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Creole Petroleum Corporation.

Welcome to Amuay.

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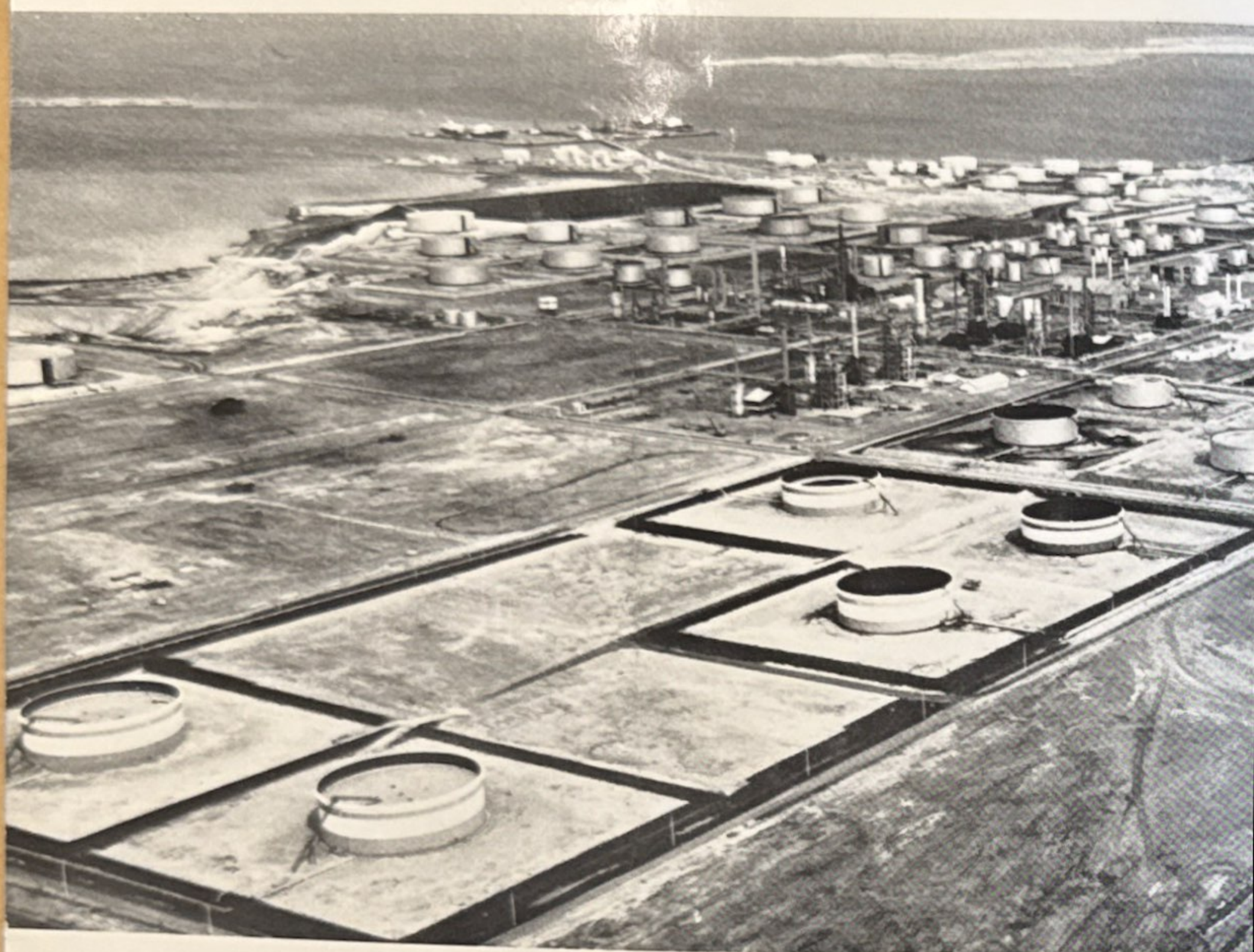
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Creole Petroleum Corporation

**Welcome
to
AMUAY**





Creole Petroleum Corporation

Welcome to

cop. 1



AMUAY





Creole is happy to welcome you as a visitor to our Amuay refinery because it gives us the opportunity to show you through one of the largest and most modern oil refining installations in the world.

We share with the Venezuelan nation a feeling of pride at the achievement represented by the industrial complex you are visiting. Only a little more than 15 years ago the refinery area was nothing but sand and brush — a desert waste. Our refinery and that of Shell, located four and a half miles from here at Punta Cardón, offer tangible evidence of the tremendous strides taken by Venezuela in this region in its economic and industrial development of the past 15 years.

Construction of the refinery began in 1946, just after the war. It went "on stream", i. e., it began to process crude oil, in January, 1950. At that time its capacity was 60,000 barrels a day. Today this capacity is 406,000 barrels. There is a saying in the oil business that you never finish building a refinery, and this has certainly been true in the case of Amuay.



Artist's Map
of Amuay

- | | |
|--------------------------|-----------------------------|
| 1. Pipestills | 11. Pipelines terminal |
| 2. Hydroformer | 12. Secondary oil separator |
| 3. Hydrofiner | 13. Main office building |
| 4. Lube Oil plant | 14. Refinery office |
| 5. Asphalt plant | 15. Laboratory |
| 6. Steel tanks | 16. Isopentane tower |
| 7. Fuel oil storage pits | 17. Naphtha fractionator |
| 8. Port installations | 18. Judibana community |
| 9. Power plant | 19. Shopping center |
| 10. Warehouse and shops | 20. Service station |

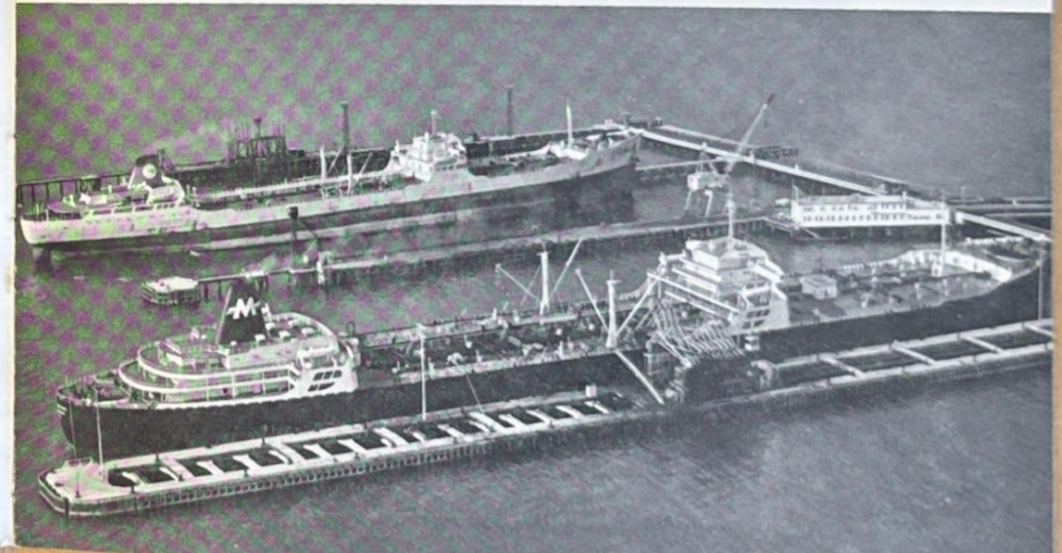
Your Visit to the Refinery

A large industrial installation like the refinery offers a great many things to see. In case you are unable to get around to all the more important features, this booklet covers them all for you. It also contains the major facts and figures about the refinery.

Like many other aspects of the oil industry, refineries operate 24 hours a day. If you can arrange your visit so that you can get a night view of our plant, you will enjoy a rewarding experience. Seen from a distance after the sun goes down, it takes on a fairy-land quality, with its towers and superstructure festooned with twinkling lights. A night view of a refinery is perhaps as close as the oil industry ever comes to looking romantic.

In its operation, however, the refinery is far from romantic. The oil industry is highly competitive, and refining is perhaps the most competitive of all its functions. Consequently, in order to show a profit, the refinery must be highly efficient. It must keep abreast of and utilize all the latest techniques and equipment if it is to remain competitive. Much of the oil industry's considerable research program is dedicated to finding new refining methods and to developing new and better products from the crude oil that is refining's raw material.

To do all this requires substantial capital investment. Creole's investment here at Amuay, at the end of 1962, stood at about \$ 223 million.



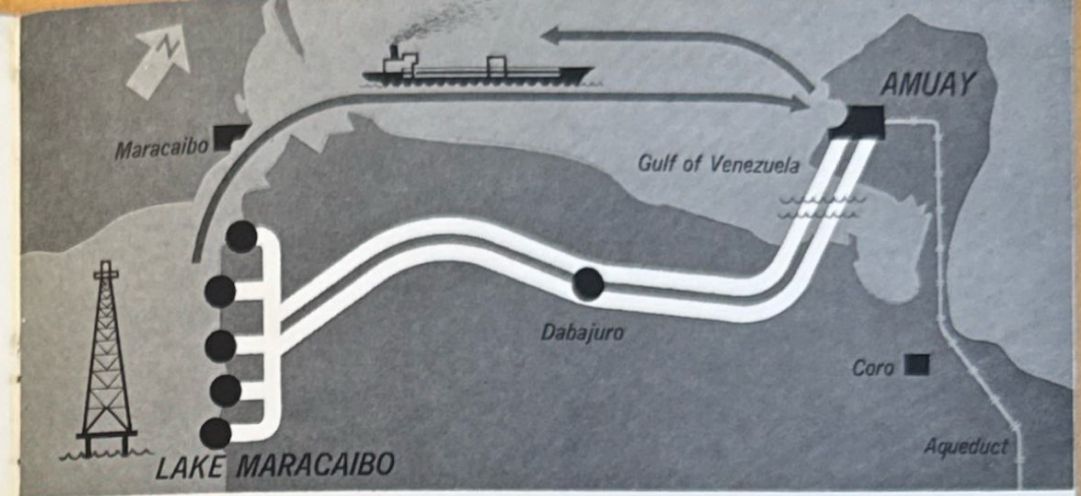
Artist's Map of Amuay

1. Pipestills
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18. Service Station
19. Isopentane Tower
20. Naphtha Fractionator

As a result of these expenditures, the company has in operation a complete refining plant, and large terminal, storage and dock facilities. It is also assisting substantially in the construction of a housing development where there was nothing before.

Air Conditioning: Courtesy of Nature

These installations are located on the west coast of the Paraguaná peninsula, a roughly rectangular area, 45 miles from north to south and 30 miles from east to west, which is connected to the mainland of Venezuela by a straight, narrow isthmus 30 miles in length. As you will have noticed, the wind blows most of the time, and a good thing it is, too. The westerly trade winds, are nature's air conditioning for the peninsula. Without the breezes, the heat would be oppressive.



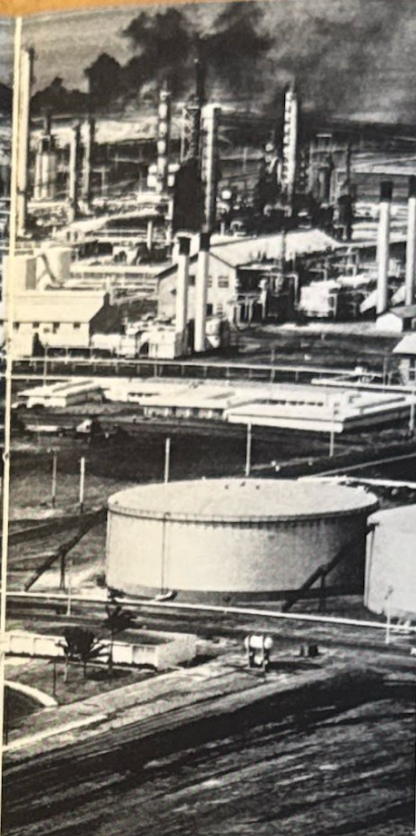
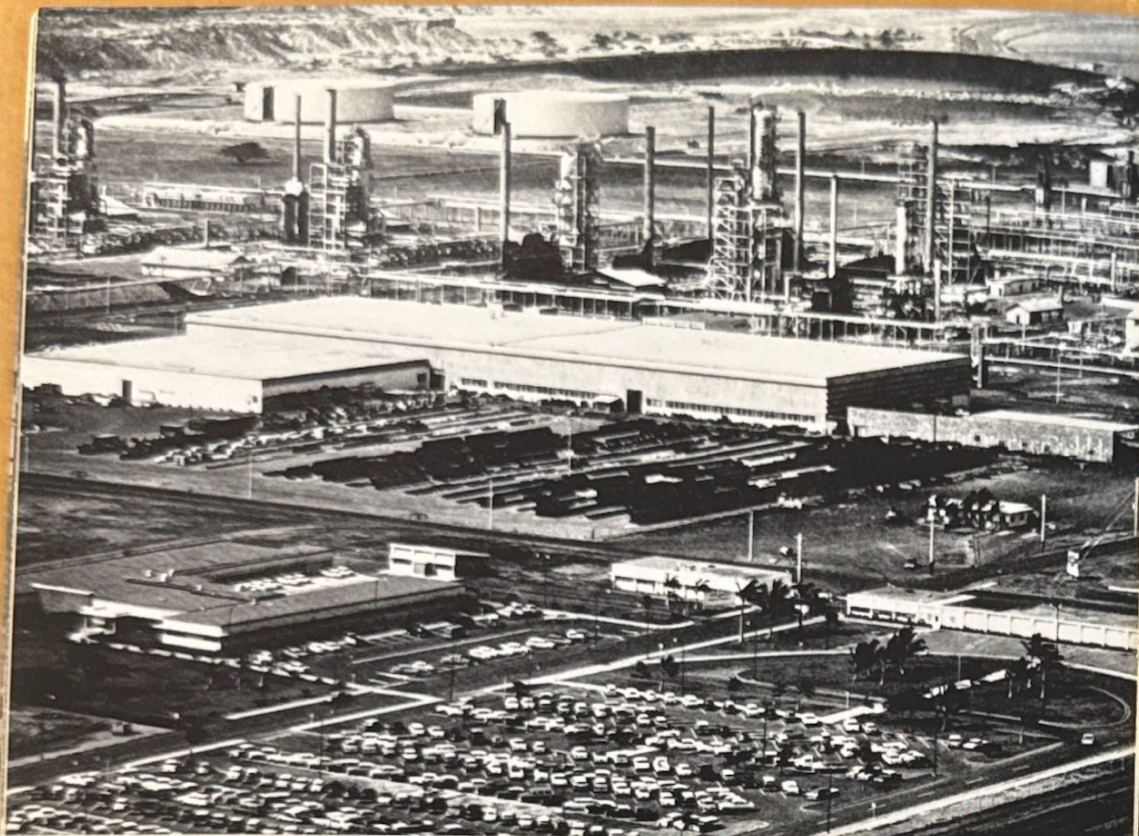
Although not a complex refinery, Amuay produces a wide variety of products, ranging from asphalt to jet fuel and it has the largest throughput of any refinery in South America.

No oil is produced on the Paraguaná peninsula, although many attempts have been made to find it here. All the oil received by the refinery comes from Creole's wells in the fabulous Lake Maracaibo basin, one of the most prolific oil producing areas of the world. Approximately 525,000 barrels are received daily through twin 26-inch pipelines which carry the crude 143 miles from the eastern shore of the lake to Amuay.

The older of the two lines has a capacity of about 300,000 barrels a day. Crude oil transported by this line starts its journey at Ulé, where powerful pumps force it through the line. At the mid-way point, at a place called Dabajuro, there is a "booster" pumping station which provides the motive power for the second half of the journey. The newer line carries about 225,000 barrels a day. It has no "booster" station.

The lines are laid directly on the ground, except for water and road crossings. They pass through dense jungles, swamps and semi-arid desert regions. At the point where they leave the mainland, they go under water for a distance of 15 miles across the Gulf of Venezuela.

When the crude oil reaches the refinery, it goes into storage. There it is measured carefully and is then either sent into the re-



Approximately two-thirds of the crude oil that reaches Amuay each day—more than 525,000 barrels, all told—is processed by the refinery. Fuel oil, aviation and motor gasoline, jet fuel, kerosene, Varsol, gas oil, diesel fuel, asphalt and lubricating oils are produced here. The remaining crude oil received each day is shipped to foreign markets as crude.

finery itself, or is placed directly aboard tankers, still in the form of crude oil, for shipment to foreign markets. Storage facilities are extremely important in a refinery. Amuay is able to store some 33 million barrels of crude and products.

The Refining Units

The refinery processes approximately two-thirds of the crude oil it receives and ships out the rest. The proportion that is refined and shipped as products has increased steadily through the year as the refinery expansion program has been carried out.

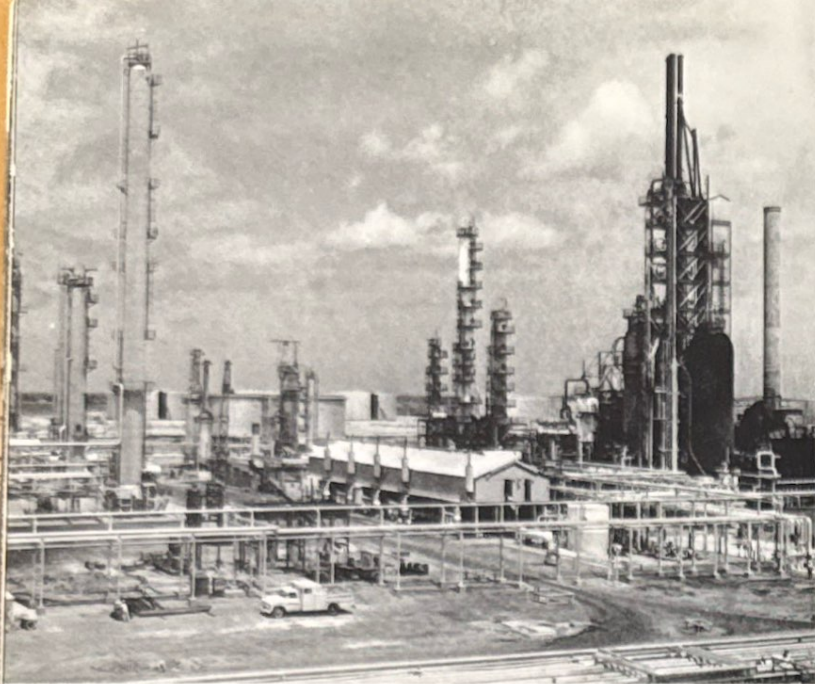
Let's consider first the crude oil that is processed here and the equipment used for that purpose.

The main pieces of equipment are the four pipestills. Their essential function is to heat the oil and distill it into different products.

Another important piece of equipment is the fluid hydroformer, with a capacity of 13,000 barrels daily, which turns out high octane aviation gasoline, motor gasoline and some other products. The hydroformer, built in 1956, involves one of the newest refining technical processes developed. It is the only one of its kind in Latin America.

In 1958 two important units were added to the refinery. One was a hydrofiner, not to be confused with the hydroformer. Its function is to improve the quality of diesel fuels. The other was a 900 barrels daily lubricating oil plant. It produces enough lubricating oils to satisfy most of the demand in Venezuela.

The refinery also has two naphtha fractionators, the second of which was installed in 1959 to increase the quantity of products for feeding the hydroformer.



This is the hydro-former, one of the most important technical advances in the refining field.



The lube plant, as it is called by the refiners, has a capacity of 900 barrels a day and produces 104 types of lubricating oils.

Also in 1959, the highest tower in the refinery was installed, the isopentane fractionator. This 200-foot unit greatly improves the quality of the light naphtha.

Finally, in the lineup of basic refining equipment, is the asphalt plant, which has turned out most of the asphalt used to pave Venezuela's roads. Up until 1956, it was the only asphalt plant in the country. Since that time, two other plants producing asphalt have gone into operation in Venezuela.

From this assembly of equipment, the refinery turns out the following products:

Three types of motor gasoline, three of aviation (high octane) gasolines, two types of jet fuel, kerosene, Varsol (a cleaning fluid), gas oils, diesel oils, asphalts, lube oils, and fuel oil.

After these products have been manufactured, they must be stored until they can be shipped. Of the refinery's 33 million barrels storage capacity, there is room for 13 million barrels in large steel tanks, of the type to be found in any refinery. Most of these tanks can hold 150,000 barrels, but recently four tanks capable of storing 266,000 barrels each, were put into service. Each tank is surrounded, as you will notice, by a dike that is high enough to contain all the oil the tank holds in case of fire.

The remaining 20 million barrels of storage capacity at Amuay consists of two great pits dug in the earth, one large enough to hold over 8.5 million and the other 11.5 million barrels of fuel oil. Creole is not the first oil company to try open air storage of oil or products, but a combination of circumstances has permitted these to function more successfully than any others. For one thing, the climate makes it unnecessary to provide a roof, which has proved a tough problem in other reservoirs of this kind. For another, the soil where the reservoirs have been built contains a clay that is almost impermeable, providing an ideal lining for the pits that prevents seepage loss. Rain water that falls on the contents of the pits is easily drained off.

Open Air Storage

The pits were built to store fuel oil because of the great fluctuation in demand for this product. They are filled during the slack season (summer) and are emptied at the periods of high



Thirteen million barrels of crude oil and products can be stored in Amuay's installations of traditional steel tanks.

demand (fall and winter). If it were not for them, and other storage facilities, refinery operations and production of crude oil would have to fluctuate with the demand. Their addition to the Amuay facilities makes possible a greater uniformity in both basic functions. The first open air reservoir was built in 1955 and enlarged in 1962, the second in 1956. The cost of the earthen reservoirs is a fraction of that of steel tankage of similar capacity.

We have now gotten the oil through the refinery and into storage, ready for shipment. To handle this important phase of its business, Creole has constructed a modern port installation of pumping units, an automatic tanker loading system and four piers, capable of handling most of the larger tankers now being increasingly employed in the movement of oil. About 130,000 barrels of the total of 525,000 received daily is shipped out almost immediately as crude oil. The remainder goes through the refining process and is shipped out as products.

The Amuay docking facilities handle an average of 130 tankers and two dry cargo vessels a month. The latter bring in supplies

Twenty million barrels of fuel oil can be stored in the two open air tanks seen in the foreground and at the center. A smaller pit between them is used to filter sea water that has been used in refining processes.



and equipment needed in the operation of the refinery and some general cargo as well.

An average of 525,000 barrels daily of crude oil and products is shipped across the Amuay docks. Eight tankers can load simultaneously at the four piers. More than 1 million barrels of crude and products have been shipped in one day during the refinery's busiest periods. Recent expansion work in the dock area includes construction of the fourth pier and extension of the three existing piers, plus dredging of the harbor to a depth of 41 feet to permit larger vessels to enter.

Other Installations

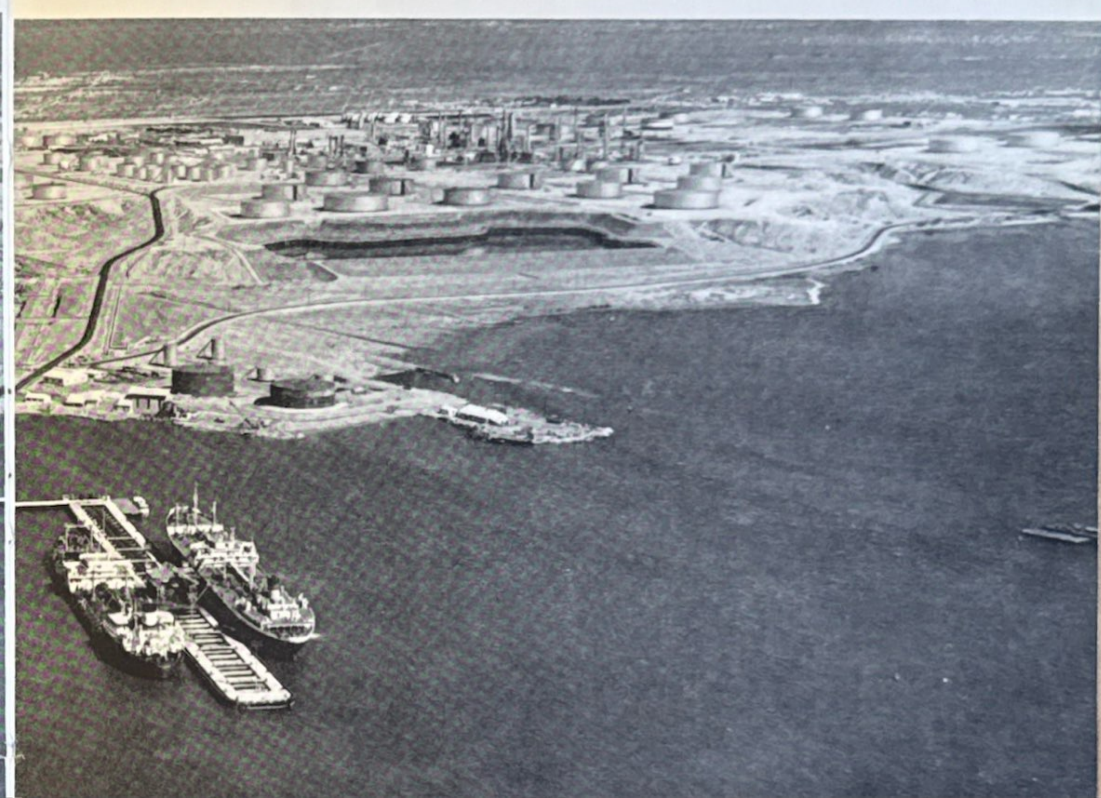
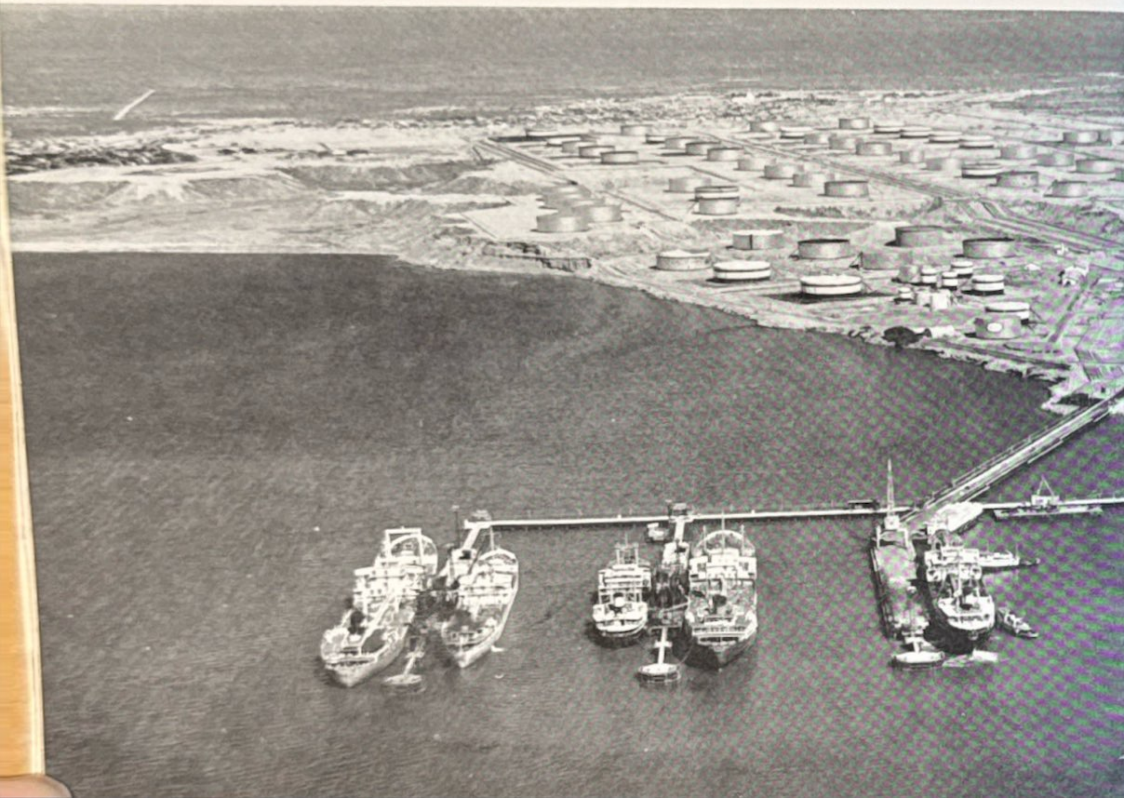
These are the main features of the refinery "per se". But there are many other installations needed to back up the refining operations.

For instance, water. There is plenty of water right at hand, of course, but it is sea water, and great quantities of fresh water were needed. So Creole, together with the Venezuelan govern-

ment and Shell, built a 30-inch pipeline to bring fresh water from the mountains near Coro on the mainland, 70 miles away. This joint project cost \$ 13 million. It brings about 180,000 barrels of water daily to the two refineries (Amuay and Punta Cardón) and to the surrounding communities. A water purification plant is part of this installation. The provision of a fresh water supply has been a substantial contribution to the development of the entire area.

In addition, the refinery uses water from the sea for industrial purposes. This water, in the amount of about 55,000 gallons per minute, is used for cooling and is drawn from the sea by five pumps through two 48-inch lines. After it has been used, it is passed through an oil separator and is returned to the sea.

Electric power for the refinery and for the residential areas is provided by a plant that generates 37,500 kilowatts. This plant also furnishes the great quantities of steam used in refining processes.





Lubricating oils are packaged at the lube plant's warehouse, ready for sale to the consumer. This plant meets most Venezuela's lube oil needs.

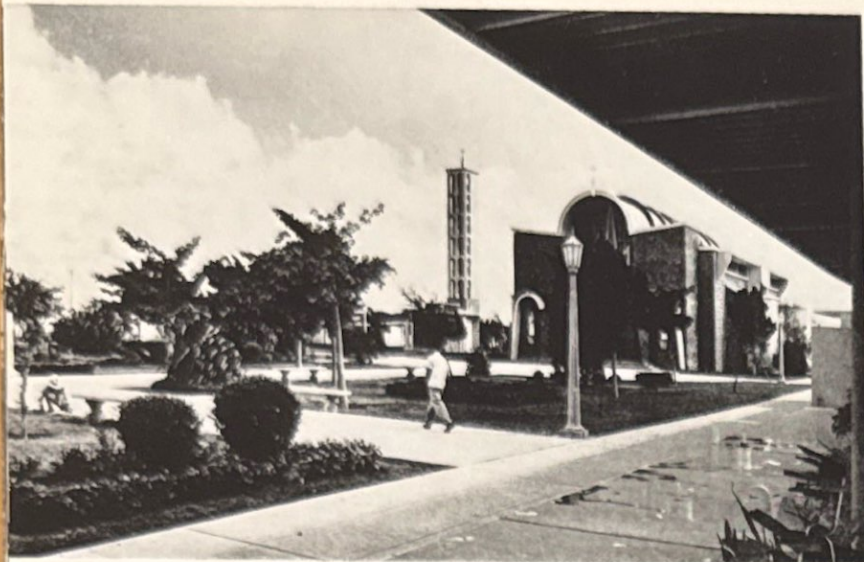
All equipment in the refinery is serviced and maintained at the mechanical shop. If any piece of machinery breaks down, or needs a new part, it is repaired by this shop. The craft skills developed by shop personnel in its 13 years of operation are typical of the manpower training carried out by the company at Amuay. They are on a par with those of the most advanced industrial areas in the U. S.

There is one more important part of the Amuay story. That is the program of the Company to develop an open community where refinery workers and non-refinery people can live together as in any self-sustaining town.

New Departure

When Creole began operations in Venezuela, it was necessary to build paternalistic camps where workers were cared for in "cradle-to-grave" style. This resulted from the fact that oil was found in remote areas, far from any established population centers. All community services were provided by the company. The camps were fenced in, isolated from surrounding areas.





The religious center is one of the modern buildings on the Plaza of Judibana, the new open community near the refinery.



Plaza Bolívar is the center of "downtown" Judibana, adding beauty to this business, religious and entertainment center.

This pattern was deliberately avoided at Amuay. The company felt that all concerned would be served better by a policy that it calls "Community Development." The objective is either to merge the old camps with the communities that have grown up around them, or, as in the case of Amuay, to start from scratch to develop an open community which is continuously growing. Workers are encouraged to participate, with financial assistance from the Company, in building their own homes. Private enterprise now performs many of the services that the Company had to perform in earlier years at other Creole installations. The goal is to eliminate the old-style camp in which workers formerly lived.

The residential area near the refinery where this program has been carried out is called Judibana. Here there is found a modern shopping center that includes a supermarket, banks, a drug store, a soda fountain, a motel, a 700-seat air-conditioned theater, an attractive restaurant and a variety of other small businesses. There is also a modern religious center. And at the center of this area is the garden-like Plaza Bolívar.

Judibana boasts a dual-curriculum school where both the North American and the Venezuelan curriculums are offered and two Venezuelan curriculum schools which, although built by Creole, are operated by the Salesian Order and are open to the public. Social clubs and an athletic stadium complete the community.

As we said at the start of this pamphlet, we are happy that you could be our guest, and we hope your stay with us has been interesting and pleasant. Taking our cue from the Spanish language, we won't say good-bye but "hasta luego" and we hope to see you again.

BASIC INFORMATION

CAPACITY OF THE REFINERY:

406,000 b/d.

NUMBER OF EMPLOYEES:

1,600, approximately.

EXPORTED IN 1962:

459,000 b/d (crude and products).

RECORD SHIPMENT IN ONE DAY:

More than 1 million barrels.

INVESTMENT:

\$ 223 million (\$ 140,000 per employee).

PRINCIPAL PRODUCTS:

Motor and aviation gasolines, jet fuel, asphalt, diesel oils, gas-oil, lubricating oils, kerosene, fuel oil.

PRINCIPAL REFINING UNITS:

- 4 pipe stills.
- 1 hydroformer.
- 1 asphalt plant.
- 1 hydrofiner.
- 1 lubricating oil plant.
- 2 naphtha fractionators.
- 1 isopentane tower.

SOURCE OF ENERGY:

- 1 electric plant which also generates steam.

SUPPLY OF CRUDE OIL:

Two 26-inch pipelines from Lake Maracaibo which move 525,000 b/d.

STORAGE CAPACITY:

33 million barrels (20 million in earthen pits, 13 million in steel tankage).

WATER SUPPLY:

Water wells and springs in Siburúa, and San Antonio, 70 miles from the refinery; water for industrial purposes is taken directly from the sea.

MAINTENANCE OF EQUIPMENT:

A modern maintenance and construction organization with completely equipped shops and warehouses maintains all facilities.

PORT FACILITIES:

Docking and loading facilities to handle up to eight large tankers at a time. An average of 130 tankers and 2 dry cargo vessels is handled monthly. Loading rates of as high as 47,000 barrels per hour have been attained.

ECONOMIC IMPORTANCE TO AREA:

More than \$ 19 million in wages, salaries, benefits, local purchases and other expenditures were pumped into the economic stream of the Paraguaná area during 1962.







