VEPICA DOWNSTREAM EXPERIENCE

1	05/24/2021	UPDATED EXPERIENCE	R. PESSE	J. NUTT	J. NUTT
0	09/08/2020	ISSUED FOR USE	R. PESSE	J. NUTT	J. NUTT
REV	**DATE**	**REVISION DESCRIPTION**	**BY**	**REVIEWED**	**APPROVED**

1.0 EXPERIENCE

1.1. Refinery and Petrochemical engineering

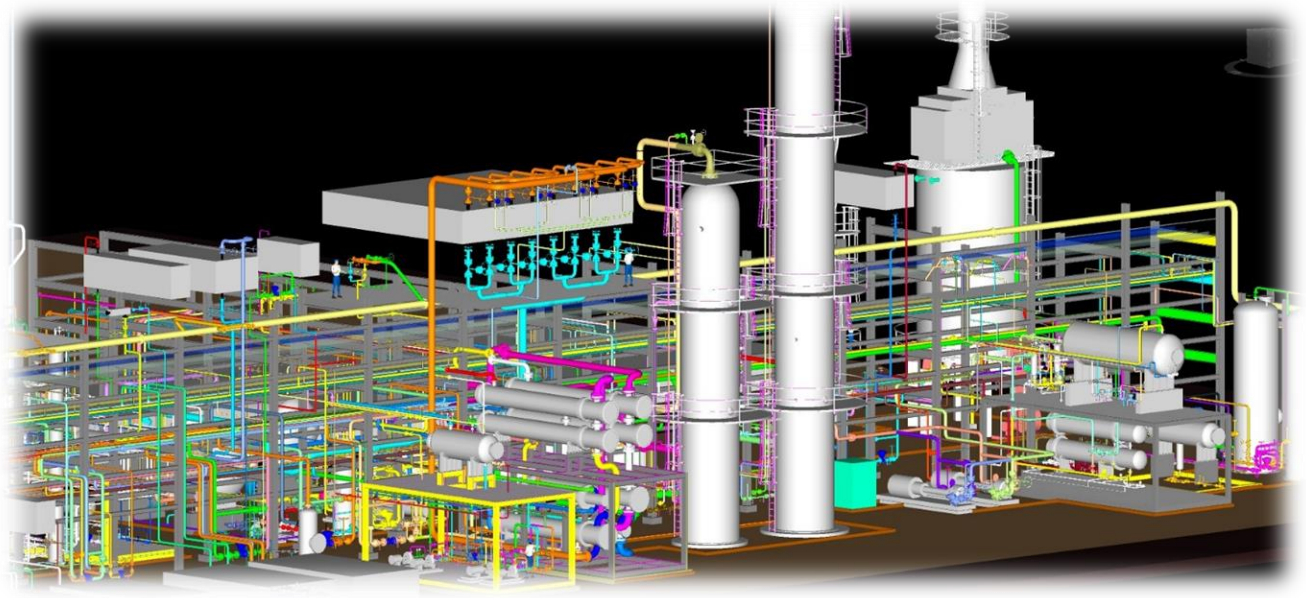
During its 48 years in business **VEPICA** has developed a significant number of Refinery and Petrochemical project. Some of the most relevant projects include:

- GMF Texas International Terminal Redesign and Completion
- 6,500 BPD Flagship 1 HPU, Texas
- Tier III Gasoline Compliance Project, Louisiana
- 55,000 BPD Davis Refinery, North Dakota
- 25,000 BPD Crude Fractionation Unit, Texas
- 60,000 BPD Santa Ines Refinery, Venezuela
- Lázaro Cárdenas FCC and HDD Units, Mexico
- Rabigh Development, Saudi Arabia
- Lujan del Cuyo HDS Unit, Argentina
- ULSD Unit, Oklahoma
- Pto. La Cruz Refinery Expansion, Venezuela
- Cerro Negro Crude Upgrader, Venezuela

Details on the SOW and the facilities is included next.

Project Name	**GMF Texas International Terminal Redesign and Completion**		
Client	DRL Engineering / Texas International Terminal		
Location	Texas, USA		
Year completed	Ongoing		
Scope of Work	FEED / Detail Engineering		
Description	Redesign to a Crude Distillation Unit to achieve design capacity of 50,000 BPD (incorrect original design only achieved 30,000 BPD) and adapt it to a wider range of feedstock. Includes redesign of main towers as well as replacement and addition of equipment. Project also includes the completion and optimization of the OSBL and Tank Farm design.		
Units / Qty / Capacity	Crude Distillation Unit	1	50,000 bpd
	Tank Farm		

Project Name	**FLAGSHIP 1 Renewable Diesel HPU**		
Client	Steamboat Fuel LLC		
Location	Texas, USA		
Year completed	2019		
Scope of Work	FEED		
Description	Grassroot 6,500 BPSD Renewable Diesel Plant. Includes Hydro Processing Unit to process feedstock ranging from 0%-100% of any combination of distillers' grade corn oil, soy oil and grease to obtain Mogas Blend Naphtha, and renewable diesel as Ultra Low Sulfur Diesel (ULSD). The project includes some utilities and CCM, Control Room and Administrative buildings.		
Units / Qty / Capacity	Renewable Diesel Hydrotreater	1	6,500 bpd

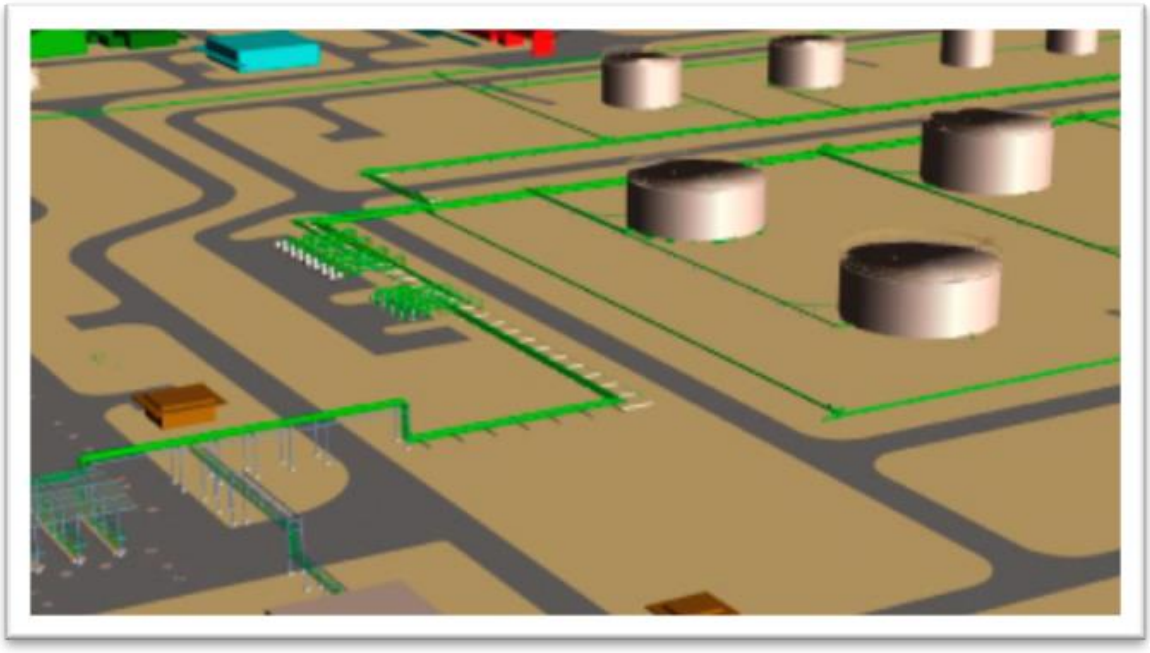


Project Name	**TIER III Gasoline Compliance Project**		
Client	CITGO Lake Charles Refinery		
Location	Louisiana, USA		
Year completed	2018		
Scope of Work	Detail Design		
Description	The scope of this project is modifying the Lake Charles Refinery Treating Plant regeneration section to improve sulfur removal from the caustic stream which improves sulfur removal in the straight run C4/C5 stream. Modifications include isolating the straight run C4/C5 treaters to a single regeneration train and modifying only one of the two regeneration trains. The specific works performed include: • Replacement of Fiberfilm bundles on existing caustic extractors for treating SRF / Unicracker C4/C5 streams. • Repipe existing equipment • Modification of existing equipment and addition of new equipment for Caustic Regeneration System. • Installation of a new Incinerator Package for process the off gas stream from the new Regeneration system. Project objective is compliance with the Tier III regulation to reduce sulfur in finished gasoline to a Companywide annual average of 10 ppm.		
Units / Qty / Capacity			

Project Name	**DAVIS REFINERY**		
Client	Meridian Energy Group		
Location	North Dakota, USA		
Year completed	2015		
Scope of Work	Engineering Studies, Pre-FEED		
Description	Engineering studies to define the design basis, costs and schedule for the Davis Refinery, a 55,000 BPSD high-conversion crude oil refinery to be constructed in southwestern North Dakota to serve Bakken crude oil producers and local liquid fuels and chemicals markets. Upon completion of these studies, Meridian, with **VEPICA**'s support, completed its permitting and approval requirements.		
Units / Qty / Capacity	Atmospheric Distillation Unit	2	27,500 bpd
	Vacuum Distillation Unit	1	26,000 bpd
	Naphtha Hydrotreater	1	8,500 bpd
	LSR Naphtha Merox	1	5,000 bpd
	Kero / Jet Merox	1	7,500 bpd
	iC4 Merox	1	1,400 bpd
	Butane Isomerization	1	1,400 bpd
	HF Alkylation	1	2,400 bpd
	Catalytic Reformer #2	1	3,000 bpd
	Catalytic Reformer #3	1	7,000 bpd
	Gasoline Merox	1	7,700 bpd
	Diesel Hydrotreater	1	8,750 bpd
	FCC Feed Pretreater	1	13,000 bpd
	Fluid Catalytic Cracking (FCC)	1	13,000 bpd
	C3/ C4 Merox Unit	1	2,276 bpd
	Hydrogen Unit	1	8 MMSCFD
	Sulfur Unit	1	48.6 USLTPD
	Amine Unit	1	13 MMSCFD

Project Name	**CRUDE FRACTIONATION FACILITIES**		
Client	BASIC Equipment / Petromax Ref. – Sunoco Logistics		
Location	Texas, USA		
Year completed	2015		
Scope of Work	FEED / Detail Engineering		
Description	Design of highly modularized new Crude Fractionation facilities to process 25,000 BSPD of light crude (API 38.2° or API 45.8°). The facilities handle single crude streams or a combination of these two feed stocks mixed at any ratio.		
Units / Qty / Capacity	Atmospheric Distillation Unit	1	25,000 bpd

Project Name	**SANTA INÉS REFINERY**		
Client	PDVSA		
Location	Barinas State, Venezuela		
Year completed	2010		
Scope of Work	Conceptual and Basic Engineering		
Description	Design of a grassroot 60,000 BPSD capacity refinery for processing Guafita crude (24 - 28.8 °API) to produce gasoline (regular and premium), diesel, jet fuel (A-1), LPG, fuel oil and asphalt.		
Units / Qty / Capacity	Atmospheric Distillation Unit	1	60,000 BPSD
	Vacuum Distillation unit	1	31,900 BPSD
	Naphtha Hydrotreating Unit	1	5,600 BPSD
	Catalytic Reforming Unit (CCR)	1	5,500 BPSD
	Diesel Hydrotreating Unit	1	16,300 BPSD
	Kerosene Treatment Unit	1	7,000 BPSD
	VGO Hydrotreating Unit	1	20,550 BPSD
	Fluid Catalytic Cracking Unit	1	17,300 BPSD
	Asphalt Blowing	1	3,100 BPSD
	Sulphur Recovery & Tail gas treatment	1	46 t/d
	PSA	1	26,200 Nm3/h
	Amine Regeneration (MDEA 40% wt)	1	51 m3/h
	Sour water Stripper	1	43 m3/h
	LPG Treatment Unit	1	900 BPSD
	Sulfur Handling	1	46 t/d
	Steam Methane Reforming	1	13,100 Nm3/h
	Gas Plant Unit	1	1,100 BPSD
	Utilities: Water/air/vapor/fuel gas/nitrogen	1	60,000 BPSD
	Truck loading area		
	Offsites		



Project Name	**FCC & DIESEL HYDRODESULFURIZATION UNITS**		
Client	Dragados Industrial / PEMEX		
Location	Veracruz State, Mexico		
Year completed	2007		
Scope of Work	Basic Engineering Review, Detail Design, Procurement Assistance		
Description	100% responsibility on design including the following scope: • Verification of the FCC KBR basic design and validation of IMP basic design for HDS • Smart P&ID's • PDS intelligent three-dimensional model • RFQ's and technical evaluations for all equipment and project materials • Drawings and specifications AFC for all disciplines • Bulk material MTO's • Vendor drawings expediting, review, approval & control, using project wise.		
Units / Qty / Capacity	FCC Unit - (Orthoflow Cracking Technology)	1	42,000 BPSD
	Diesel Hydrotreating Unit - (IMP and Exxon technology).	1	34,000 BPSD
	Merichem TIOLEX & MERICAT Tech	1	133 M3/HR
	C4 Isomerization Units	1	65,000 BPSD

Project Name	**RABIGH DEVELOPMENT**		
Client	Tecnicas Reunidas		
Location			
Year completed	2010		
Scope of Work	Basic and Detail Engineering		
Description	The project consisted of a fully integrated world class refinery and petrochemical complex to be built at Rabigh by Rabigh Co., Saudi Aramco and Sumitomo Chemical Co., Ltd. PHASE I: Open Book Estimate phase (OBE) developed by Tecnicas Reunidas with **VEPICA**'s support. PHASE II: Detailed Engineering: This work was completely done at **VEPICA**'s home offices, based on a basic engineering developed by Foster Wheeler Energy Ltd and pre-work developed by TR during the OBE phase.		
Units / Qty / Capacity	Amine Units	1	450 M3/HR
	Amine Units	1	56 M3/HR
	Sour Water Stripping Units	1	178 M3/ HR
	Sour Water Stripping Units	1	141 M3/HR

Project Name	**HDS UNIT IN LUJÁN DEL CUYO INDUSTRIAL COMPLEX**		
Client	REPSOL YPF		
Location	Mendoza, Argentina		
Year completed	2006		
Scope of Work	Basic Engineering		
Description	Basic engineering of the following units at the Repsol YPF refinery (105.500 bbl/d)		
Units / Qty / Capacity	New gasoil hydrodesulfurization unit (UOP)	1	
	Revamp of the existing gasoil hydrodesulfurization unit (ExxonMobil)	1	
	Amine Unit	1	
	Steam Reformer (TOPSOE)	1	
	Sour Water Stripping Unit	1	
	Sub-Station	1	
	OSBL		

Project Name	**ULTRA LOW SULFUR DIESEL (ULSD)**		
Client	BE&K / Valero Energy Corporation		
Location	**Oklahoma, USA**		
Year completed	2005		
Scope of Work	Basic and Detailed engineering, Procurement services		
Description	Review of the basic engineering Cost estimation and control Procurement assistance and material control QA/QC Safety activities during detailed engineering (HAZOP) Process detailed engineering (P&DI, hydraulics, and instrumentation) Equipment, piping, civil structural, electrical and instrumentation engineering Equipment design HVAC fire-fighting system, and architecture		
Units / Qty / Capacity	Ultra-Low Sulphur Diesel	1	11,900 BPSD

Project Name	**STREAMS VALORIZATION (VALCOR)**		
Client	OPERADORA CERRO NEGRO (MOBILE / PDVSA)		
Location	Pto. La Cruz Refinery, Anzoategui State, Venezuela		
Year completed	2004		
Scope of Work	EPC		
Description	EPC contract in consortium with two Japanese companies (JGC and Chiyoda). This project included engineering, procurement, construction, commissioning and start-up of the new process units for the revamp and the expansion of the Puerto La Cruz Refinery. **VEPICA**'s scope of work included: • Detailed design in 3D PDS for all project units • Local procurement • Supervision of Construction and commissioning		
Units / Qty / Capacity	Sulfur Unit	2	100 MTPD (ea)
	Amine Unit	1	604 MSCFH
	Sour Water Stripping Unit	1	260 GPM
	CCR UNIT	1	35,000 BPSD
	Diesel Hydrotreating Unit	1	38,000 BPSD
	Naphtha Hydrotreating Unit	1	35,000 BPSD
	Flare	1	
	Cooling Water	1	
	Interconnecting Pipe Racks		
	Sub-Stations	2	
	Satelite Control Room	1	

Project Name	**CERRO NEGRO UPGRADER**		
Client	PDVSA		
Location	Jose Industrial Complex, Anzoategui State, Venezuela		
Year completed	2001		
Scope of Work	EPC		
Description	EPC contract for upgrading 122 MBPSD of 8.2º API extra heavy crude oil to 110 MBPSD of 15.2º API upgraded crude, including a 3 MM BBLS tank farm, developed in consortium with a Japanese company (JGC) as the leading partner. **VEPICA**'s scope of work included: Detailed design in 3D PDS for a naphtha hydrotreater (6,500 BPSD), a hydrogen purification plant, utilities and offsite Local procurement of 53 pieces of equipment and bulk Construction supervision and support, commissioning and start-up support.		
Units / Qty / Capacity	Sulfur Unit	1	115 MTPD (ea)
	Amine Unit	1	681 GPM
	Sour Water Stripping Unit	1	300 GPM
	Naphtha Hydrotreating Unit	1	6500 BPSD
	Delayed Coker Unit	1	48000 BPSD
	Tank Farm		
	Flare		
	Utilities		
	Admin Buildings		
	Sub Stations		
	Control Room