Odour Control Systems Limited

NEWS RELEASE

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Sweet Smell of Success for Akzo Chemicals, Blackpool

DI-OX™ a.

- Di, double, twice
- Ox, beast of burden, hence patient & powerful

Contact

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Akzo Chemicals, operating from the ICI Chemicals & Polymers Hillhouse site near Blackpool, was confronted by a stinking problem when its main hydrogen sulphide gas holder became due for a 20 year internal corrosion inspection.

Requirement was to achieve category 1 entry conditions, in other words without protective clothing or respiratory equipment, for the inspector and any subsequent repair contractors to a gas holder used to store hydrogen sulphide and carbon bisulphide. Waste gases are transferred from the bell in the top half of the holder to a sulphur recovery unit and the sulphur is recycled in a continuous process.

Odour emissions – the traditional schoolboy's bad egg smell – were a principal concern. Not only for personnel and visitors on site, but for the appalling effect that several weeks exposure would have on local residents living barely half a mile away.

Plan of work was first to degas the bell by purging with nitrogen; displace the nitrogen with air to take the vacant space to below occupational exposure limits; and eventually lift the bell to its highest safe hooked position.

Approximately 1100m^3 of contaminated water and oil then remained which had to be treated before draining to the effluent system. Being saturated with hydrogen sulphide, the water was dosed with OCS DIOX PLUS. The oil/organic sludge was drummed for disposal off site.

Good odour reduction resulted from the DIOX PLUS treatment, but the residual smell was still intolerable for work by the decommissioning team and for residents of the nearby housing estate. It was perceived that traditional odour masking methods would struggle with the scale of the problem, so odour countervailant compounds were employed.

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Five specially formulated batches of odour countervailant compound were submitted for laboratory tests, using one litre samples from different levels in the gas holder, after hydrogen sulphide had been neutralised by prior treatment with OCS DIOX PLUS.

A smell panel of four people simply sniffing each sample and agreeing which gave the most innocuous effect decided subjectively on a formulation called Persnickety 312AP.

Another step was to obtain approval from National Rivers Authority. To determine the effect that treated liquors would have on normal plant effluent discharged into the river Wyre, samples were taken from the main plant effluent lagoon, mixed with treated samples and tested. No adverse effect was detected.

Based on opinions of the smell test panel, optimum dose rate for the 312AP countervailant was calculated, and an order placed for 25 drums each 200 litres capacity.

Having degassed the holder, temporary pipework was fitted into the base and contaminated water transferred in batches of 50,000 litres to a special treatment vessel for dosing with OCS DIOX PLUS and countervailant at predetermined rates. Samples were regularly checked before treated water was dropped to a holding lagoon, and checked again in the site environment laboratory for COD, pH, aniline and benzthiazole, four hours before each tidal pumping. Records of each batch were carefully kept and the disposal was a continuing activity over a three week period with the approval of NRA.

To cope with emergencies, such as a contrary wind, undiluted 312AP was kept available for shock dosing with a hand pump. Trigger for this action was a rise to 3 ppm of the reading on continuous local H_2S monitors. Reaction to an excursion above 10 ppm was to seal the annulus with foam pads and suspend decontamination operations until the nuisance subsided.

Eventually only a residual sludge appeared to remain at the base of the tank, and environmental services company Wistech ran temporary pipework from the gas holder base for suction loading into a tanker, which acted also as a separation vessel. The water layer was transferred to a holding still and sludge pumped into drums for separate disposal.

Expecting to find just a light skim of oil and sludge on the floor when it entered the holder, the decontamination team was dismayed to discover 17 tonnes of solids buildup under the gas inlet pipe – an accumulation of 20 years of removing pipework blockages with steam. Attempts to break it up by high pressure cleaning were unsuccessful, so it had to be tackled manually and removed in drums through the manway. As the team of three emerged from the tank, each stepped into a foot bath to be scrubbed down with diluted countervailant before going off to decontamination.

With the solids and slippery residue removed, the entire interior was cleaned with high pressure washers. Water in the supply tank was naturally dosed to minimise the smell. Water used in cleaning was collected at the base of the tank, pumped to the tanker to be separated and, after testing, drained direct to an effluent channel. Finally inspectors were able to enter the bell and carry out thickness checks without the need for protective clothing.

Decontamination took three weeks. It was estimated that use of a conventional masking agent would have required dosing at 0.5% of treated water volume; with 312AP 0.2% proved sufficient, giving a materials cost saving of more than £15,000. A three month window was allocated for testing and recommissioning of the gas holder. The day gas was due to arrive, the holder was back satisfactorily on line.

preserving the environment

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