Brownfields on the Horizon
Without adequate financial assurances for clean-up, oil refineries present long term environmental justice hazards

Abandoned oil facility in southern California. Photo by Beau Stanton.

By

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There are currently 124 active oil refineries in the United States with an operating capacity of roughly 17.7 million barrels per day. As the transition away from fossil fuels accelerates, careful planning is needed to ensure that these facilities don’t degrade and become more dangerous as they continue to operate or become abandoned toxic brownfields that saddle future generations with long term environmental hazards and enormous clean-up costs. As part of its Fossil Fuel Risk Bond Program, Center for Sustainable Economy and its partners have been advocating for state and local governments to take a hard look at what financial resources owners have set aside for compensating victims and repairing damage when

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catastrophic accidents occur and for dismantling, removing, and restoring sites to their natural condition (DRR) to prepare the ground for beneficial land uses in the future. In this policy note, CSE compiled data from federal, state, and local agencies to determine the adequacy of financial assurance mechanisms for a sample of 10 active or recently closed oil refineries in four states and found that funding for DRR activities and accidents are far below what is needed.

Oil refineries present long term environmental justice hazards

Like many hazardous facilities, oil refineries in the US and elsewhere have had a disproportionate effect on communities of color and those least able to afford to live beyond the reach of their fumes, contaminated water, and blast zones in the event of a catastrophic accident. In 2020, for example, thirteen U.S. oil refineries released the potent carcinogen benzene at levels high enough to require action under federal law. Roughly 60 percent of the people living near the 13 refineries are people of color and residents living near refineries are several times more likely to have incomes below the poverty line than the U.S. average according to a recent report from the Environmental Integrity Project.²

In addition to the location of oil refineries, EPA penalties for violations of the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act have been shown to be applied to oil refineries unevenly. For example, research has found that the mean penalty served to oil refineries in majority-Black census tracts was significantly lower than the mean penalty in majority-white census tracts, and the same was true for low-income census tracts versus high-income census tracts.³

And in addition to everyday pollution, oil refineries can have accidents such as spills and explosions that can result in injury and death of workers and massive pollution over a short period of time. For example, both have occurred at the Chevron-owned oil refinery in Richmond, California. Among other incidents, in August 2012, a fire at the refinery sent

15,000 area residents to the hospital and in February 2021, between 500 and 750 gallons of oil spilled into the nearby bay according to local news reports.

When oil refineries are closed, risks of catastrophic accidents are reduced but the hazardous materials and infrastructure left behind will pose ongoing risks to neighboring communities until it is removed. As such, federal, state and local public agencies with jurisdiction over these facilities would do well to ensure that once closed, a sufficient amount of funds are readily available for an orderly but speedy DRR process to be completed.

Public agencies have ample authority to require that these costs be internalized

Federal, state, and local public agencies all have authority to require that owners of major industrial facilities - including refineries - post bonds or take out other forms of financial assurance to ensure that taxpayers are not left on the hook for the costs of decommissioning or clean up and recovery following an accident. For fossil fuel infrastructure, potential taxpayer liability is enormous.

For example, the price tag for restoration of the now defunct Philadelphia Energy Solutions (PES) refinery site may end up costing over $1 billion to deal with asbestos contamination and the demolition and removal of 3,000 tanks and vessels and more than 100 buildings and other infrastructure. Given that the responsible corporation is now in bankruptcy, it is unclear who will foot this bill. Taxpayers will no doubt bear a hefty share.

As another example, the US Department of Transportation estimates that the public damages from oil and gas pipelines has been nearly $1.4 billion since 2005, and for the most part, companies are not required to pay any of these costs, especially if they occur outside of the navigable waters of the US. As such, it is important to understand exactly what types and amounts of financial assurances are in place for all major fossil fuel infrastructure types and identify regulatory gaps that need to be filled to reduce taxpayer risk and incentivize orderly but rapid dismantling of fossil fuel infrastructure when it is no longer needed.

But financial assurances for accidents or abandonment fall far below what’s needed

To get a sense of what financial assurances are available for the nation’s oil refineries, CSE conducted an analysis of refineries located in Pennsylvania, California and Washington and queried federal, state, and local public officials to gain access to any and all public information available. Unfortunately, there is no single source of information about financial

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assurance requirements for these facilities, so the process is somewhat cumbersome and requires piecing together data from various federal, state, and local sources.

The most accessible federal database is one managed by the US EPA. The EPA oversees financial assurance requirements related to the Resource Conservation and Recovery Act (RCRA), which requires all hazardous waste treatment, storage and disposal facilities (TSDFs) to demonstrate that they will have the financial resources to properly close the facility or unit when its operational life is over or provide the appropriate emergency response in the case of an accidental release. Oil refineries, by themselves, are not considered TSDFs. But there are several refinery components that could qualify depending on the level of contamination, such as onsite storage tanks, pipelines, waste disposal sites, waste treatment facilities, and combustion units that emit volatile organic compounds (VOCs). EPA’s financial assurance database includes information on what companies expect to pay to remove and clean up these components, what they have set aside to do so, what form of financial assurances they are using, and what resources they will have to cover the costs of accidents.

The second source of information CSE used to assess the adequacy of financial assurance mechanisms for refineries was the state agencies that are charged with implementing RCRA requirements. EPA has delegated this implementation authority to the states but does retain the ultimate responsibility for enforcement. In Washington, the responsible agency is the Washington State Department of Ecology, through its Hazardous Waste and Toxics Reduction Program. In California, it is the Department of Toxic Substances Control, and in Pennsylvania it is the Department of Environmental Protection by way of the Hazardous Waste Program. CSE interviewed staff involved with the RCRA financial assurance programs and compiled their data. Some of these data included financial assurance requirements related to requirements other than RCRA.

For example, in California, financial assurances may be required as part of several regulatory programs, including those related to disposal of solid waste, which may apply to refinery operations. As another example, most states have been delegated authority under federal underground storage tank (UST) regulations to require financial assurances for petroleum storage facilities.

The third source was local land use authorities. While rare, financial assurances may be required as part of the land use permitting programs of counties, cities, port authorities, and other local agencies. CSE contacted and interviewed county officials to determine whether


\[8\] Cal. Code Regs. Tit. 27, § 22205.

there were any financial assurances they had issued with respect to refineries under their jurisdictions.

The results are presented in the table below. For the ten active refineries in California, Pennsylvania, and Washington the table reports the financial assurance data available from state agencies and the EPA. For the state data, financial assurance data is broken out into three categories: liability for accidents, closure and decommissioning costs, and post-closure care to ensure that long term hazards are monitored and addressed after the facilities are closed. For the EPA data, facilities have provided a cost estimate based on what they believe it will actually cost to remediate the RCRA-related components at the refineries as well as the face value (maximum payout value) of the financial assurance mechanism they have chosen. The type of mechanism is listed as well, which include corporate guarantees (CG), insurance (I), letters of credit (LC), and surety bonds (SB). So, for example, for the Martinez Refinery in California, the state has evidence of $24.8 million in financial assurance on file to cover accident liability, closure, and post-closure costs. The EPA indicates that about $8 million of this is related to the RCRA-related components. All of this is provided by an insurance policy.

<table>
<thead>
<tr>
<th>Financial assurance (FA) data</th>
<th>Select oil refineries in California, Pennsylvania and Washington</th>
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<tbody>
<tr>
<td><strong>California facilities</strong></td>
<td>Financial assurance data (state)</td>
</tr>
<tr>
<td>Current Owner</td>
<td>Liability</td>
</tr>
<tr>
<td>El Segundo Refinery</td>
<td>Chevron USA, Inc $8,000,000</td>
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<tr>
<td>Richmond Refinery</td>
<td>Chevron USA, Inc $8,000,000</td>
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<tr>
<td>Carson Refinery</td>
<td>Phillips 66 $8,000,000</td>
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<tr>
<td>Wilmington Refinery</td>
<td>Phillips 66 $8,000,000</td>
</tr>
<tr>
<td>Martinez Refinery</td>
<td>Shell Oil Co. $16,000,000</td>
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</tbody>
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| **Pennsylvania facilities**  | Financial assurance data (state) | Financial assurance data (EPA) |
| Current Owner                | Liability | Closure | Post-Closure | Cost | Face value | Mechanism |
| Philadelphia Refinery        | PES &M LLC - | - | - | $50,000,000 | $135,000,000 | I |
| Marcus Hook Refinery         | Sunoco - | - | - | $448,363 | $448,363 | LC |

| **Washington facilities**    | Financial assurance data (state) | Financial assurance data (EPA) |
| Current Owner                | Liability | Closure | Post-Closure | Cost | Face value | Mechanism |
| Ferndale Refinery            | Phillips 66 $20,000,000 | $114,687 | - | $10,000,000 | $240,033,982 | CG |
| Puget Sound Refinery         | Holly Frontier $10,000,000 | $394,937 | $2,898,479 | $7,054,971 | $9,162,300 | SB, I |
| Anacortes Refinery           | Tesoro-Marathon - | $188,691 | - | $188,691 | $117,074,416 | CG |

How adequate are these requirements? First of all, there has been much critique of mechanisms like self bonding, self insurance, and corporate guarantees since these financial assurances often don’t survive bankruptcies and even corporate mergers and acquisitions. They are also much harder for public agencies to monitor, since they require sifting through the complexities of corporate financial records to verify their existence and amount. Often they are just lines on bookkeeping spreadsheets, and not much more. Insurance policies, surety bonds, and letters of credit have more weight and are considered safer bets. So with respect to the sampled refineries, six out of ten reply on corporate guarantees. The other

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three involve one or more of the other, safer mechanisms. If this sample is reflective of other refineries, it means that most liability for accidents and DRR is not backed by any reliable financial assurance mechanism.

If we accept that corporate guarantees are likely to be honored, then three of the refineries appear to have adequate financial assurances on hand to cover the costs of significant, but not worst-case scenario accidents and perhaps a share of DRR costs. These include the Philadelphia refinery ($135 million), the Anacortes Refinery ($117 million) and the Ferndale Refinery ($240 million). The remaining refineries have extremely low levels of financial assurance on hand relative to what is needed for major accidents and for adequate DRR.

Fortunately, catastrophic accidents at refineries have been rare, but when they have occurred, economic damages have run into the hundreds of millions if not billions. For example, according to the United States Chemical Safety and Hazard Investigation Board (CSB) the August 6, 2012, explosion at the Chevron Richmond Refinery in Richmond caused more than 15,000 injuries. It cost nearly $450 million, including $2 million in fines and restitution, and led to a $447 million in gas price increases. The March 23, 2005, explosion at the BP Texas City Refinery in Texas City, Texas killed 15 workers and injured 180 more. Financial losses in the incident totaled $1.5 billion.\(^\text{11}\)

With respect to DRR, a general rule of thumb is that what it costs to completely dismantle and clean up a major industrial facility is roughly equivalent to or at least a significant share of what it costs to construct it, if not more (since cleaning up hazardous wastes involves much more than simple disposal). For nuclear facilities, DRR estimates are significantly higher than construction costs for this very reason.\(^\text{12}\) Refineries also suffer from contamination, and so using construction costs is a conservative approach. Currently, construction costs for a medium-sized oil refinery run into the billions. In Canada, a recent cost benefit analysis of new bitumen refineries estimates construction time to run between 5 and 7 years at a cost of $7-10 billion.\(^\text{13}\) Other global estimates for petroleum, including ones in the US, are similar.

Given this, the amount of financial assurance available for DRR at the refineries we considered is nowhere near what is really needed for full dismantling and removal of infrastructure and a full remediation of the site to prepare for beneficial land uses in the future. While there are requirements for closure and post-closure financial assurances under RCRA and other federal and state statutes, it is clear that the scope of these requirements is extremely limited.

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\(^\text{13}\) Canadian Energy Research Institute, 2014. Refining Bitumen: Costs, Benefits, and Analysis. Study #15. Calgary: CERI.
**Fossil Fuel Risk Bond programs offer a solution**

Since 2016 CSE and its partners have been promoting the idea of Fossil Fuel Risk Bond programs that states, counties, and local jurisdictions can use to force owners of fossil fuel infrastructure to put up real, verifiable funds for DRR, the costs of accidents, and the costs of climate change. With respect to DRR, there are already laws on the books for oil and gas wells, including offshore facilities. In Alaska, for example, the state’s Department of Natural Resources recently updated its DRR regulations for oil and gas wells to be based on actual decommissioning costs rather than just a generic fee, which was previously set at a rate far below what was needed. In Montana, and somewhat ironically, the oil and gas industry was successful in getting legislation passed requiring solar and wind installations to post bonds for DRR. There is no reason why this concept cannot be applied to oil refineries as well.

As with these existing programs, each refinery would first need to submit a credible plan and cost estimate for full DRR, and then demonstrate that it has, on hand, the funds needed to carry out those activities. Self bonding, self insurance, and corporate guarantees would be excluded since they are unreliable and drive up the costs of monitoring compliance. Trust funds, letters of credit, and surety or performance bonds should be used instead. Taking this step now for the 124 active refineries in the US would be a major step forward towards reducing the risk that these hazardous facilities become brownfields that saddle future generations with the enormous costs of clean up and decontamination.

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15 See 20 AAC 25.025 for the most recent bonding regulations.