BUREAU OF ECONOMIC RESEARCH (*USVIBER*)

U.S. Virgin Islands Economic Impact:

Closing of Limetree Bay Refinery

OFFICE OF THE GOVERNOR
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BACKGROUND

Limetree Bay Terminals LLC, an oil storage terminal and marine facility, is located on approximately 1,500 acres along the south shore of St. Croix, U.S. Virgin Islands (USVI). The facility consists of Limetree Bay Refinery (LBR) with a processing capacity of more than 200,000 barrels per day (BPD) of crude oil, and Limetree Bay Terminal (LBT), a 34-million-barrel crude and petroleum products storage and marine terminal facility. The LBT site also includes ownership, access control and use of adjoining seaport and monobuoy for unloading and loading of refinery and terminal products.

For more than 50 years, oil refinery has been a significant part of the USVI industrial economy. In 1966, the Hess Oil & Chemical Corporation (Hess Oil) constructed a 45,000 barrel per day refinery on St. Croix. The Hess Oil Virgin Islands Corporation (HOVIC) refinery expanded to 650,000 barrels per day by 1974, making it one of the world's largest refinery and petrochemical plants and one of the largest suppliers of crude oil and products to the U.S.

In 1998, Amerada Hess Corporation, the parent company of HOVIC, and Venezuela's state-owned Petróleos de Venezuela, S.A. (PDVSA) formed a joint venture. They renamed the facility HOVENSA, which acquired ownership and operational control of the HOVIC facility.

On January 18, 2012, HOVENSA announced that it would permanently shut down its refinery on St. Croix and ceased all refining and processing operations on February 17, 2012. New refining capacity in emerging markets and the global economic slowdown were cited as reasons for closing the refinery that had losses of $1.3 billion in its last 3 years of operation. The closure required an agreement from the USVI government to terminate a concession agreement with the owners. Negotiations led to HOVENSA agreeing to a sale process and the owners operating the Site as a storage terminal.

On September 15, 2015, HOVENSA filed a voluntary petition for relief under Chapter 11 of the United States Bankruptcy Code in the District Court of the Virgin Islands, Bankruptcy Division. As part of the bankruptcy process, an auction of HOVENSA's assets resulted in a sale of all terminal assets and above-ground refinery assets located at the Site. The Asset Purchase Agreement (APA) was executed on January 4, 2016. As a party to the APA, ArcLight Capital Partners LLC affiliate Limetree Bay Holdings LLC became the owner and operator of all terminal assets and above-ground refinery assets of the St. Croix facility.

In 2018, Limetree Bay announced an approximately $1.6 billion funding plan to restart the idled refinery, which began operations in February 2021. The refinery in May was forced to halt operations following emissions that assertedly included air pollutants and oil droplets release. LBR filed for Chapter 11 bankruptcy on July 21, 2021, following the announcement that it intended to end refining operations due to financial and regulatory constraints, thereby terminating nearly 300 workers at its refinery, effective September 19, 2021. The parent operations company expects to continue operations at its oil storage terminal, LBT.

EXECUTIVE SUMMARY

In the following analysis, we estimate the likely economic losses that would attend the shutdown of the Limetree Bay (LBR) directly through its operations and multiplier effects in other industry sectors.

This analysis is limited in scope to the economic impact generated by the LBR in the form of employment, spending, and tax payments. It does not capture any effects attributed to any negative externalities associated with the oil refinery activities on neighboring communities.

Notably, the shutdown of LBR will likely result in the direct loss of high-wage jobs and tax receipts for the local governments. LBR directly employs a total of 300 workers and 300 contractors in 2020, based on company data. The average yearly wage of employees at LBR is $143,000, which is substantially above-average earnings of USVI's full-year full-time workers ($48,000).

The LBR creates economic impact well beyond the refinery, as it supports additional jobs through local revenue and supply chain activity associated with its operations. As those employed directly by LBR and in the supply chain spend their wages, jobs are supported in the broader economy in industries such as construction, retail, and business service establishments. The ripple effects of the closure will likely result in additional employment, income, and tax revenue losses in those sectors.

ECONOMIC CONTRIBUTIONS OF LBR TO THE U.S. VIRGIN ISLANDS COMMUNITY

Estimates of the economic contributions of the oil sector are summarized in Table 1. The findings indicate that the LBR substantially impacted the territory's employment, income, spending, and tax revenues. Considering the direct and multiplier effects, LBR supported a total 800 jobs, $112 million in wages, $1.8 billion in sales, and $633 million of USVI gross domestic product (GDP).

LOCAL TAXES AND FEES

Beyond these economic effects, local government received an estimated $25 million in tax revenues from the activities of businesses and workers. This total included $19.7 million in individual income tax, $4.6 million in gross receipts, and $ 0.8 million in trade and excise taxes (see Table 2).

CHARITABLE CONTRIBUTIONS AND OTHER IMPACTS

The oil company also made charitable contributions of $300,000 to non-profit organizations for causes in St. Croix and granted $237,000 in university scholarships to various community causes in 2020. These economic and fiscal benefits would be eliminated with the shutdown of the refinery's operations.

In sum, the total annual economic and fiscal losses of closing LBR is estimated as:

- 800 lost jobs
- $112 million foregone labor earnings in wages and salaries
- $633 million reduction in value added or gross domestic product
- $1.8 billion loss in economic activity
- $25 million lower annual government tax revenues.

ECONOMIC IMPACT OF LIMETREE BAY OIL REFINERY CLOSING

In this section, we estimate the economic contribution of the LBR operation, including through activity it enabled elsewhere in the broader economy. The impact assessment intends to construct a plausible profile of gross economic impacts that would likely result from the refinery closure. This economic impact estimates are for 2020, the most recent year for which data are available.

The analysis is limited in scope to the economic impacts in terms of employment (number of full-time–equivalent jobs), labor income (wages and salary for those jobs), gross value-added (GDP), gross output (sales or receipts), and government revenues that would be lost with the petroleum refinery closing.

In describing our results, we quantify the oil sector's impacts across three core channels of economic activity to distinguish LBR's direct impact, those of its supply chain, and the broader impacts as its employees and suppliers spend their wages in the economy. The three channels are defined as follows:

- **Direct:** The activity attributable directly to LBR's operations (the jobs, wages, and output of the refinery itself).
- **Indirect:** The jobs, wages, and value-added contributions that are supported through LBR's supply chain.
- **Induced:** The economic benefits resulting from household spending of labor income of LBR employees and suppliers and their employees.

The sum of these three effects yields an estimate of the total local economic impact that results from the oil refinery closure.

We have utilized a customized IMPLAN1 Input-Output (I-O) based model of the USVI economy to simulate a permanent decrease of refinery employment and measure the resulting changes in total territory employment, labor income, value-added, and output. Economic "multipliers"2 estimated from local input-output models are then applied to the direct effects to estimate total economic impact.

Local multipliers are based on changes in employment, wages, and output that have historically resulted from changes in economic activity. An underlying assumption of this analysis is that the multipliers implied by the input-output model apply to LBR as well. This assumption allows us to analyze the local-level economic impacts based on operating expenditures and the number of jobs, income, and economic activity that would have accrued had the LBR continued to operate.

[1] MPLAN (Impact Analysis for Planning) is a social accounting and impact analysis tool (www.IMPLAN.com).
[2] Multiplier is defined as the ratio of total change to the initial change.

TOTAL ECONOMIC IMPACTS

In bringing together the direct, indirect, and induced impacts in Table 1, we estimate the oil refinery sector's total economic contribution; thus, the potential economic losses expected to be caused by the closure of the LBR. The industry supported a total of 800 jobs, $112 million in labor income or wages and salaries, $633 million GDP contribution, and $1.8 billion in output or sales in the economy, directly and through the supply chain and worker spending multiplier effects.

The totals include direct effects of 600 jobs, $86 million in labor income, $610 million in GDP, and $1.7 billion in output attributable to the refinery itself. The totals also include about 200 jobs, $26 million in wages, $23 million in value added, $97 million in output attributable to businesses supplying goods and services to the refinery as well as spending by households of the refinery's employees and its contractors (the indirect and induced impacts).

Table 1
Total Economic Impact (Direct + Multiplier) of Limetree Bay Refinery Closing

Type of Impact	Employment	Labor Income ($)	Value Added ($)	Output ($)
Direct Impact	-600	-85,800,000	-610,200,000	-1,743,428,571
Multiplier effects:				
- Indirect	-31	-2,090,709	-4,339,449	-9,474,668
- Induced	-169	-24,154,029	-18,298,659	-87,685,621
Total Impact	**-800**	**-112,044,738**	**-632,838,108**	**-1,840,588,861**

Source: USVIBER; IMPLAN

EXAMINING BROADER IMPACTS IN THE ECONOMY

While the oil refinery directly made a substantial economic contribution, it played an arguably valuable role in supporting many jobs, income, and business sales elsewhere in the economy through the supply chain activities and household spending of earned income. We explore those impacts in more detail below.

EMPLOYMENT

Overall, an estimated 800 territorial jobs were effectively dependent on the refinery, as previously noted. Besides the refinery workers, consideration must also be given to the large supply chain of workers who were involved with the petroleum industry in a variety of sectors, including but not limited to construction, transportation, wholesale and retail, restaurants, and other services. About 31 jobs were supported from business-to-business transactions, and 169 jobs were supported by the household spending generated by LBR operations. These industries may suffer employment losses due to the closing of the oil refinery.

LABOR INCOME

The associated labor income directly attributed to the refinery is estimated to be $86 million, and $26 million of wage payments are attributable to businesses and households supported by the oil refinery. Thus, the shutdown could result in over $112 million less in employment income in the economy because of job loss.

VALUE-ADDED

Value-added measures an industry's contribution to gross domestic product (GDP). It includes the total value of income generated from production, employee compensation, proprietors' income, payments to government (taxes), and profit or return on investment.

The refinery's activity generated a total of $633 million in value-added to the territory's economy. Approximately $610 million of this contribution is attributable to the operations of the LBR directly, and $23 million of indirect and induced GDP generated from suppliers and workers' household spending due to economic activity generated by the refinery. The total GDP associated with LBR represented 15 percent of the $4 billion USVI economy that will be lost as a result of the shut-down of the refinery.

OUTPUT

Gross output is a measure of sales or revenue from the production and can be characterized as the market value of the goods or services the industry sells. Direct output is estimated at $1.7 billion. Because of the indirect and induced business transactions resulting from local purchases by the refinery and its vendors and household spending in the economy, the petroleum industry's total supply chain impact was approximately $1.8 billion in receipts that would be forgone.

TAXES AND FEES

The LBR is generally exempt from local taxes. However, spending tied to jobs indirectly and induced related to the refinery's operations resulted in tax revenues for the local government. We estimate an impact of $25 million from individual income taxes, gross receipts, and trade and excise taxes directly, indirectly, and induced from the activities and spending of other taxpayers and suppliers (see Table 2).

Table 2
Local Taxes Paid by LBR Refinery ($ Millions)

Tax Category	Total
Individual Income Tax	-19.7
Gross Receipts	-4.6
Trade and Excise	-0.8
Total	-25.1

CHARITABLE GIVING AND OTHER IMPACTS

The oil refinery also made charitable contributions to entities in the local community. The oil company made charitable contributions of $300,000 to non-profit organizations for causes in St. Croix and granted $237,000 in university scholarships.

CONCLUSION

This impact analysis brings together a compelling account of the economic contribution of LBR and summarizes the potential impacts that the shutdown could have on the USVI economy. As such, we express the impacts in terms of loss of aggregate annual jobs, wages and salaries, GDP, output, and government revenue.

The cost of the LBR closure would likely be about 800 jobs, $112 million in wages, $633 million in GDP, $1.8 million in gross output, and $25 million in local tax revenues.

LBR closure will impact many industries, including transportation, maintenance and repair, construction, engineering services, retail and wholesale trade, manufacturing, real estate, and business services. The more significant of these impacts will be on St. Croix, where most workers and some suppliers reside. However, these are transitory impacts, wherein in the long run, the interaction of economic productivity of the workforce, capital investments, and policy will determine the overall health of the U.S. Virgin Islands' economy.

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