

## **Cornubia warehouse attack – the road to recovery**

### **Introduction**

On the morning of Monday the 12th of July 2021 most people and businesses in KwaZulu-Natal started the day feeling anxious and fearful. Threats of violent unrest, seemingly linked to the imprisonment of former President Jacob Zuma, had been percolating for weeks, finally materialising on the 9th of July. What followed was unprecedented looting, violence and unrest. Trucks were burnt, the N3 had been blocked and the Mooi River Toll Plaza was closed for part of the weekend. Looting had started in places and was spreading. The Durban CBD was being shut down and barricaded.

Violence was spreading and there were increasing attacks on warehouses and other facilities. It had become clear that the South African Police Services (SAPS) were completely overwhelmed by the unprecedented catastrophic breakdown of the rule of law that was unfolding.

On the 12<sup>th</sup> of July the scores of looters who had initially targeted the neighbouring Makro facility, switched their focus to the UPL building and broke into the premise and began looting.

When it became apparent that looters were targeting the area, prior to the break in, UPL had repeatedly contacted the SAPS for assistance. When it became apparent that looters were targeting the area, UPL repeatedly contacted the SAPS for assistance. The SAPS attended at the site in the early hours of the evening, temporarily dispersing the crowd and then left, presumably to attend to the many other incidents of unrest. UPL continually endeavoured to secure the assistance of additional security personnel but was unsuccessful.

When SAPS left the premises, the looters returned and forcibly gained access to the premises. They broke into the admin building which leads into the warehouse and began to vandalise and strip the building and set trucks alight. The looters stole anything of value in the building. Upon being notified that those trucks had been set alight, UPL immediately contacted the fire department and the law enforcement authorities once again, to alert them to the imminent threat to life and property.

While UPL had an emergency strategy in place in the event of a fire breaking out at the warehouse, like any other business that strategy was dependent on the ability to gain access to the warehouse and the timely and appropriate response of emergency and law enforcement services.

By the time emergency services attended the scene, with one truck, the fire was raging beyond control.

The water released by the internal fire sprinkler system added to the significant amount of water used by the fire department in the days following the fire and product released from its burned containers, resulted in the release of large volumes of contaminated water.

UPL has Spilltech (a specialist contractor) on retainer, and they were immediately contacted. However, they were unable to respond due to the unrest situation. UPL contacted an alternative spill team, Drizit, but they could not get to the site safely until the 13th of July. As a result, they could not prevent or contain the release of the contaminated water from the warehouse site. On the 15th of July, Spilltech was finally able to join Drizit.

On the morning of the 13<sup>th</sup> of July UPL gave notice to all of the necessary local, provincial and national authorities as required by the legislation (NEMA). This was in response to the fire, and as it became apparent there had been a spill, authorities were updated. This was overseen by a well-qualified environmental expert appointed by UPL on the morning of 13 July to coordinate UPL's environmental response and to urgently assemble a team of experts as necessary. Air quality experts were contacted and freshwater experts, together with water and land contamination specialists were the first appointed to assess the environmental damage and recommend immediate containment measures. Before long a multi-disciplinary team of independent specialists was put in place. That team included leading air quality, toxicological, human health, freshwater, wetland, environmental engineering, and coastal, estuarine and marine specialists.

During the first two and a half months following the attack, that team worked around the clock to contain and remove spilled product and undertake sampling to gain an understanding of the nature and extent of the impact. At any given time during that period there were approximately 130 people working at and around the spill site.

Initial actions focused on containing and removing contaminated water and sediments from the nearby tributary, down to its confluence with the Ohlanga River, and on containing and removing contaminated material from the warehouse site and immediate surrounds, to make them safe. As contamination levels have dropped, the focus has shifted to more advanced remediation and rehabilitation efforts.

## **Initial response**

Once the incident had been reported to the relevant authorities on 13 July, the immediate task was to extinguish the fire and ensure public safety from airborne pollution. Communication was ongoing between UPL, the specialists and the eThekweni Health Unit, who issued a press release warning about potential risks from smoke inhalation as a result of the fire. UPL also worked through available channels to communicate with surrounding communities, and made a toxicologist available to the public to answer queries and concerns.

The fire took many days to fully extinguish. That was because the roof had collapsed, preventing the firefighters from accessing the fire adequately. Ultimately, on the 22<sup>nd</sup> of July, a demolition company was brought in to remove sheet metal roofing and rubble so that the fire department could fully extinguish the blaze.

Air quality stations were quickly established in order to monitor air quality in the immediate surroundings of the fire. A decision was taken to collate and store all the information to be used to assess inhalation and other health risks potentially associated with the incident. An air quality expert was also appointed to undertake air dispersion modelling and compile an Atmospheric Impact Report. There were many other fires that occurred during the period of violence, including other significantly large blazes, that had the potential to make reliable modelling very complicated.

## **Containment and clean up**

The immediate containment and clean up phase began even before the fire had been extinguished.

### *The platform*

Work to contain and promptly clean the platform was vital – Drizit had been in attendance at the blaze since the 13<sup>th</sup> working to safely contain contaminated water. Drizit installed booms at the water outlet

points on the warehouse platform in an attempt to control runoff. However, despite this, it quickly became clear that some runoff had escaped. When that became evident, the lead environmental expert appointed both estuarine and marine specialists to advise on the immediate interventions required.

When SpillTech were able to reach the site, they immediately began assisting with containment. At the warehouse site itself, SpillTech's focus was on removing contaminated debris from the largely destroyed warehouse platform. This was achieved through a number of methods – spreading absorbents, the use of super suckers, physically gathering, bagging and removing waste and high-pressure washing. All the resultant waste was taken for disposal at a Class A landfill.

A storm water attenuation dam was identified early on for re-purposing as a Pollution Control Dam (PCD). This dam would serve to collect contaminated water from the warehouse platform so that it can be removed for disposal. It was lined with bentonite, and its outlets were closed. Removal by tanker started, and extracted water was transported to Class A landfills for disposal. Modular ponds were later also established on the platform in order to capture and evaporate clean rainwater in order to reduce contamination from the platform area.

#### *Ohlanga Tributary*

SpillTech placed absorbents and absorbent booms along the tributary, and established berms and weirs throughout the system to operate as collectors, create areas where water could be treated, and attenuate water so that it could be pumped into tankers and removed to Class A landfill.

The height of an existing tributary weir approximately 1km downstream was raised for the same purpose and this, together with other existing and additional weirs (24 in total) provided a system of containment principally to prevent as much contamination as possible from reaching the estuary and sea.

Contaminated sediment and other materials were excavated over August and September 2021. During this period sediments in the tributary streambed were high-pressure washed and the resulting water was sucked out of the channel and appropriately disposed of.

#### *Estuary and marine environment*

The first clean-up operation in this section of the affected area was the collection of dead fish and other marine life in the estuary and along the beaches adjacent to the estuary mouth. The quick action in this regard resulted in not one bird dying from eating affected fish. SpillTech barricaded the accesses to the lagoon, and signage was erected on the beach, along the tributary, the estuary banks and at the entrances to the Havaan Forest. Because of the dynamic tidal and reed-bed system in the estuary, physical clean-up was not the recommended course. Instead, the natural cleaning processes have been allowed to take their course, under the watchful eyes of the authorities and the specialists. As a consequence, the primary focus of the clean-up and remediation interventions has been in the warehouse platform, its immediate surrounds, and the tributary.

## **Monitoring and remediation work**

### *Initial remediation work*

The area behind the weir on the tributary was reshaped to create a sinuous treatment dam. The purpose of this dam is to create a meandering rather than straight stream channel, slowing the flow of the water and increasing its exposure to sunlight and natural biochemical breakdown processes, which would optimise and enhance the natural breakdown pathways of residual pesticides.

Where excavation of contaminated sediments had taken place, these streambanks were partially reshaped, and rocks placed to prevent erosion.

UPL's marine and estuarine specialists have been sampling water and sediments at specified points within the estuary and in the adjacent beach environment, to monitor the presence of specific chemicals of concern and overall toxicity levels. They have furthermore been assessing certain parts of the food chain's (trophic levels) health in the ecosystem.

In the marine environment, specifically, the specialists did the following:

- Took samples of bivalves (mussels, oysters) to assess how environments were functioning and whether there was any bioaccumulation (build-up of substances from the spill in fauna) in samples. This was important to be able to advise on safety for human consumption.
- Screened different marine habitats (like rocky shores or subtidal reefs) to gauge their health, including the animals present in each habitat and how rich this was overall.

- In the system as a whole, sediment and water have been sampled every two weeks, checking for chemical concentrations and the impact or potential toxicity for plant and animal life. Beach and estuary bird life has been monitored as have invertebrates in the estuary and plant life.

This combination of targeted chemical sampling and broader toxicity sampling is helpful to understanding which of the chemicals of concern remain in the environment and what effect the combination of the various chemicals may have on life throughout the food chain. The object is to ascertain, in relation to the most sensitive organisms, whether there is a continuing effect upon them and what dilutions may be necessary in either water or sediment to reach a 'no effect' level.

It is important to remember that an estuary is not a freshwater system and has its own unique dynamics. Because of this, the estuary and the coastal system have been monitored separately from the tributary and the river – which are monitored by freshwater specialists.

Sites for monitoring (sample taking) have been identified in the freshwater system (water and sediment samples) and similarly, control sites have also been identified in order to provide a comparative picture of the system from those parts of the freshwater system impacted by the spill. Samples have been taken monthly along the tributary and in the Ohlanga River, and in the pollution control dam and various other points in proximity to the platform. Additional samples have been taken as and when appropriate (road runoff etc) to inform the management of water on the site. Thousands of samples (soil/water/air) have been taken by the specialists since the incident and sent for detailed analysis.

Herpetological (snakes/frogs) and entomological (insect) surveys of the site and potentially affected ecosystems have also been commissioned and supervised by the freshwater team.

#### *More advanced remediation and monitoring work*

Monitoring work as mentioned above will continue. In addition to what has already been achieved, the teams are now working on more specialised and targeted interventions – identifying areas or pockets of concern and testing new methods to rehabilitate them.

Planting of locally sourced grass sods in affected areas, which commenced in January of 2022, is showing success, achieving ground cover on those exposed soil areas affected by the spill and clean-up activities and continues as the base level of rehabilitation.

In addition to this, more advanced rehabilitation methods are being used. Longer term rehabilitation planning is being undertaken in consultation with all the relevant roleplayers.

As mentioned, scavenger wells have been installed in areas of continued concern to remove substances from the spill that remain in the river/tributary banks (particularly at points where the collection dams were erected to collect and pump the majority of the initial spill). Scavenger wells are essentially perforated pipes which are sunk in the ground in identified areas. Water from the upstream portion of the channel is pumped into these perforated pipes to create a hydraulic gradient and positive pore pressure to drive the in-situ contaminants into the scavenger boreholes. This water is collected and tankered for approved disposal, but before removal it is tested to ascertain what substances remain, the success of the extraction and whether there is a need for more focussed interventions in these areas.

The treatment of certain areas with Biosolve is the second method which is currently being tested. Laboratory testing has shown that this successfully reduced the concentration of contaminants within the water. This methodology is now being investigated for its application in treatment of the open soil areas currently showing residual substances which could inhibit plant growth. Specialised Guano products are also being used to facilitate breakdown of these substances and development of biologically functional soils in preparation for planting.

## **Progress so far**

### *Beaches reopening*

On 2 November 2021 KwaZulu-Natal MEC for Economic Development, Tourism and Environmental Affairs (EDTEA), Mr. Ravi Pillay, announced that all of the beaches that were closed as a result of the spill would reopen for recreational purposes on that day, save for an exclusion zone.

This decision followed the finalisation of the EDTEA's external peer review of a report compiled by the independent specialists, submitted by UPL on the 24th of September to the eThekweni Municipality. That report concluded that, save for a 1km exclusion zone north, south and east of the Ohlanga River

mouth, the beaches were safe to reopen (regardless of whether the Ohlanga Estuary mouth was open or closed).

This development demonstrated the success of UPL's clean-up efforts, as well as the natural degradation that pesticides are subjected to in the environment, and which will have been acting during the extensive clean-up processes.

#### *Bivalve report*

In March 2022 the marine and estuary specialists released a report to the authorities on bivalves (oysters and mussels) in the spill affected coastal areas. The report found that the oysters and mussels *do not* represent a threat to human health as a result of the spill.

Unfortunately, however, the report cautioned the authorities that these bivalves do pose a risk to human health from various other causes like sewerage and wastewater which are not connected to the spill or to UPL.

UPL is pleased that the results from study show positive progress for our clean-up, remediation and rehabilitation efforts - in that the bivalves do not reflect any residual contamination from the spill.

#### *Revegetation trials*

As mentioned, revegetation trials have begun and work with grass sods in January 2022 have shown success in re-establishing vegetation. Areas where revegetation has been less successful, along with regular testing, have helped the expert team to identify where more remediation is needed.

Experts are also looking to establish a plant and tree nursery and begin propagating plants indigenous to the area to use in revegetation initiatives.

#### *Monitoring results*

Overall, the concentrations of contaminants have declined significantly since the clean-up operation began. However, UPL is cognisant of the fact that there is more work to be done. Some chemicals of concern remain at levels above the NOEC in some areas of the tributary, the Ohlanga river and the estuary, although they are generally currently very low. Consistent monitoring by the expert teams, as



well as consistent sampling and testing have guided the introduction of trial interventions such as the scavenger wells, and have enabled the team to gauge their success.

Pleasingly, in the estuary and marine environments the metal levels of arsenic, manganese, copper and zinc are now below the guideline levels set for the South African coast which includes estuaries.

Water and sediment from estuary sites show that overall, there has been a slow decline in toxicity levels in the estuary. However, new results will need to be assessed as the area (and broader city) received historic rains in mid-April and late May which led to significant flooding. The rainfall may lead to changed results for the estuary test sites. The river, estuary and beach environment at the estuary mouth will all improve as the upper catchments are increasingly rehabilitated. The current emphasis is therefore on continuing decontaminating the warehouse site, the tributary and the lower wetland, which will in turn see further significant improvements in the estuary environment.

The estuary mouth site remains closed and there is a 1km exclusion zone north and south of it. That is not in place because of the danger posed by the spill, but rather to restrict human and animal disturbances so that ordinary marine life can re-establish itself more quickly. There has been a significant measured increase in bird and shore life as a result of the absence of humans and especially dogs.

#### *Completion of air quality report to inform human health study and work*

In addition to the clean-up and remediation work, it has been necessary to ascertain human health impacts. In order to inform a proper human health risk assessment (HHRA), an atmospheric impact assessment (AIR) was commissioned. Its object was to identify locations that were potentially affected by air-borne contaminants from the fire. The AIR was completed and delivered to the authorities in November 2021. It consists of a modelled analysis of the phases and duration of the fire, the quantities and nature of the chemicals that were burned as a result of the arson attack on the leased warehouse, meteorological conditions and other relevant data.

It is important to note that the atmospheric impact report used conservative (in that it modelled the worst-case scenario) estimates based on a number of assumptions, such as the heat of the fire, the proportion of the various products that combusted and those that did not, and from those assumptions

determining what products would have vaporised and what vaporised chemicals were consequently contained in the smoke plume from the fire.

The AIR is a building block in constructing an effective HHRA. Based on the AIR, UPL's human health experts and its toxicologist have produced reports that indicate the likely health risks, where they would have occurred, if present, and thus where testing should take place. These reports together are currently being used to formulate a detailed epidemiological study. That will consist of detailed medical testing of a sample of individuals within the predicted impact zones, as well as a control sample of individuals, to determine whether the chemicals of concern have had, or are in the future likely to have, an effect on human health. The results of that study will inform the way forward.

At the same time that this process has been underway, UPL has been engaged in two further human health interventions. In the first of those, UPL commissioned a local occupational health consultancy to conduct testing and surveillance on first responders at the fire, on-site clean-up teams and others who may have been exposed to contaminants during or immediately after the fire. Those test results have been communicated to the personnel concerned and have been followed up where appropriate.

In the second of those processes, UPL set up a complaints procedure, in terms of which persons affected by the fire were invited to lodge complaints in a central repository, for further investigation.

In collaboration with the health authorities, UPL also established an occupational health clinic staffed at its expense, and there has been an extensive public awareness campaign (including notifications to those who lodged complaints) inviting the public and complainants to have a health assessment carried out. Those who lodged complaints were invited undergo assessments through the clinic.

Encouragingly, at this point, it appears from both the testing of first responders and on-site personnel, as well as those few people who have attended the clinic, that there is very little by way of serious health impacts attributable to either the fire or the spill.

**Scientific testing and modelling show stormwater runoff from Cornubia arson site is safe to dispose of via tributary**

Overall concentrations of contaminants have been falling in the system since the attack and substantially (dropping to either a fraction of original concentration or undetectable level) since November 2021. In March of 2022 the Pollution Control Dam (PCD), which was repurposed from a storm attenuation dam following the arson attack on UPL's leased warehouse last year to contain stormwater runoff from the site, was completely emptied, contaminated sediments and water removed and relined.

Since then, testing of water collected in the PCD by independent laboratories has shown low levels of residual pesticides present in the PCD, and low overall toxicity. Scientific modelling, which looks at a number of factors, suggests that this water is now safe to release into the system as, when combined with the water already there, it will reach such significant dilution levels as to pose no harm to the environment.

UPL South Africa have approached the authorities to consider this as a way forward for dealing with the runoff from the site. This would be one of the most environmentally friendly options available for dealing with this water, given the now low level of residual contamination and the ability to reach safe dilution levels.

## **Going forward**

The project is moving forward with the imminent demolition of the warehouse top structures by the landlord. This is an important step toward removing the remaining source of contamination and moving the project at the warehouse site toward rehabilitation. UPL has prepared a draft Integrated Rehabilitation Action Plan (IRAP) which sets out the interventions that are anticipated. Much of the content of that plan still has to be populated and will be the subject of detailed discussions with the authorities in the coming months. It will furthermore have to dovetail with the development plans of the adjacent landowners, in particular the Cornubia developers. In terms of the Cornubia development approvals, the Cornubia developers are required to rehabilitate elements of the natural environment within Cornubia, and their plans include watercourse and wetland rehabilitation and re-establishment. Detailed discussions are underway between UPL's team and the developer's planners and environmentalists to ensure that there is integration in the overall rehabilitation planning.

The IRAP will be a dynamic document, responsive to ongoing monitoring of the success of the various interventions. The targets for rehabilitation will be refined and set out in the IRAP and will take into account base levels prior to the spill.

Prior to the spill the estuary was scientifically rated as a D in terms of the national estuarine classification system. This rating indicated that the estuary had already been heavily modified, had significant loss of process, habitat, and biota. These are challenges for rehabilitation going forward, and the ultimate health of the system will therefore depend on facts that are to some extent beyond UPL's control.