References

Disposal of Tar and Tar-Containing Materials
Abandoned or unused tar pits are ecological time bombs inviting disaster. The clean-up and follow-up disposal of tar – as well as products containing tar – always has two requirements: The first is creativity. Ecological and economical methods must be carefully planned and successfully implemented. Each task is different; each situation unique. The second requirement is always a founded scientific and technical understanding of all aspects of the tasks involved.

In recent years, the Lobbe group has accepted a number of challenging tar clean-up projects, all worthy of note. Without question, our competence in this area is clearly demonstrated by the types of projects we accept. To give you a clear picture of Lobbe activities – and successes – in this sector, we have prepared this brochure for your perusal. This information provides an overview of the projects as well as ask/time/substance data in bulleted format.

The cover photo shows the old “Zerre” tar storage area. It was estimated that this site contains approximately 360,000 tons of tar residues. Lobbe has been on-site cleaning the area, working closely with the “Sekundärrohstoff Verwertungs Zentrum” (SVZ) and the “Sanierungs-gesellschaft Schwarze Pumpe” (SSP) organization. In its entirety, the project also includes the clean-up of the “Terpe” dump containing an estimated additional 180,000 tons of tar residues.
From the very start, the amount of material, as well as its relative inaccessibility, made removal a far more difficult task than mere dig out with excavators. Lobbe did a predesign investigation and then designed and implemented a pilot project based on cryogenic technology. Recovering the tar involved injecting liquified nitrogen. The tar hardened, became crumbly, allowing most of it to be removed.

But in the end it turned out that residues in the pits could be cleaned out using conventional removal techniques. Clean-up time, including cleaning of the pit walls, took two months, by working at times in three around-the-clock shifts. Lobbe completed the project and turned over the cleaned facility a week ahead of the projected completion time.
Clean-up and soil remediation at the SpreeGas manufactured gas plant (MGP) necessitated the emptying, material disposal, and clean up of two tar and ammonia pits. Substantial emissions were coming from the face of the pits that were 7 metres deep. Sheet piling had to be driven into the walls of the pits to protect the workers who would enter the pits for the cleaning operations.

To prevent the steel-reinforced concrete pit covers from caving in during the pit clean-up operations, diamond cutting apparatus was employed to dismantle the covers section by section. The tar and construction debris was conditioned in situ using fine grained aerated concrete. Bulky items in the pits were pulled out and disposed of ecologically. "Pure" tar was mobilized and recovered by heating, moved to receptacles for further heating, and finally hauled away in tank trucks. After the tar was removed, the pits were cleaned, sealed, and backfilled. Each step of the entire process was monitored continuously by local environmental authorities.

Task: Develop a clean-up concept; treat and remove the tar
Time frame: 1st pit, August-October 1996; 2nd pit, August 1997-March 1998
Substances: 400 tons of tar residues, phenol water, contaminated soil, construction debris

Cottbus Gas Works
At the start of the project, the tank contained a mixture of phenolic water and tar oil solids. The phenolic water was drained off through outlet pipes near the top before the mixture was heated. A combination pump/heat-exchanger apparatus then heated the tank contents. Materials were removed from the tank through outlet pipes at the base. This procedure substantially reduced the inherent danger of the operation. Coordinating closely with the local mining authorities, a 500-ton crane was used to lift the top from the tank. Excavators removed the remaining contents of the tank. Cleaning and disassembly of the structure prepared it for scrap.
A pit complex full of tar and tar-content building materials had to be cleaned up at the old Spremberg gas works. For decades, the complex had been used as a dumpsite. Large quantities of construction materials and construction apparatus had been dumped into the pits.

The facility – located in a city – bordered on the grounds of a hospital. The area was residential. To keep emissions to an absolute minimum during the clean-up operation, the site had to be completely covered by a giant tent. During all work, the chambers of the pit were kept covered, the sole exception being the chamber being worked on. A large screen was used to separate solids from the materials recovered from the pits. Emissions generated by the operations were filtered through carbon adsorption units for purification. The pit was newly compacted, sealed, and backfilled.
At the Luckenwalde gas works site where tar, gas, and coke were formally produced, a tarpit complex containing tar residues, contaminated soil, and construction debris had to be cleaned and decommissioned. Construction debris had been dumped into the tar pits. The pit cover was taken off and the tar was removed from the three pits by normal excavation and loaded into conical receptacles.

After the tar residues were removed and disposed of, the pits were backfilled, compacted, and sealed. The tar water that had accumulated in the foundations of the gas tank holders was pumped out and disposed of. Before the final cleaning of the area, sludge and sediments had to be disposed of along with the lightly to heavily contaminated excavated earth and recovered construction debris.
Rehabilitation of the “Neue Sorge” tar disposal site in Rositz (Thuringia) was completed at the end of February 2008. Lobbe was awarded the contract in September 2003. Altogether, about 230,000 tonnes of tar, of which the consistency varied from liquid-pasty to solid-pasty, were consolidated using the vertical drill.

At its peak, the daily stabilisation and extraction quantities reached well over 1,000 tonnes, so that in the first phase of the project, which was restricted to six months, it was possible to dispose of around 60,000 tonnes of tar. In the period following admittedly extraction quantities were laid down at a much lower rate. One of the final tasks was to prepare and lay a covering layer impermeable to water.

The tar disposal site Neue Sorge, an opencast mining pit, belonged to the erstwhile GDR industrial complex the “Tar-processing factory Rositz” (Teerverarbeitungswerk Rositz), which was located right in the middle of the village.

Between June 1998 and May 2000, Lobbe had already disposed of some 40,000 tonnes in total of production waste, earth and building rubble from this location. The complete area of the tar-processing factory was converted into a recycling-park, where in the meantime a number of new businesses have moved in.

Task: Clean up of the tar dumpsite “Neue Sorge” in Rositz (Thuringia)
Time frame: September 2003 to February 2008
Substances: 230,000 tons of tar
Lobbe was commissioned to collect and recycle tar-laden residues from the Terpe waste dump and the Zerre storage area in the ARGE VTL (Arbeitsgemeinschaft “Verwertung Teerdeponien Lausitz”). The tar waste originated from brown coal processing undertaken at the Schwarze Pumpe gas combine of the former GDR.

Rehabilitation work began in January 2000 and was successfully finished in September 2006 with public support. The project was always right on schedule.

The sediments involved tar oil residues (tar oil solids) containing a variety of tar oils, water and solids in various consistencies. Lobbe was tasked with not only designing and planning the project, but with restoring and conditioning the tar oil solids as well. This included the construction and commissioning of a facility for accepting and processing liquefied tar oil solids.

For the liquefied tar oil solids, Lobbe was able to make use of a floating dredger already on hand at the Zerre site to recover some 200 tonnes of residues each day, pumped under 100-bar pressure through pipes to the storage area. Starting in Autumn 2000, a facility was brought online to pelletise some 300,000 tonnes of tar oil residues for later recycling in the secondary raw material recycling centre. Synthetic gas created in the initial steps was also converted to ultra-pure methanol.

Zerre and Terpe Tar Pits
The total rehabilitation project involved completion of the following primary projects:

- Recovery of 120,000 tons of liquid/pasty tar oil solids from the Zerre storage site using a floating dredger, as well as 20,000 tons of liquid/pasty tar-oil solids from the Terpe waste product heap; heating and homogenisation of the recovered tar oil solids.
- Recovery of 360,000 tons of solid/pasty tar-oil solids, as well as 69,000 tons of coal dross and mud using excavating technology.
- Pelletisation of the solid/pasty tar oil solids and of the coal dross and recycling of the pellets using a fixed bed gasifier.
- Purification of approximately 1 million m³ of ground water, as well as the disposal of 40,000 m³ of heavily contaminated surface water.
- Temporary storage and refilling of approximately 300,000 m³ of soil, construction debris and slag using mobile earth moving technology; backfilling including certification of compaction.

The use of the existing facilities for backfilling and disposal and the construction of the new storage and loading facilities provided for a significant improvement in the quality of the product. The pelletisation facility opened in the second half of 2000, fulfilled the requirements for the recycling capabilities of solid/pasty products. Once all investments were made available, the two landfills were dismantled parallel to one another, including recycling of the recovered product volumes.
The central part of the three tar lakes, the pollution typical of gas-works spread right into the ground-water, and had to be removed. Lobbe had set up a working consortium together with Preiss-Daimler Industries for rehabilitation of the tar lakes. Management of the project encompassed establishment of the building site, recovery and reprocessing of the tar, tar-like residues and the contaminated earth, and separating out and disposal of the pollutants as well as refilling and compaction of the whole area. The final stage was to seed the area with grass.

Throughout the operation, work was accompanied by a comprehensive programme of examinations and measurements. In preparation for the main clean-up campaign, a pilot clean-up had already indicated what would be required in terms of excavation equipment, emission and water protection, material characteristics and provisions for safety at work.
The lightly contaminated water was purified on-site before returning it to the local sewage system. Heavily contaminated water required off-site treatment. Tar mixtures with viscosities allowing material to be pumped could be thermally conditioned. For this process, a modular heating system was set up at the site. Heavy viscous materials were dug out using normal excavation equipment. Removal of the partially fluidised residues required special treatment: Foam mortar was added to the material as a binding substance. This increased the viscosity of the material, allowing it to be normally excavated. The recovered material was moved on special conveying ramps and hauled away in covered vehicles. 

Chemnitz Gas Works

The former gas works at Chemnitz included a pit complex containing tar and contaminated water that had to be cleaned out.

Lobbe did treatability testing and predesign investigation to analyse the situation to determine the magnitude of the contamination as well as to establish the most expedient and appropriate clean-up methodologies.

Task: Empty and clean up the Chemnitz gas works pit complex

Time frame: June 1999 to April 2000

Substances: 2,000 m³ solid tar sediment as well as viscose tar residues and 4,400 m³ of water

Chemni tz Gas Works

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Lobbe emptied, disposed of the materials, and cleaned three settling basins on the grounds of the former Schwarze Pumpe gas combine. In preparation for the demolition of the entire facility, the goal of the clean-up project was to rid the area of tar-oil products that had been stored for years at the site.

The tar-oil products that were still fluid were removed by means of an excentric worm-drive pump fitted to the boom of a crane. The Lobbe vertical cutter was employed to mechanically “work” the tar in the immediate vicinity of the swivelling crane. This homogenized the residue and substantially enhanced the capability of the material to be pumped. A cable dredger was used to remove the solid residues. Fine grained aerated concrete was used to stiffen the residues for loading and haul away to the appropriate processing facilities. A wrecking ball attached to the crane, in addition to specially-configured steel elements, and high pressure water jet technology were used for the final cleaning of the settling basin walls.
Exploratory drilling for oil on the Usedom island has left behind a number of drilling sludge catch basins. Two of those basins in the vicinity of the Lütow community contained highly contaminated soils and sludge that had to be removed to eliminate actual endangering of environment with the goal of preparing the land for farming. The varieties of contaminated substances in the drilling sludge, as well as the differing types and levels of contamination, necessitated a comparable variety of clean-up and disposal technologies. Compounding the problem, the mixtures contained foreign substances that had to be sorted out and removed. Lobbe’s vertical cutter was used to condition the sludge to solidify it to the point where it could be landfilled. Following that, the recovered materials were disposed of and the trenches backfilled with top soil from the area. The entire project – conditioning 11,000 tons of sludge – was accomplished in the record time of less than ten weeks.