Refining
Capability & Experience
WorleyParsons provides a comprehensive range of refining services developed over 60 years of delivering grassroots, revamp, and expansion projects worldwide. We leverage our experience and knowledge gained from these projects to provide global resources and expertise to our customers in local project delivery.
WorleyParsons delivers engineering, procurement and construction management services for refineries worldwide. From feasibility studies to facility operations, from grassroots refineries to clean fuels revamps, heavy oil upgrades, gasification and sulphur management, WorleyParsons has the resources and capabilities to deliver refining projects in any phase.

In the front-end Select phases of a project, WorleyParsons identifies and evaluates project options that consider the entire lifecycle of an asset. Our focus on strategic viability and long-term business value provides customers with options that optimize outcomes and minimize both technical and nontechnical risk.

In Deliver, our global footprint enables us to employ expertise and knowledge in engineering, procurement and construction management from around the world. Our customers have access to our global best practices and deep local knowledge, while benefiting from our workshare system that leverages our high value project delivery centers to reduce costs and increase project outcome certainty.

In the relationship-based Improve phase, our customers benefit from our unique alliances that employ integrated execution teams and deliver considerable cost and schedule savings compared to conventional project execution methods. Under several umbrella contracts with major petroleum refiners we provide customers with a single source for the resources and technology needed to deliver their sustaining capital programs and meet the complex requirements of the operating refinery.
Capability overview

Clean Fuels Design
WorleyParsons designs solutions to meet clean fuels regulations and government mandates on sulphur, aromatics and oxygen content. Our extensive experience covers both reformulated gasoline and ultra-low sulphur diesel (ULSD) projects. This includes grassroots units and conversion projects for ULSD as well as gasoline fractionation, benzene saturation, catalytic reforming, cat cracker feed hydrotreating, selective hydrogenation units, isomerisation units, butamer units, alkylation units and FCC revamps.

Heavy Oil Upgrading Facilities
We have over 40 years of global experience utilizing our capabilities to deliver heavy oil projects locally. At the forefront of new technology, we have designed heavy oil upgrading facilities for oil gravities ranging from 6˚ to 21˚ API.

Our capabilities and experience in the design of upgrading facilities to produce synthetic crude and finished products has led WorleyParsons to be a leader in providing processing solutions from SAGD and bitumen production for heavy crude oil fields all over the world.

Revamps & Expansion
WorleyParsons’ project execution background includes revamp facility design and expansion of refineries across the globe. As one of the world’s largest project delivery companies, WorleyParsons provides a range of services that includes all aspects of engineering, procurement, and construction management through all phases of a project.
Energy Efficiency & Greenhouse Gas Emissions

Our customers align themselves with WorleyParsons to address the constraints of their currently operating refineries, which were often designed at a time when energy prices were lower and less volatile, and greenhouse gas emissions were of little concern.

WorleyParsons leverages our deep local knowledge while applying global best practices to make existing plant operations more energy efficient and compliant with local regulatory requirements.

Sulphur Management

With a track record extending over 60 years, WorleyParsons is a world leader in sulphur recovery technology. We currently offer more than ten sulphur recovery processes inclusive of those developed in conjunction with partners such as BOC (Linde). These technologies meet the most stringent environmental standards and include standard and oxygen-enriched Claus technology, tail gas treating technology and sulphur degassing.

Atmosphere and Vacuum Distillation

WorleyParsons designs crude and vacuum units and applies the latest in energy optimization strategies to minimize energy consumption and maximize return on investment. We’ve designed more than 100 crude distillation units with capacities ranging from 5,600 to 400,000 BPSD single fractionator designs. Additionally, WorleyParsons is a member of the Fractionation Research Institute (FRI) of which two charter members, Mitch Sakata and Tak Yanagi, from WorleyParsons have developed knowledge transfer resources to develop our new generation of engineers.
Defining the challenges

WorleyParsons manages project risk using a holistic approach that optimizes business decisions where trade-offs exist between technical and nontechnical performance. Understanding that nontechnical risks can pose the biggest challenges in project execution, our team designs with stakeholder commitments in mind while identifying value improvement opportunities.
WorleyParsons’ Select business line is focused on project viability assessment and development. Our specialists support strategic decision making on critical front-end planning issues to meet our customers’ ultimate business objectives.

The complex configuration of refineries brings many challenges to the optimization of refining processes. Our Select services comprise comprehensive pre-feasibility and feasibility studies for all refining process units and support facilities to overcome these challenges, mitigate risk and enhance project outcomes.

The team brings in-depth cross-industry experience to provide technical analysis and decision support during the initial stages of a refinery project, securing the greatest value over the project lifecycle. Additionally, our processes and tools quantify risk and commercial value, enabling our customers to make data-driven decisions with confidence.

WorleyParsons is Technology-Neutral

The technical integrity delivered with our refining projects stems from our technological neutrality. Select is comprised of concept strategy specialists that develop business models and financial analysis prior to FEED. This conceptual review includes the neutral evaluation of technologies, which ensures that the final recommended solution maximizes investment return and underlying confidence.

WorleyParsons’ tools provide decision support based on the objective outcomes of case evaluations.

Concept evaluation is supported by the EcoNomics™ DELTA tool, one of WorleyParsons’ many proprietary data analysis programs, which assigns quantitative values to risks associated with environmental, regulatory, and social issues that can often impede project progress. This internally developed program simplifies and expedites the assessment of complex situations and enables fact-based decision-making in a timely manner. This approach compares multiple technical and nontechnical criteria and assists customers in identifying and selecting the most robust and sustainable project options for the long-term.
WorleyParsons helps our customers succeed in this dynamic and competitive business environment by supplying innovative, cost-effective and safe project solutions.

We’re a leader in delivering these solutions in a way that meets the latest government mandates for clean fuels and exceeds the expectations of our customers around the world.

Our ability to deliver refining projects locally with global resources is driven by our high value project delivery centers in Monrovia, California and London. Through our proven workshare processes, customers around the world have access to the cumulative knowledge gained from over 60 years of EPCM experience, and from our delivery of over 2,100 refining and petrochemicals projects worldwide.

Cost benefits realized through workshare

- **CUSTOMER**: SAUDI ARAMCO
- **PROJECT**: RAS TANURA REFINERY EXPANSION
- **LOCATION**: SAUDI ARABIA
- **PHASE**: IDENTITY

WorleyParsons provided full front-end engineering design (FEED) services for a 400,000 BPD expansion of the Ras Tanura refinery in Saudi Arabia. This project capitalized on WorleyParsons’ extensive refining experience and realized cost benefits from our unique workshare structure, as seen through the support provided by our out-of-Kingdom locations in California and China and in-Kingdom services in Al-Khobar and at the Ras Tanura site.
WorleyParsons can reduce greenhouse gas emissions with an optimized heat exchanger network design.
Maintaining and optimizing existing assets is becoming an increasingly higher priority for refiners as they are affected by new developments for upgrading units and by the introduction of unconventional feedstocks.

Over the last two decades WorleyParsons has been modernizing refineries—enabling customers to maintain plant efficiency, throughput and margins while effectively managing the increasing amounts of sulphur production from generally heavy, sour feedstocks. In all project phases, we focus on the optimization of common critical issues such as budget, schedule, quality, operating reliability and technical integrity.

WorleyParsons provides engineering and project delivery services associated with Syncrude’s portfolio of expense and capital projects. We support project specification and standards, built drawings, information management and construction management activities. The facilities include the mine face and the extraction process through to the refining processes. It also includes facilities, utilities, mine water management and tailings management. During 2011, CoSyn Technology celebrated its 20 year anniversary of the alliance.
Using the knowledge accumulated from over 230 international alliances or long-term contracts, we have developed a culture and a suite of unique tools, systems and delivery methodologies that incorporate industry best practice to drive innovation, efficiency and performance.

This strong, industry-specific knowledge and long track record of success is underpinned by our performance-based, relationship contracting model. The trust that this generates enables WorleyParsons to deliver maximum value to refining customers using local teams, supported both locally and globally.
Previous performance

Voyageur Upgrade Hydrotreater Project
CUSTOMER: SUNCOR
LOCATION: CANADA

The Voyageur Upgrader Project (VUP) encompassed the delivery, upgrading, marketing and infrastructure growth required to increase the total Suncor Oil Sands production capability from 357 KBPCD in 2008 (post Millennium Coker Unit start-up) to 550 KBPCD by 2010 to 2012. WorleyParsons was responsible for the EDS and detail phase engineering and procurement for the Voyageur upgrader UOP hydrotreating units, HTUs (coker gasoil, coker diesel and coker naphtha). The HTUs process all the Voyageur Upgrader delayed coker side streams to reduce product sulphur, nitrogen, and aromatics content. HTU catalyst beds and operations were optimized to obtain 30 months between bed replacements.

Rio de Janeiro’s Petrochemical Complex will be one of the largest industrial undertakings in the history of Petrobras and Brazil with a total investment of US $8.5 billion. Due to come on-stream in 2013, COMPERJ will have the processing capacity for 150,000 bpd of Brazilian heavy oil and will include first, second, and third generation units. This project will require approximately 4,000 major pieces of equipment and in excess of 2,000 P&IDs, and the site plan will take nearly 25 km2 to accommodate infrastructure and process units. Executed from three of WorleyParsons’ global hubs, key challenges successfully overcome included cultural, language, and regulatory barriers, the large size of the project, and the coordination with the many licensors and FEED contractors involved.

WorleyParsons is providing SAMREF with assistance in modifying its Yanbu refinery to comply with 2013 mandatory specifications for gasoline with 10 ppm sulphur, 1% benzene, and diesel with 50 ppm. Diesel with 10 ppm of sulphur will be mandatory by 2016. Phase 1 will start-up 1Q2013 after a refinery turnaround and will install a grassroots desulphurization train to treat 60,000 BPD of FCCU gasoline. The project will also have an extensive brownfield component to revamp the 98,000 BPD distillate hydrotreater, and the refinery utilities infrastructure. Phase 2 will start-up by the end of 2015. The scope may include a new high pressure distillate hydrotreater hydrogen manufacturing, sulphur recovery, and off-sites and utilities infrastructure.
WorleyParsons performed FEED, detailed design, and procurement services for this greenfield/brownfield refinery expansion that added a new grassroots 3,500 tons/day CCR Platformer, a new naphtha splitter, expansion of CDU capacity to 13,000 t/d, facilities to increase naphtha HDS capacity by 1,400 tons/day to 5,400 tons/day, and conversion of an existing semi-Regen platformer to a 1,000 tons/day Par-Isom/de-Isohexaniser isomerization unit (Par-Isom/DIH). The project was executed by teams located in California, New Zealand, and Beijing. A key challenge was integrating new units into the existing process control system while upgrading the brownfield process units.

Through its Integrated Services CME (Construction, Maintenance, and Engineering) Alliance with ExxonMobil, WorleyParsons provides project scoping and development as well as refinery maintenance and EPC delivery of capital projects, including all major shutdowns and turnarounds. On average, 50 projects are completed each year. Facilities included are: Altona refinery, Yarraville tank farm, Williamstown crude receiving wharf, Gellibrand pier, and Somerton jet fuel terminal.

This alliance contract for the Shell Deer Park facilities primarily included a crude oil refinery and olefins complex. WorleyParsons’ services include engineering and design, procurement services, project management, project controls (both off-site and on-site), and construction management. WorleyParsons’ scope ranges from pre-FEED to FEED through detailed design and engineering, and construction phases. The portfolio to date is composed of approximately 70 projects.
Corporate overview

WorleyParsons is a leading global provider of professional services to the resources and energy sectors, and the complex process industries.

We cover the full asset spectrum, both in size and lifecycle, from the creation of new assets to services that sustain and improve operating assets.

Our business has been built by working closely with our customers through long-term relationships, anticipating their needs, and delivering inventive solutions through streamlined, proprietary project delivery systems. Strong growth continues to characterize our performance both through organic development and through strategic acquisition as we strive to provide tailored services wherever our customers need us.

HYDROCARBONS
POWER
MINERALS, METALS & CHEMICALS
INFRASTRUCTURE & ENVIRONMENT

EcoNomics™

EcoNomics™ provides our customers with the systems, technologies and expertise to optimize and balance financial, social, and environmental outcomes, improving sustainability performance while enhancing profit and long-term viability.

WorleyParsons’ vision is to be a leader in sustainability by helping our customers capture new markets and business opportunities created by the new energy economy.

Zero Harm is our corporate vision for health, safety and the environment (HSE).

We are committed to our vision and apply it to all operations, at all times, in all locations, and at all levels of responsibility. We will actively work to align our expectations and behaviors to achieve Zero Harm in our dedication to continuous improvement. These expectations are reflected in our integrity management framework, OneWay™, and linked to our global systems and procedures.
Arctic & Cold Climate
WorleyParsons and INTECSEA are world leaders in design and construction of oil and gas production facilities located in remote, hostile environments. Innovative solutions are required to solve unique challenges associated with projects, above and below the ice.

Floating Production Systems
WorleyParsons, jointly with INTECSEA, leads in the design of TLPs, SPARs and semi-submersibles. With more than 30 years of experience in this industry, the floating production systems team has been responsible for many achievements and the development of some important leading techniques.

Gas Processing
WorleyParsons has designed and built more than 400 gas processing plants around the world. Locations have ranged from deserts of the Middle East, the jungles of South-east Asia to the Arctic regions of Canada.

Heavy Oil & Oil Sands
As the world's oil resource is getting heavier, producers worldwide must find production solutions for heavy oil and in-situ bitumen production. WorleyParsons is a leader in this area with nearly 40 years of experience.

INTECSEA (Deepwater)
INTECSEA is a global company within the WorleyParsons Group and combines all the group's capabilities for offshore pipelines, subsea production, marine production risers and floating production systems.

LNG
WorleyParsons' track record in LNG/FLNG production and regasification extends from evaluation studies and concept technology selection, through FEED and detailed engineering, procurement and construction management for greenfield and brownfield developments.

Offshore Topsides
WorleyParsons offers customers a full service solution in a range of speciality areas, including subsea production, offshore pipelines, marine production risers, full insurance and floating production systems including all types of deepwater hulls, tendon and mooring systems.

Onshore Developments
With much of the world’s easy to produce oil already recovered, WorleyParsons increasingly assists customers on projects employing a range of secondary and tertiary enhanced oil recovery techniques.

Petrochemicals
With expertise gained over 600 project in over 30 countries, our experience covers the manufacture or processing of over 65 types of chemicals and petrochemicals.

Pipeline Systems
WorleyParsons' dedicated Pipeline and Terminals group operates from centers of expertise in onshore pipelines, compressor and metering stations, geomatics and SCADA systems.

Sulphur Technology
Our sulphur recovery units account for approximately 60% of the world’s production of recovered sulphur. These facilities include the world's largest single-train units and apply processes developed and patented by WorleyParsons.

Unconventional Oil & Gas
WorleyParsons is developing solutions to the unique logistical challenges associated with unconventional hydrocarbons projects across the globe.
Refining
Capability & Experience

For further information about our global capability, email:
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