One Major Refinery's Spill Response Usage

Anonymous at the request of client; original letter on file at main office:

June, 1996: Spill of DNF (hazardous waste) to ground around tank. High levels of aromatics, could not access area to clean spill without SCBA respiratory protection. Sprayed Micro-Blaze® Emergency Liquid Spill Control on spill to suppress vapors. Benzene levels dropped from 60 ppm to 10 ppm in approximately five (5) minutes. Sprayed Micro-Blaze again and aromatics were BDL (below detection limit) in another five (5) minutes.

October, 1996: Small spill of MTBE to standing water in pipe trench. Highly volatile product created explosion hazard and respiratory hazard. Sprayed Micro-Blaze® Emergency Liquid Spill Control hoping to suppress vapors. Vapors were immediately suppressed. In a short period of time, spill material was digested and there was virtually nothing left to recover.

February, 1997: Diesel spill in pipe conduit and two (2) tank fields; pumped free product out and used Micro-Blaze® Emergency Liquid Spill Control to remove product from outside of piping. Also sprayed Micro-Blaze Emergency Liquid Spill Control followed by Bio-Catalyst, in the tank fields to remediate the area. TPH levels dropped from low thousands to low hundreds (in one case to 43 ppm) in approximately four (4) weeks.

June, 1997: Crude oil spill in tankfield; pumped free product out and sprayed Micro-Blaze® Emergency Liquid Spill Control to break up crude remaining in grassy areas after washing. Used Micro-Blaze Emergency Liquid Spill Control to remediate the area. TPH levels dropped from low thousands to low hundreds (in one case to 39 ppm) in approximately eight (8) weeks. Crude oil takes longer to break down than refined products, such as diesel.

November, 1997: Diesel spill in pipe conduit; pumped free product out and used Micro-Blaze® Emergency Liquid Spill Control to finish removing product. TPH levels dropped from a range of 25,000 ppm – 57,000 ppm to a range of 600 ppm – 9,900 ppm in approximately four (4) weeks.

February, 1998: Alkylate (gasoline blend stock) spill in tankfield due to leaking tank bottom. After product was removed from tank, Micro-Blaze® Emergency Liquid Spill Control was put into tank hoping it would travel the same path as the alkylate and clean product out from under the tank. TPH levels were reduced from a range of 200 ppm – 600 ppm to a range of 30 ppm – 130 ppm in approximately three (3) weeks.

A Petrochemical Turnaround Cleanup

Memo submitted by customer; retyped, original on file at main office

MEMO

TO: Verde Environmental, Inc.

RE: Micro-Blaze Application

We have used Micro-Blaze [Micro-Blaze® Emergency Liquid Spill Control] three turnarounds for equipment cleaning. The first turnaround involved cleaning an absorber tower section. A light aromatic oil is used as an absorption medium for hydrocarbons. To clear the towers and associated equipment of oil, the tower inventories are pumped out. The next step is to wash the towers, exchangers, and pumps with water to flush the residual oil from the system. In the past, this usually took a minimum of three washes with water, followed by a wash using soap. Using Micro-Blaze, this was accomplished with one wash, followed by a washing using Micro-Blaze. When the system was checked for contaminants, it tested clean. This shortened the cleanup time by 24 hours. It was noticed during the cleaning that the Micro-Blaze worked best when a high point bleed was opened to enrich the oxygen content. Micro-Blaze was also used on small spills of oil on the slab that occurs when equipment is opened. In a matter of minutes, the oil was gone, leaving a clean, slip free surface.

Micro-Blaze was used during a turnaround for the sister unit of the one described above with the same results.

Micro-Blaze was then used on a turnaround in an extractive distillation unit that uses Dimethylformamide (DMF) as the adsorption agent. DMF is a solvent that is particularly difficult to remove from equipment. This particular tower section also produces a polymer that tends to trap DMF and hydrocarbons in the bottom of the tower, making clean-up of the system very difficult. Micro-Blaze was used in this system to clean the towers, exchangers, and pumps as described above. The system was cleaned in 36 hours less than normal as a result of using Micro-Blaze. It was also discovered during the turnaround that if a bleed valve was plugged, it could be cleared by spraying Micro-Blaze into the valve.

Micro-Blaze has also been used by the Emergency Response Team during an incident where a mixture of oil and hydrocarbons entered the plant sewer system. The hydrocarbon was vaporizing to the atmosphere, and the oil was creating an odor problem. Since Micro-Blaze had worked so well during the turnarounds, it was decided to try it as a means of clearing the sewer lines of the mixture. Micro-Blaze was sprayed into the sewer hubs using hand sprayers. This turned out to be the perfect solution to the problem. We were able to limit hydrocarbon emissions and solve the odor problem. We now keep Micro-Blaze on hand for use by the Emergency Response Team.

I am not sure of my company's position regarding testimonials. Therefore, I request that my name, as well as the company's, not be used by Verde Environmental, Inc. and/or Micro-Blaze.

Uses in a Gulf Coast Petrochemical Plant

Client requests anonymity per company policies; original letter on file at main office

We have used Micro-Blaze® Emergency Liquid Spill Control in a variety of ways during the past year. I will try to briefly describe the uses we have found for Micro-Blaze®, as well as some projects we will try it on in the future.

EQUIPMENT CLEANING

One of the main uses we have found for Micro-Blaze® is for the cleaning of equipment. Prior to turning the equipment over to maintenance, the equipment must be decontaminated to remove any residual contaminants. By using Micro-Blaze®, we have been able to clean equipment faster and more completely than in he past. The equipment we have tried Micro-Blaze® in is towers, exchangers, lines and pumps.

TOWERS

When preparing towers for a turnaround, the tower has to be completely de-inventoried and washed. Depending on the composition of the material in the tower, this has taken anywhere from two to five days in the past. Standard procedures in the past have called for the towers to be washed with water and drained several times, steam the tower with 150-lb. steam, and wash again (sometimes using industrial soap). Even after all of this, the towers would sometimes show elevated levels of contaminants. When this happens, additional cleaning is required, and/or maintenance personnel are required to use some type of respiratory protection (i.e., half masks or supplied air respirators).

Beginning in the latter part of 1997, we began using Micro-Blaze® in the wash portion of the tower cleaning. We tried using a standard eductor to proportion the Micro-Blaze® into the towers at the appropriate concentration. However, we found that standard eductors used for applying foam through hand lines will not work properly against back pressure. The back pressure results from the weight of the water as the tower fills. We are looking at purchasing high back pressure eductors that will work for this type of application.

To get around this problem of the eductors, small air driven Viking pumps are currently used to pump Micro-Blaze® into the towers. The technicians try to get a mixture of 1 – 3% Micro-Blaze® in the tower by calculating the total volume of water in the tower. Sometimes they simply ball park the estimate. They have found that on a typical tower, one drum of Micro-Blaze® does the trick. Once we have located the proper eductors for the job, we will be able to proportion the Micro-Blaze® correctly to prevent the overuse, and thus, waste of Micro-Blaze®.

During one of the turnarounds, cleanup time was reduced by 24-hours. In a second turnaround, the cleanup time was reduced by 36-hours. It is easy to see that the Micro-Blaze® more than pays for itself in less down time for the unit. Of interest on the second turnaround is the fact that the Micro-Blaze® solution was later calculated to be about 5% in the wash water (the ballpark estimate calculated by the technicians during the cleanup was off quite a bit). This particular system has historically been the most difficult one to cleanup; and in fact, fresh air has been required in the past because contaminants could not be reduced below regulatory limits. Using Micro-Blaze®, the levels of contaminants were reduced to zero.

In some of the towers, it was possible to circulate the wash water in the towers using the pumps associated with that process. However, some pumps will not pump water. In those cases, the tower

was filled with water and Micro-Blaze® and allowed to sit for 2 – 3 hours. In either case, the Micro-Blaze® worked. It should be noted that the Micro-Blaze® works best when sufficient oxygen is available. This was accompanied by opening high point bleeds to allow oxygen to enter the tower. Since the towers are gas freed prior to washing the towers, this option is usually available.

EXCHANGERS, LINES AND PUMPS

Micro-Blaze® has also been used to decontaminate exchangers, lines and pumps prior to turning the equipment over to maintenance. It is usually easier to get an estimate of the water capacity for this type of equipment, so the amount of Micro-Blaze® to use is easier to determine. A 1 – 3% solution is normally used when cleaning exchangers, lines and pumps. Since oil usually floats on water, oil is sometimes trapped in the high points of exchangers and pumps, which can cause problems when the equipment is drained and/or opened. By using Micro-Blaze®, the oil and associated problems are eliminated. In cleaning this type of equipment, the Micro-Blaze® is normally allowed to sit in the equipment for a couple of hours. We are looking at ways to circulate the Micro-Blaze® through the equipment, which should shorten the cleaning time.

SPILLS

In the past year, we have also used Micro-Blaze® during spill response. In each case, Micro-Blaze® was able to handle the problem quickly.

SMALL LEAKS AND SPILLS

During routine operations, small amounts of oil are sometimes spilled on the slab in operating areas. The operating units have small hand-held sprayers (garden type sprayers) with a 3% solution of Micro-Blaze® in them. When oil is spilled, the technicians use the sprayers to apply Micro-Blaze® to the spill. In a matter of minutes, the oil is gone. Not only does this eliminate a slip/trip hazard, it also keeps oil out of the contaminated sewer system.

EMERGENCY RESPONSE TO A GAS RELEASE

Earlier this year, we had a gas release where Micro-Blaze® was used by the response team to eliminate the source of the gas. A suction drum on a compressor began to fill with oil. The technicians had to drain the oil to the contaminated sewer to protect the equipment. This would not normally cause a problem, since the contaminated sewer enters an oil/water separator where the oil could be captured. However, unknown to the technicians at the time, the oil contained entrained hydrocarbons. When the oil entered the sewer system, the hydrocarbons began breaking free of the oil, resulting in a gas release. Since the contaminated sewer is an enclosed system, it is very difficult to remove hydrocarbons from the system. The hydrocarbons tend to hold up in the sewer system's high points, and remain there until flushed out with water.

However, when flushed with water, the hydrocarbons can leave the system at any sewer hub in the system. The response team took hand-held sprayers and began spraying the Micro-Blaze® solution into sewer hubs in the area. Many of the hubs had shown concentrations exceeding LEL prior to applying Micro-Blaze®. Within less than two hours, all of the hydrocarbons had been eliminated from the system, with all hubs showing zero on the LEL meter. Rather than flushing the system and liberating the hydrocarbons in large amounts throughout the plant, the response team was able to mitigate the problem in place, greatly reducing the threat of a fire or explosion.

EMERGENCY RESPONSE TO A MTBE SPILL

Recently, an MTBE tank car was overfilled when the automatic shutoff valve failed. The loading rack has a secondary containment system that drains to a holding pond. The amount of MTBE collected by the system was later estimated to be 600 gallons. While the MTBE was contained, the vapors from the containment system were both irritating to personnel in the vicinity, and explosive. A hand line and eductor was used to apply Micro-Blaze® at a 3% solution to the pond. Fifteen gallons of Micro-Blaze was applied to the MTBE initially. After one hour, the vapors were only detectable within a few feet of the pond. An additional 10 gallons of Micro-Blaze® was applied to he pond at that time. One hour later, there was no MTBE detectable in the pond. So within two hours total, the entire 600 gallons of MTBE was cleaned up, leaving nothing but water in the pond.

FUTURE PROJECTS

We have several projects that we plan to try Micro-Blaze® on in the future. Based on what we have seen Micro-Blaze® do in the past, we feel that these projects will also be successful.

CAFETERIA GREASE TRAP

The grease trap in our cafeteria has been filling up every four to six weeks, which requires us to have the trap cleaned out by a vacuum service. Bob Fairchild was telling us how a Luby's Cafeteria used Micro-Blaze to slow the buildup of grease in their grease trap. The way this program works is to use 4 ounces of Micro-Blaze in the mop water each day. The Micro-Blaze® will remove the grease from the floor during mopping. After the mopping is complete, the mop bucket's contents are poured down the drain that enters the grease trap. The Micro-Blaze® attacks the grease in the trap, reducing buildup in the trap. Luby's went from pumping out their grease trap each month to pumping it out once every 8 – 12 months. We recently started this program in our cafeteria, but there has not been sufficient time to determine how it will work on our grease trap. The Micro-Blaze® is doing an excellent job of removing the grease from the kitchen floor.

EXCHANGER CLEANING

The earlier discussion of cleaning exchangers pertained to decontaminating exchanger bundles that had fouled, requiring the bundle to be pulled and cleaned. Prior to the bundles reaching the point where they are completely fouled, our plans are to try a preventative maintenance program whereby the bundles will be cleaned in place using Micro-Blaze®. If Micro-Blaze® will work in this type of application, the usable life of the bundle will be extended. The exchanger will be taken out of service for a six-hour period, during which time the bundles will be cleared of product and filled with a 3% solution of Micro-Blaze®. A small pump will be used to circulate the wash water through the bundle. After three hours of circulating the wash water through the bundle, the bundle will be drained and placed back in service. We feel that this has a good chance of working on exchangers that have not begun to bake the material onto the bundle. This project has the potential to save our company quite a bit of money. Each time a bundle is pulled, hydroblasted, and replaced, it costs us a minimum of $5,000. If the life of the bundle can be extended a few months by this PM Program, substantial cost savings will be realized. If a bundle is currently being pulled for cleaning three times a year, but only has to be pulled twice a year after using Micro-Blaze®, we can save $5,000 / year on the maintenance cost of that bundle. If it only has to be pulled once a year after using Micro-Blaze®, we will save $10,000 / year. If this is successful on 100 bundles, we are looking at a cost savings of $500,000 - $1,000,000 per year. This will be quite a return since it will only take about 4 – 5 gallons of Micro-Blaze® [*concentrate*] per bundle.

CONTAMINATED SEWER SYSTEM

We also plan to experiment with a drip system of Micro-Blaze® into our contaminated sewer system. The sewer system is routed to a biological treatment plant for TOC removal. By instituting a continual drip system of Micro-Blaze® we feel that we can lower the TOC entering the biological treatment plant. This will help lower the load on the system, as well as avoid potential upsets in the biological treatment plant. It was mentioned earlier that high points have developed in the sewer system over the years. These high points trap oil until the system is flushed out during a heavy rainfall event. When this happens, the oil/water separator system can be overwhelmed by the sudden influx of oil. We feel that introducing Micro-Blaze® through a drip system will eliminate this problem by allowing Micro-Blaze® to attack the oil trapped in these high points.

CONCLUSION

As you can tell, we are firm believers in Micro-Blaze®. *To date, we have not found any hydrocarbon-based material in our plant that Micro-Blaze® will not work on.* [Italics ours. –Verde]
Every application we have come up with for Micro-Blaze® has worked so far. It appears that its uses are only limited to our imaginations. If a hydrocarbon-based material needs to be eliminated, all you have to do is find a means of getting Micro-Blaze® into contact with the material.

As I mentioned to you during our telephone conversation, I request that you do not use my name or my company's name when using this information. I make this request since I am not sure how my company feels about endorsements and/or testimonials.

Bioremediation of Sand Pad under Gasoline Storage Tank

Given to Verde Environmental, Inc. by a major petrochemical facility project engineer (Original on file in office)

Tank 31 is a 73-foot diameter gasoline storage tank at the Tesoro Refinery in Anacortes, Washington. During the summer of 2000, the tank was emptied and cleaned for a scheduled internal inspection, and as a result of the inspection, the decision was made to replace the floor. Initial efforts to remove the floor were stopped when test holes drilled through the floor revealed the presence of gasoline in the sand pad under the floor. Patches were glued over the test holes to keep gasoline fumes from entering the tank.

On 7/13, 250 gallons of Micro-Blaze and 4000 gallons of water [*a 6.25% solution-Verde*.] were pumped into the tank. With the Micro-Blaze and water solution in the tank, approximately 85 one-inch square holes were punched into the tank floor with an air chisel (buster gun). Approximately 40 holes were cut in a circle about two feet in from the shell circumference, another 40 were cut in a circle 12 feet in from the shell circumference and three holes were cut near the center. To keep the explosive concentration from rising in the tank, wooden stakes were driven in the holes immediately after the holes were cut. When all the holes were cut, the stakes were cut to allow the Micro-Blaze to drain into the sand pad. The stakes were pulled out at the end of the workday on 7/13.

Five coupons were cut from the floor at various locations on 7/17 to check for explosive concentrations and benzene. Both were detected, but at low levels. By 7/30, there were no detectable explosive concentrations of gasoline or of benzene, so work was started. On 8/9 and 8/10 about 50 cubic yards of sand were removed from the tank and piled outside. A sample of sand for lab analysis was taken on 8/10, and on 8/15 the lab results came back with no detectable hydrocarbon. The sand from under the floor of Tank 31 was subsequently disposed of as a non-hazardous waste.

Brent Beisher
Project Engineer
10/13/2000