

PETROLEUM IN SOUTH AFRICA 2003

1. THE SHELL/BP REFINERY

The SAPREF refinery, located on the coast of South Africa south of Durban, began its operations in the 1960s. Today, it is the largest crude oil refinery in South Africa, capable of processing over 185,000 barrels a day, and employing a total of 1,150 staff and contract workers. In addition to the refinery proper, there are also seven pipelines radiating out from the refinery in various directions. The Island View tank terminal, north of the refinery at Durban Harbor, is directly connected to the refinery via pipelines, and includes a number of big aboveground storage tanks as well as its own internal network of pipelines. Island View is also a servicing terminal for merchant ships which use SAPREF bunker fuel. For most of its history the SAPREF refinery and associated facilities have pretty much operated on their own, without stringent government oversight. Apartheid-era laws gave many South African companies a free hand, with little environmental accountability. Since the 1960s, there have undoubtedly been spills and accidents at these facilities, but few have been publicly documented. In the 1990s, however, some refinery accidents and pollution have been documented.

In May 1998, an explosion and fire occurred at the refinery due to a failure at the alkylation unit. The explosion was heard several kilometers away and the fire was fought for more than six hours. No injuries were reported at the time, but an estimated five tons of hydrogen fluoride (HF), a highly dangerous substance, were released. HF is used as a catalyst in the alkylation's process, but it is highly reactive and dangerous as hydrofluoric acid. Acute exposure through inhalation causes extreme irritation of the respiratory tract that can be fatal. Ingestion causes tissue death in the esophagus and stomach and results in burning pain, nausea, vomiting, diarrhea, circulatory collapse, and death. Skin contact with the liquid or vapor causes severe burns, and contact with the eyes results in permanent eye damage or blindness. The HF released at the SAPREF refinery in May 1998 was in the form of gas. The refinery has also been a chronic polluter. In fact, by February 2000, SAPREF management admitted it had underreported sulfur dioxide emissions to the local government for the last five years by as much as 12 tons a day – or 4,380 tons or 10 million pounds a year. By September 2000, the refinery claimed to have cut its SO₂ pollution by 30 percent, down to 37 tons a day. Flares have also been frequent at the refinery, as there is no back-up power source, leading to the use of flares as a safety valve in shut downs and power failures.

SAPREF has acknowledged its emissions may affect public health. "Under certain weather and operating conditions, and when combined with other pollution sources in the valley (including vehicles), we acknowledge that our SO-2 emissions could contribute to the overall impact on people with respiratory ailments." SAPREF also acknowledged that its SO-2 emissions have exceeded World Health Standards.

"Evidence suggests that we are a contributor to those surplus," said SAPREF officials in September 2000, "but we are committed to reducing excess to the point where they cease altogether." But in the year 2000 certainly, that hadn't occurred. In early January 2001, a fire broke out in the refinery's bitumen blending area. The same day 6,000 liters of a chemical solvent spilled from a faulty valve in a SAPREF tanker truck. Later in January 2001, another fire broke out at refinery's No. 2 Crude Distillation Unit. The same day, about 1,000 liters of bunker fuel spilled into Durban Bay.

a) LEAKING LEAD

Then, in March 2001, at the Island View tank terminal on Durban Harbor, a SAPREF storage tank leaked 25 tons of tetra-ethyl lead (TEL), a highly toxic substance and a known carcinogen. A rupture occurred in the tank while the lead was being pumped from a ship into a SAPREF tank at the terminal. SAPREF buys the lead from Associated Octel. The leak, however, was not discovered by SAPREF or Octel, but by other industrial workers from Engen, and then it was about eight hours after the leak had started. Once discovered, some of the lead was pumped back into the ship. Following the tank leak, a number of workers in the area were evacuated and tested for lead in their blood. Although one worker on the ship was diagnosed with elevated lead levels, none of the neighboring residents were evacuated or tested. The depots nearby residents were kept in the dark about the leak for about three days. From March 21-24, two local roads near the terminal were closed, and residents say they were never told why.

Yet SAPREF and others at the depot were obligated to do so under the National Environmental Management Act. About 300 meters away from the storage tank failure is the residential area of Flynnlands in the area of south Durban known as the Bluff. Rory O'Connor of the South Durban Community Environmental Alliance said that health tests should be done on nearby residents, and that some of the storage tanks at the terminal were decades old and needed independent inspections. ". . . At least the firms should tell us what they have in those tanks and what should happen in an emergency," said local resident Willem van Loggerenberg.

Lead has been stored at the terminal since 1968. Lead, a highly toxic substance, is not naturally found in the human body. In children, lead is particularly insidious, poisoning the developing brain in very small quantities. With moderate long-term exposures but no immediate symptoms, children show reduced short term memory, delayed reaction time, reduced ability to concentrate, and diminished IQ scores. For adults too, exposure to lead can damage the peripheral nervous

system, affecting memory, vision, and muscle coordination and can also weaken wrists and ankles. Absorption at high levels can damage kidneys, result in anemia and miscarriage, and decrease fertility in both men and women.

Chronic low level exposures may be associated with hypertension, blood pressure problems and heart disease. In the US, occupational and safety regulations requires that workers with blood levels of 50 micrograms per deciliter be removed from the exposure. In soil, lead occurs naturally in background levels between 25 and 60 ppm.

In the US, the Environmental Protection Agency sets 400 ppm as the maximum acceptable level in soil, beyond which actions are often taken to remove the contamination.

At the Island View terminal, a number of the tanks used to store the lead were more than 20 years old. In fact, an independent engineering consultant, Project Development Africa, that conducted a follow- up investigation of the SAPREF tank, indicated it failed because of severely rusted welding joints. SAPREF claims the tank had been routinely tested and, only two years earlier, had “no apparent indication of rust.” However, it turns out that the measurement technique SAPREF was using wasn’t the most accurate, as three other tanks which had been demolished in 1998 had also shown signs of severe, unexpected internal rusting.

That’s when SAPREF sought the advice of Shell Global Solutions in the Netherlands, which reported back to SAPREF that the technique it was then using was inadequate to measure localized rust. A technique used at nuclear facilities to detect rust – known as TOFD, and used in the UK since the 1970s – should have been used by SAPREF, but wasn’t, despite the advice from Shell Global Solutions.

The older method was also cheaper. The consultant concluded that SAPREF and the tank operating company, Associated Octel, “appear to have allowed themselves to be deluded” by the older testing method. But there was also evidence, according to the consultant, that other anti-rust and anti-pollution measures “may not have been fully effective and properly managed by SAPREF” at the Island View terminal.

b) PIPELINE LEAK

A few months after the lead leak, another SAPREF leak was discovered in early July 2001. This time, an underground pipeline supplying a petroleum fuel known as Mogas had leaked, releasing what was first thought to be about 750,000 liters of fuel into the ground.

The leak – later found to be much larger, just over 1,000,000 liters¹⁴ – occurred silently and out of sight, seeping out of a 4mm hole in the line into the ground below. The fuel soaked into the ground beneath two residential areas of south Durban, Wentworth and the Bluff, with some of the material reaching groundwater

below. For days following the spill – which was first detected by the local residents, not SAPREF – hydrocarbon fumes permeated the area. Families living near the corner of Tara and Angelier roads were the first to lodge complaints. SAPREF then shut the line down to reduce the risk of fire or explosion. Three days following the leak, air samples collected by Ecoserv showed very high levels of hydrocarbons, with readings next to one storm drain at 3,700 parts per million (ppm). More than a month later, benzene levels in the air were being found at 0.2 ppm inside certain houses, a level that is several times higher than World Health Organization (WHO) outdoor limits.

Several families were evacuated as other families began considering legal action. Soon after this leak, other SAPREF pipelines were tested and found to be leaking or corroded as well. There are at least seven SAPREF pipelines running between the refinery and the Harbor View terminal, most with no above-ground markers, and some which run adjacent to residential areas and right next to some homes.

Shell and BP say they have tested and repaired their structurally weak pipelines, most as recently as 1998. Yet in the last few years there have been several pipeline leaks. Some residents and activists, including Bobby Peek, proposed that Shell and BP replace their pipelines with new ones.

“We know the pipelines are about 30 years old and should all be replaced,” said Peek. “The pipelines are laid in an area that was originally the south Durban wetland, which means corrosion will always be a problem.”

The companies say replacement of their lines is not necessary. Instead, Shell and BP recommend that more tests be done on the lines, and that residents be relocated. But at least one government official, Minister Moosa of Environmental Affairs, stated that people in the communities of south Durban would not be relocated.

The July 2001 pipeline leak, reaching groundwater, was serious enough that SAPREF had to sink a series of 368 extraction wells to try to clean up the leaked fuel. SAPREF estimated they recovered 25 percent of the spill by October 2001.

Still, at that time, SAPREF was planning to sink another 220 extraction wells in the area to continue the clean up. On the matter of the hydrocarbon fumes in residential areas, SAPREF reported the following in October 2001:

. . . 24-hour air quality monitoring, by an independent company, in these homes has shown some peak levels of benzene (a known carcinogen) on occasion in some homes. . . .

Although these peaks were in excess of lifetime exposure for European Union and World Health Organization residential standards, they did not constitute a health risk in the short term. SAPREF also showed the result to two medical experts, one local and the other from overseas. Their advice was that it would be better for

these residents to relocate temporarily as a precaution to be quite sure that there will be no risk to health in the longer term.

Still, SAPREF had acknowledged they would not be able to entirely clean up the spill, as some of the spilled material would bind to soil and vapors would continue to escape into the surrounding air.

Within the community, some residents experiencing immediate health effects from the leaked fumes, such as coughing, burning eyes, headache, dizziness, and nausea, began to wonder about longer-term health effects as well. What about other leaks that may have occurred over the years, and the continuing assault of regular fumes from the refinery?

There were some rare immune diseases in the community as well as a number of asthmatics. One 15-year-old girl in 1997 had died of lupus erythematosus, a rare autoimmune disease, and another 13-year-old girl also had the disease. A three-year-old in the community had also died of kidney cancer in 1994.

Meanwhile, back at the refinery, there had also been other incidents. In June 2001, a failure of a refinery flare resulted in the release of unburnt gases, including substantial amounts of hydrogen sulfide. In mid-August 2001, the asphalt plant at the refinery failed.

On September 3rd, 2001, a marine fuel oil pipeline leaked. About ten days later, there was another flare failure. On October 14th, 2001, an estimated 2,000 liters of bunker fuel spilled into Durban Harbor during a SAPREF ship refueling operation at the Island View terminal.

One evening in early October 2001, local residents gathered at the Dirkie Uys Primary School to discuss their predicament, raising both the short-term and longer term health issues. Scharlotte van Staden, who had been advised by SAPREF to abandon her home temporarily because of the leak, asked the help of the government “to protect us from the polluting industries immediately.” She said the poor environmental practices of the SAPREF refinery would not be tolerated elsewhere. “But the third world is different,” said Desmond D’Sa, a south Durban community leader. “Our lives are cheap.” D’Sa, in fact, had checked out Shell’s operations in Europe. “I went to a Shell refinery in Denmark and there was no smell at all. And when we looked at the data we found that there was 85 percent less pollution from the refineries in Denmark than here.”

A few local government leaders soon got the message and began to move on SAPREF. Provincial Environment Minister Narend Singh issued a directive to the refinery in early October charging that SAPREF had failed in its duty to care for the environment. Singh listed the pipeline and tank leaks and hydrogen sulfide pollution. He called for a detailed clean-up plan from the refinery or face legal action under the National Environmental Management Act. SAPREF manager Richard Parkes, soon held a meeting with senior officials in Singh’s office and

agreed to speed up the refinery's actions in order to avoid criminal prosecution. However, some political leaders, including councilor George Mari, hearing from residents in the south Bluff and Wentworth communities, wanted an investigation of the health effects in the area as well as an evaluation of the effect of spills and pollution on community property values. Others, like councilor Duncan duBois at the Unicity council meeting in late October 2001, sounded a more angry tone: "We are dealing with the world's largest oil company, tip-toeing around what is a major human and ecological disaster that must be condemned in the strongest terms."

Indeed, even Lloyd's of London, in its December 2001 Lloyd's List International, was citing "South Africa's decaying refineries," singling out the SAPREF refinery for its "third leak in five months – this time from a 38-year old marine fuel oil pipeline."

Yet SAPREF has continued to evidence problems throughout its system. On December 30, 2001, about 15,000 liters of oil spilled from a SAPREF line into Durban Harbor during the refueling of a ship. A March 2002 break in an underground pipeline inside the Island View terminal caused another 3,000 liters of oil to leak. In April 2002, SAPREF fuel lines being pressure tested at the Island View terminal revealed another corroded pipeline.²⁷ During August 2002, there were SO-2 and SO-3 releases from the refinery, some due to extra flaring and a power failure. By mid-September 2002, SAPREF had pumped out of the ground about 1.03 million liters of its year-old pipeline spill on the Bluff, but some still lingered in soil and groundwater. Refinery manager Richard Parkes promised to do more. "Today we cannot turn the clock back or downplay the country's biggest-ever petrol leak," he said, "but we are committed to putting right what went wrong more than a year ago. We pride ourselves on running a safe, reliable refinery. We feel a deep sense of regret and we are focused on cleaning up."

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