for Automation Projects (LEAP) approach—built on the Lean Six Sigma method deployed throughout the company—to the execution of alumina projects. The LEAP solution consists of processes and tools that decouple hardware and software subsystems from each other (breaking down task interdependencies), thereby allowing multiple activities to be carried on in parallel across multiple engineering centres distributed around the world.

“We chose Honeywell and Experion PKS because we wanted the best process control solution we could get with experienced project delivery we could count on. The result has been very positive for our company. The project was executed on time and on budget, and Experion has proven to be highly reliable and robust.”

Holger Grotheer, DCS Manager, AOS

The four key enablers that make LEAP effective are:

**Best Practice Engineering Methodologies**

Standardised global best-practice engineering methods and workflows (optimised for alumina refineries on the strength of millions of engineering hours across multiple sites). An example is shown in the image.

**Integrated Documentation**

Integrated documentation tools based on Intergraph’s ISO 15926-compliant SmartPlant® Foundation technologies—a collaborative conduit for sharing valid and consistent engineering data among applications and users.

Specifically, the SmartPlant Instrumentation (SPI) component is a bi-directional interface for exchanging control-system tag information between design and configuration databases. This enables field hardware designs to be completed within SPI and then simply uploaded to the control system. Site modifications can be efficiently published to complete as-built documentation.

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3 Case Study: Aluminium Oxide Stade Revamps Refinery Units with Experion
Virtual Engineering Platform

Honeywell’s cloud-based engineering environment allows design to happen in the cloud—effectively bringing the project to the right engineers, no matter where they may be in the world. This facilitates interactions and ensures testing can be performed immediately, allowing problems to be solved early, in real time, and without flying people all over the world. In some cases this approach has entirely eliminated the need for centrally-sited factory acceptance testing.

Honeywell applies this technology not only to the engineering environment but also to the control system hardware. This minimises upfront hardware requirements, extending design freeze dates. It also helps ensure hardware is current since it can be purchased close to system commissioning.

Alumina-Proven Lifecycle Simulation Environment

Honeywell’s UniSim® software suite provides steady-state and dynamic process modelling for use over the entire plant lifecycle—from design, through to construction and commissioning, and ongoing operator training. Many alumina refineries have taken full advantage of the UniSim environment to reap benefits such as reduced commissioning times and improved start-up control amounting to millions of dollars.

The UniSim software family consists of three products covering the entire plant lifecycle:

- **UniSim Design**: Steady-state simulation environment supporting conceptual, process and equipment-design activities.
- **UniSim Operations**: Dynamic simulation environment building upon UniSim Design, supporting operator training, control strategy verification, operating procedure development and online equipment monitoring.
- **UniSim Optimisation**: Integration of the UniSim models into process and production optimisation solutions for on-line control, optimisation, and planning and scheduling.

One of the most important uses of UniSim is for operator training. This is especially valuable in the case of new-construction refineries or major process additions such as calciners or digestion trains. In fact, simulator training has become a standard practice in many large-capital projects owing to the enormous risk of starting and running the refinery with operators who are inexperienced with the new equipment.
Alumina refineries that adopt UniSim have reported millions of dollars worth of benefits from faster commissioning and control system check-out times for greenfield and brownfield expansion projects, in addition to the improvements in safety resulting from better-trained operators.

“Honeywell’s UniSim enabled us to train our operators in advance so they could practice new skills without adversely affecting the plant operations and meet our startup needs.”

Manoj Pandya, Manager, Alumina Projects, Rio Tinto Alcan

Taken together the above advantages of Honeywell’s LEAP approach—engineering best practices, integrated documentation, virtual engineering platform, and lifecycle simulation—have helped refineries save thousands of man-hours in project execution. In one instance, an alumina refinery was able to start up six weeks ahead of schedule. Another example is the Worsley Alumina upgrade project, which earned an Australian Engineers Excellence Award.

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4 Case Study: Rio Tinto Alcan Gove Improves Operator Training and Startup Time with UniSim

Lifecycle Support

Automation can deliver significant benefits throughout the refinery lifecycle. However, a variety of factors can cause these benefits to decrease over time.

To guard against this, Honeywell provides services that help sustain the value derived from the installed solutions. Preventing equipment failures and resolving problems quickly are the keys to consistent performance. Honeywell offers proactive component monitoring and maintenance services that boost performance, extend component lifecycles, and lower overall cost of ownership. Honeywell invests heavily in the knowledge development of all personnel serving its customers, and operates support centres around the world, staffed with technical experts who average more than 20 years of experience in the business of process automation.

Honeywell also offers software applications, such as Profit® Controller, to help maintain superior process control. These tools can be remotely monitored to optimise profitability of operations and identify any needed revisions.

What’s more, Honeywell is the only automation services provider that continues to support products—third-party systems as well as Honeywell’s own—developed and installed as much as 30 years ago. Honeywell’s Assurance 360 program provides for proactive maintenance based on a balanced scorecard to ensure business benefits are not only maintained but improved upon.

“We relied heavily on Honeywell to help ensure the success of the migration project. Honeywell consultants with the knowledge of their technology and our process were able to quickly resolve any issues. The support system was excellent.”

Jean Beaulieu, Automation Coordinator, Alcan

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6 Case Study: Alcan Turns to Honeywell for Process Control Migration and Improved Plant Operations
**Competitive Pricing**

The automation market is highly competitive, with strong competition among the established vendors as well as from emerging suppliers, particularly from China. Honeywell operates globally across multiple markets and is acutely aware of the cost constraints imposed by the alumina commodity market. To meet this challenge, Honeywell constantly strives to minimise pricing by using low-cost engineering and manufacturing centres, and by examining project win-loss data to assess pricing competitiveness. Thanks to this approach, Honeywell has been able to win competitive projects in very price-sensitive regions such as India and China, and to increase its alumina market share.

Alumina refinery projects have historically been measured on a cost and schedule basis. As a consequence of this, automation technology decisions can sometimes be entirely cost-driven without any consideration for integration, long-term sustainability or maintenance. Yet those are precisely the factors that determine overall operating performance, so when evaluating price it is important to consider:

**Architecture**

First of all, should it be a programmable logic controller (PLC) or distributed control system (DCS) architecture? There may be hardware savings with PLCs, but on the other hand those systems require considerable integration engineering that generally exceeds the hardware savings. Additionally an alumina refinery process is highly interactive, requiring precise analogue control to optimise performance. Ease of configuration and ability to handle complex analogue control must be considered when choosing a control system.

An alumina refinery is a large, complex operation involving a number of discrete, yet interdependent, unit operations. The control system has to be able to accommodate this requirement, and the Experion® Distributed Server Architecture (DSA) is able to accomplish this cost-effectively by modularising the control functionality.

**Compliance**

As the world’s dominant alumina automation supplier, Honeywell thoroughly understands the unique requirements of an alumina refinery. As a result, requests for quotation are assessed not just according to compliance but also with an eye to the specific operational needs of alumina. The result is fewer changes and delays, and ultimately a lower delivered price.

**Cost Structure**

Honeywell uses low-cost engineering centres, but under the supervision of engineers with alumina-specific experience who ensure that the project requirements are satisfied. The company’s cloud-based Virtual Engineering Environment enables distributed engineering tasks to happen seamlessly from the customer’s perspective.

**Fit for Purpose**

Honeywell’s TDC2000 distributed control system was the first DCS to be deployed in alumina refining. Since then, this solution has continuously evolved to become the current Experion Orion system--with customers involved throughout the journey in setting the priorities and direction for the products. Both Alcoa and Worsley Alumina have chairs on the Honeywell User Input Subcommittee, formed to provide a mechanism for customers to provide input on product enhancements. This industry participation helps ensure that the Honeywell DCS is not only fit for the purpose of controlling an alumina plant, but also highly optimised for that application.

**Domain Expertise**

Honeywell has hundreds of engineers currently actively involved in alumina refinery automation, some of whom have over 20 years of experience. This represents an unrivalled level of domain expertise in alumina automation, that enables Honeywell not only to correctly implement control of this process, but also to execute it in the most cost-effective manner.

Honeywell is committed to providing the best value for money automation systems for alumina refining throughout the lifecycle of the plant, from a greenfield project through the optimisation of the operations and continuous support. The resultant business benefits provide quantifiable value for money.
Distributed Control System (DCS) Technology

Honeywell offers a broad array of products and solutions that are applicable to— and have effectively been employed in— alumina refining, as illustrated below:

All of these technologies are currently in use within alumina plants across the world. Among these, some which can provide notable benefits are:

**Experion**

The heart of any alumina refinery is the Distributed Control System. Experion DCS is an evolution of the world’s first DCS—the TDC2000—which was first applied to alumina refining in 1978. That same site today runs the Experion DCS, taking full advantage of the latest technologies and advanced control.

**Distributed Server Architecture (DSA)**

An alumina refinery can be thought of as a continuous line where bauxite is fed in at one end, and alumina comes out of the other. In-between there are a number of steps (digestion, clarification, precipitation, calcination, etc.) that operate independently but are at the same time interconnected, with the liquor moving continuously from one stage to the next. In order to optimally run the alumina refinery, each of these unit operations has to be optimised within the larger liquor circuit. This is where the DSA provides significant benefits.

A DSA allows each section to be operated as if with a standalone control system (providing rapid response and narrowing the operator’s focus), while still being a part of a larger control system that covers the entire facility. The total system functions as a single entity (providing maintenance and support benefits, such as a single global database) with a unified overview of all areas, yet with the flexibility of a smaller system. This architecture also means the system can be easily expanded, for example to accommodate a second or third train.

**Integrated Supervisory Control and Data Acquisition (SCADA)**

The main operations of an alumina refinery are contained within the Bayer circuit, where the bauxite is converted into alumina, but there may also be other entirely separate operations such as the bauxite mine or waste mud lakes. These often do not need a sophisticated control system and can be controlled by remote terminal units (RTUs) or by PLCs with a SCADA system. However, the main DCS still needs to be able monitor those operations.

Experion has an integrated SCADA system that allows these separate operations to be monitored (and controlled) from the central system without compromising their independence. This capability enables all of these extra tags to be easily integrated into the main control system.
Universal Input/Output (I/O)
Universal I/O is a standard remote input/output cabinet containing modules whose function (e.g., digital input, digital output, analogue input, analogue output) is software configurable. No field changes are required to modify the configuration of each point. This eliminates the need for patch panels or marshalling boxes between field instruments and the control system.

![Traditional vs. Universal I/O](image)

Universal I/O can result in significant savings (in the order of millions of dollars) during construction. It also eliminates the schedule and cost impact of rewiring to accommodate late changes to the control system.

Collaboration Station
The Collaboration Station is a large-format, multi-touch display for viewing system and plant-wide information and data. It enables high-quality collaboration with personnel in the field or with experts in other locations and is especially useful for facilitating functions such as shift changeovers, operations meetings and troubleshooting, because it provides seamless access to all Experion displays and other business applications that include:

- Enterprise Historians
- Maintenance Systems
- Closed Circuit Television
- Permit to Work
- Production Planning
- Standard Operating Procedures
- Materials Management
- Reporting Systems
One of the world's largest alumina refineries has become an early adopter of this technology, and Honeywell is working closely with them to ensure that benefits are maximised.

**Virtualisation**

Honeywell is a leader in virtualisation, which is the ability to separate hardware and software functions from the actual underlying physical hardware and operating system. Virtualisation is an answer to the business challenges associated with keeping control systems current and maintaining their security within today's open architectures.

The advantages of virtualisation include a reduction in the physical hardware and footprint, along with an improvement to the security of the system. For a greenfield project this also means that hardware only needs to be purchased close to plant start-up and commissioning, which ensures that the hardware is current.

Honeywell's virtualisation solutions are already deployed and playing a critical role in many large alumina operations, as well as being adopted as a standard for new-build projects.

This comprehensive array of alumina-proven control solutions—Experion DCS, integrated SCADA, DSA, Universal I/O, the Collaboration Station, virtualisation, and many others—delivers benefits to refineries through every stage of a project: from start-up and commissioning, to production, maintenance and expansion.
Wireless

Honeywell has contributed to the development of ISA100, which is today the standard for wireless automation. The Honeywell OneWireless™ Network provides a secure multipath mesh network that can be effectively deployed for anything from small systems to large systems involving hundreds of field devices. The OneWireless backbone is being deployed site-wide by many alumina refineries to enable a variety of applications without the cost of wiring. Some capabilities being supported by wireless are:

- Maintenance
  - Continuous Equip Health Monitoring
  - Instrumentation device management
  - Automated Field Rounds

- Research & Development
  - Better pilot study data
  - Remote monitoring

- Production
  - Redundant backup monitoring
  - More Data for Decision Support
  - Operator Rounds

- Technical
  - Sample timestamping
  - Accurate campaign data

- Safety & Security
  - People/Asset Tracking
  - Equipment Protection
  - Leak Detection

- Environmental
  - Emissions Monitoring
  - Tank Spillage

- Engineering
  - Reduced installation cost (non critical I/O)
  - Faster installation

A specific example of these types of applications is a wireless safety shower switch, which Honeywell developed for one of its alumina customers. These switches are self-diagnosing (when needed, they must be guaranteed to work), with a battery life of 10 years. Whenever a safety shower is used, the switch ensures the emergency department is notified immediately and helps them pinpoint the exact location of the employee.

An alumina refinery can have thousands of instruments, many of which are used to directly control the process. However, there can also be up to 40% of the instrumentation that is used for monitoring or other non-critical purposes. Since wiring costs can easily amount to 3 or 4 times the cost of an instrument, for a greenfield alumina refinery this adds up to a significant portion of the project cost. There are thus substantial savings to be made by using wireless instead for non-critical measurements. One Honeywell customer—a large alumina refinery currently under construction—is doing precisely that to fully benefit from the cost-savings of wireless.
Advanced Control

Advanced control has long been used extensively across the hydrocarbon processing industries, and is now also being successfully deployed within alumina refineries. Honeywell has over 15 years of experience in the application of advanced process control (APC) to alumina refining, and its first installed APC has been continuously providing benefits over that period. The world’s largest alumina refinery, Alunorte, has also reported production improvements of over 1% as a result of applying Honeywell’s APC to its digestion unit7.

Profit® Suite—Honeywell’s unified family of advanced control and optimisation applications—is exceptionally well-suited to alumina refining, with over 100 instances of the software today helping to run a score of alumina refineries. Profit Suite addresses every aspect of advanced process control and optimisation—from the predictive control of a digestion unit to the global optimisation of the entire Bayer circuit. Based on a unique layered approach, this advanced process control solution also allows new control objectives and technologies to be added at any time, thereby meeting today’s optimisation needs without compromising opportunities to improve performance in future.

“With Honeywell’s Profit Suite advanced control and optimisation solutions, Rio Tinto Alcan’s Yarwun refinery was able to ramp up production times, check for constraints during normal operation and continuously optimise performance. Our operator load has also been reduced.”

Rudy Tio, Specialist Advanced Control, Rio Tinto Alcan8

Honeywell’s advanced control solutions deliver benefits to all areas of a refinery, with some typical values being:

<table>
<thead>
<tr>
<th>Area</th>
<th>Improvement</th>
<th>Benefit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milling</td>
<td>2% 5%</td>
<td>Throughput</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power saving</td>
</tr>
<tr>
<td>Digestion</td>
<td>1%</td>
<td>Yield improvement</td>
</tr>
<tr>
<td>Evaporation</td>
<td>1%</td>
<td>Digester yield</td>
</tr>
<tr>
<td>Heat Exchange</td>
<td>0.5°C</td>
<td>Precipitator fill temperature reduction</td>
</tr>
<tr>
<td>Calcination</td>
<td>1%</td>
<td>Energy saving</td>
</tr>
<tr>
<td>Mud Washing</td>
<td>1%</td>
<td>Caustic loss</td>
</tr>
<tr>
<td>Liquor Stock Control</td>
<td>2%</td>
<td>Overall circuit throughput</td>
</tr>
</tbody>
</table>

Honeywell is the only control system company to have implemented all these improvements.

Profit Suite helps maintain responsiveness to changing business needs while achieving optimal return, by continually monitoring and controlling the refinery operations, and then optimising unit and global processes. Delivered through the unified Experion Process Knowledge System (PKS) architecture, Profit Suite solutions improve alumina refinery profitability. Benefits are most notable in the control of the bauxite digestion process, but the technology is also proving suitable for other stages such as grinding, calcination and heat interchange. Customers are achieving significant increases in production or yield together with marked improvements in process stability, in typical cases amounting to more than $5 per tonne9.

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7 Robust Multivariable Predictive Control Technology implementation in an alumina digestion unit; Alumina Quality Workshop paper; Batista, Charr & Lopes
8 Case Study: Rio Tinto Alcan Optimizes Production with Honeywell’s Advanced Process Control Solutions
9 Application and benefits of Advanced Control to Alumina Refining; TMM Paper; Jonas
Plant Information Management

Honeywell’s Information Management solutions for alumina include process historians, databases, key performance indicators, and laboratory information systems. With solutions like Uniformance® Process History Database (PHD), an advanced plant historian system that collects, stores and replays critical plant data, alumina refineries can capture and manage large quantities of time-series data for distribution across the enterprise. At the heart of Honeywell’s information management is Intuition Executive, an advanced foundation for enterprise-wide information management, built using a service-oriented architecture approach. This provides the framework for the industry’s most comprehensive suite of Manufacturing Execution System (MES) applications. These solutions provide operations support for all aspects of the daily workflow—meeting every decision-support requirement. Typical alumina refinery applications include:

- Operational Reporting & Visualisation
- Heater Performance Monitoring
- Caustic Management
- Hydrate Tracking
- Liquor Stock Monitoring
- Communications Logs
- Equipment Status Tracking
- Production Analysis
- Task Management
- Target Monitoring
- Key Performance Indicator Management
- Production Loss Accounting
- Inventory Monitoring
- Energy Management
- Production Costing

These information management systems are today collecting and reporting millions of bits of information for alumina refineries globally. They are proving not only critical to operations but also an essential component for management and enterprise reporting.
Safety, Fire and Gas

Plant safety today calls for a comprehensive approach that includes managing operator effectiveness, continual monitoring of distress indicators, applications for personnel tracking and mustering, and ongoing asset monitoring and maintenance for asset health. This type of integrated approach requires understanding not just the link between safety and human error, but also the complex interactions between root causes and interventions by plant systems and personnel. Honeywell’s solutions for plant safety include independent yet interconnected layers of protection for deterring, preventing, detecting and mitigating potential threats.

While safety is paramount in its own right, there is also significant business value to be gained from a reduction in incidents. The Abnormal Situation Management (ASM) consortium is an organisation whose charter it is to set forth systems and methods for preventing incidents. To this end, ASM has defined a tiered structure of protection layers:

Honeywell’s offerings incorporate all these layers of protection, following the established best practice that safety and control systems should be integrated together only to the extent needed to ensure smooth and safe plant operation. In fact, certain dedicated safety-related components, such as the actual safety application, have to be kept segregated from the rest of the system because they must always guarantee high safety integrity and cannot be modified without authorisation.

In addition to a complete range of process-safety products, Honeywell also offers fire detection and addressable reporting through its Fire and Gas Division, which is one of the world’s largest suppliers of fire detection and alarm panels to the commercial market. Further, Honeywell Analytics has a range of personal gas detectors. These products are fully integrated into the Experion system, providing a comprehensive solution that covers every aspect of safety, fire and gas.

Honeywell Life Safety is the global leader in personal protective equipment.

As well as offering all the products necessary to ensure safe operations, Honeywell applies safety-first principles to project execution. For example, one programme with a major alumina producer achieved over one million hours worked without any lost time injuries.
Conclusion

Alumina refineries are complex, capital-intensive operations that require domain-specific knowledge to be automated optimally and effectively. Thanks to its extensive involvement in every aspect of alumina refining over the last 35 years—with millions of hours of project experience—Honeywell is the vendor best-placed to meet those needs over the entire lifecycle of the plant.

During the automation project phase, innovative engineering methods and tools allow alumina projects to be optimally and flexibly executed, commissioned on schedule, and competitively priced. The installed control solutions are all alumina-proven to extract maximum performance from the refining process once the plant is in the operational phase, while maximising safety. They also enable flexibility of upgrade and expansion, ensuring that the automation investment continues to deliver value over the long term.

Honeywell is the only vendor that can offer such a complete array of technologies specifically tailored to the alumina industry. Many of its solutions have in fact been developed and evolved working closely with the leading alumina producers. The Experion DCS, the UniSim simulation environment, and advanced solutions such as Profit Suite and Intuition Executive are all outcomes of this approach, which has led to Honeywell's automation solutions being adopted by the majority of the world’s largest alumina refineries.

“Working with Honeywell under the QUASAR program has enabled Alcoa to consistently exceed all our benefit expectations. What took the combined team five to six years to accomplish would have taken us more than 20 internally. The people are a major factor in the success of this program.”

Dennis Mason, Process Systems Manager, Global Refining, Alcoa Inc.

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10 Case Study: Alcoa and Honeywell Join Forces to Integrate Global Refineries
For More Information
Learn more about how Honeywell’s Alumina Refining Automation Solutions, visit our website [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell account manager.

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