

Site Communications

Joachim Cordshagen
Spokesman Sites
Phone: +49 841 89-36340
E-Mail: joachim.cordshagen@audi.de
www.audi-mediacyenter.com

Site Communications Ingolstadt

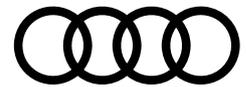
Christina Floss
Spokeswoman Site Ingolstadt
Phone: +49 841 89-38230
E-Mail: christina.floss@audi.de

January 2019

BASIC PRESS INFORMATION

IN-Campus GmbH

IN-Campus Project: New Audi technology park on remediated site	2
▶ The previous history: Ingolstadt, center of oil refining	2
▶ 2015: IN-Campus GmbH is established	3
Pollutants	3
The Methods Used for Remediation	4
▶ Groundwater treatment: A series of cylinders featuring a treatment stage cleans the groundwater	4
▶ Air sparging: Air against pollutants	4
▶ Excavated soil: Remediation using the honeycomb method with downstream soil washing	5
▶ Making certain: Working together with experts and authorities	5
The Remediation Objectives	6
Statements on IN-Campus	7



IN-Campus Project: New Audi technology park on remediated site

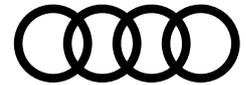
Audi is building its future, and to do so, it is revitalizing an industrial wasteland. Not far from its main factory in Ingolstadt, the company is developing the IN-Campus, an innovative technology park, on the site of a former oil refinery. IN-Campus GmbH, a joint venture between AUDI AG and the city of Ingolstadt, is working with partners to employ ingenious methods of decontaminating land that is heavily polluted in places. This remediation project is one of the biggest of its kind in Germany and unprecedented as an environmental project in Bavaria. The clean-up has been under way for more than a year now, and is due to finish by the end of 2022.

“IN-Campus” refers to a technology park that Audi is going to be building at its Ingolstadt site—a center for development and preliminary design that will one day be a place of work for thousands of experts. On the IN-Campus, Audi will be creating space for diversity and a culture of innovation. It will be a new working world for highly skilled Audi employees and high-tech service providers. The company has partnered with the city of Ingolstadt to form a joint venture named IN-Campus GmbH. The IN-Campus does not require any undeveloped land to be covered up—on the contrary, the project will breathe new life into a heavily contaminated industrial wasteland. The clean-up process required is projected to take around five years.

► The previous history: Ingolstadt, center of oil refining

The 75-hectare site, a rectangle rounded at the northwestern corner, is situated next to the A9 freeway in eastern Ingolstadt, not far from the main Audi factory. Between 1965 and 2008, Erdölraffinerie Ingolstadt AG (ERIAG) produced a range of petroleum products here on land covering roughly 100 hectares. ERIAG, which was subsequently incorporated into Bayernoil mbH after a series of mergers, was one of five refineries to be set up in the Ingolstadt area in the 1960s. The Bavarian state government had two objectives in mind at the time: To develop the local economy and to supply the surrounding major cities of Munich, Nuremberg, Augsburg and Regensburg with affordable energy. The crude oil processed by the refineries in Ingolstadt was delivered through newly erected pipelines from ports in Italy and the south of France.

When the Bayernoil refinery group entered a period of crisis at the turn of the millennium, it decided in 2005 to cease operations at the ERIAG site. Demolition work on the facilities began in 2008, and the land was cleared in three stages across three separate sections. Two smaller segments of the land were transformed into the Audi Sportpark—the home stadium of FC Ingolstadt—and a business park.



The structures that had previously stood on the 75-hectare area on which the IN-Campus will now take shape were demolished between 2010 and 2013. The site's location is ideal for AUDI AG thanks to its proximity and good transport links to the company's headquarters in northern Ingolstadt, where there is little room for expansion. It helped that it was possible to purchase the entire plot of land directly from Bayernoil for the symbolic price of one euro.

► **2015: IN-Campus GmbH is established**

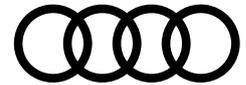
IN-Campus GmbH, a joint venture between AUDI AG and the city of Ingolstadt, was established in April 2015 to handle the project. Both partners have identical voting rights, while Audi holds a 95.1% financial stake in the company. The land purchase was certified in fall 2015. IN-Campus GmbH, the city of Ingolstadt and Bayernoil Raffineriegesellschaft mbH signed the public remediation contract in May 2016. This sets binding targets for all contaminant content, as stipulated by the German Federal Soil Protection Act and its regulations.

Pollutants

Bayernoil had the first exploratory drilling conducted back in the middle of the last decade so that an estimate could be made as to the structure of the layers of soil and the amount of contamination. To support the first round of sampling, IN-Campus GmbH commissioned a second and more thorough investigation in 2015, which involved driving probes down to a depth of 15 meters. The samples from the 1,200 or so drilling operations and 250 groundwater measurements were examined in more than 50,000 laboratory analyses. These focused on three types of contaminant:

- Volatile aliphatic (C5–C9) and aromatic hydrocarbons as components of gasoline and similar products
- Total petroleum hydrocarbons (C10–C40) as residue from petroleum processing
- Perfluorinated and polyfluorinated chemicals (PFCs) as residue from firefighting foam

The investigations made it possible to draw up a pollutant map, which showed that 22 of the 75 hectares—more than 30 soccer fields—were contaminated, especially in the areas where processing facilities and the blender for the end products used to stand. All in all, 900 metric tons of fuel oil, 200 metric tons of light gasoline and 150 kilograms of PFCs had entered into the soil. The PFC residues, which were particularly problematic, had come from the foam that the plant fire department had sprayed during its drills and that had dispersed into the groundwater over a wide area. Across the entire site, the water table was just one meter or so below ground level, and it has risen further in recent years on account of regional factors.



The Methods Used for Remediation

Once the last remnants of the Bayernoil facilities had been removed, remediation work began in fall 2017. Following the direction of groundwater flow—and the work process of the former refinery—it is taking place in stages, starting at the northwest of the site and moving toward the southeast. It is being carried out by ARGE IN-Campus GbR, a consortium comprising ZÜBLIN Umwelttechnik GmbH, the Geiger Group and STRABAG Umwelttechnik GmbH. Each of these three companies is concentrating on a particular aspect and using special high-tech methods in the process.

► **Groundwater treatment: A series of cylinders featuring a treatment stage cleans the groundwater**

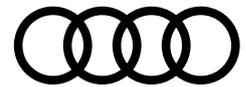
Remediation on the IN-Campus site began with the installation of a hydraulic groundwater treatment system. It prevents the polluted groundwater, which moves at a rate of up to two meters per day, from flowing into the adjacent areas. At the southeastern edge of the site stands a series of ten wells fitted with electric pumps. Every hour, they pump as much as 210 cubic meters of groundwater out of the soil—roughly enough to fill 1,400 bathtubs.

A treatment system cleans the groundwater by removing pollutants before infiltration trenches in the northeastern section of the site, designed to reflect natural processes as much as possible, return it to the soil. The multi-stage process incorporates active carbon filtration and achieves over 99.9% purification. The system, which features a 4.5-kilometer network of pipes, entered operations in early 2018. It has been running completely automatically ever since, with no interruptions. It is not expected to be switched off until 2028, when the operators can be certain that the residual pollution in the groundwater is below the specific remediation targets.

► **Air sparging: Air against pollutants**

Air sparging is a method of removing volatile hydrocarbons from the groundwater and soil. It works by a process similar to blowing air through a straw into a glass of a carbonated beverage and thereby pushing the carbon dioxide out of the liquid. Every second, one cubic meter of air is propelled through hundreds of pipelines into the soil and groundwater. As it passes through a contaminated area, it picks up the pollutants dispersed in the soil and groundwater. Just beneath the surface of the site, the air is extracted through drainage pipes. After being cleaned by various methods, it is released.

Over an area covering 100,000 square meters—the largest yet treated by this technique—up to eight air sparging systems run simultaneously and completely automatically, cleaning 400,000 cubic meters of soil. At the same time, the ground is supplied with oxygen in order to facilitate the natural breakdown of non-volatile contaminants.



► **Excavated soil: Remediation using the honeycomb method with downstream soil washing**

Eliminating the firefighting foam chemicals and total petroleum hydrocarbons, most of which can be found in the center and at the southern edge of the site, requires the polluted soil to be excavated and cleaned. Some of this is being done by conventional digging, but the vast majority is being carried out by means of an innovative honeycomb method. This is based on a leader-guided vibration system—a ram mounted on caterpillar tracks that features GPS-based precision control down to the nearest centimeter.

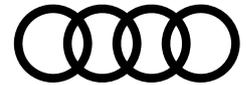
The hydraulic ram vibrates a steel hexagon measuring two meters across deep into the ground. Depending on the depth, it can capture up to 30 metric tons of material, which is picked up with a special grapple and immediately replaced with cleaned soil. It takes around four minutes to carry out one cycle of this process, and it is much more precise than conventional excavation. It also avoids problems with groundwater because the vibrations compress the soil slightly for a short time, preventing the groundwater from penetrating the hexagon from below. In total, the steel hexagons are excavating 600,000 metric tons of polluted material from the soil over 33,000 cycles, mostly involving the sand and gravel of various grain sizes typical of the site.

Trucks carry the excavated material to the on-site soil washing facility, which comprises a collection hall and a 17-meter washing tower. Over several stages, including a cyclone separator, a rotating drum, a log washer and a chain of vibrating screens, water is used to clean pollutants from the soil grains. Roughly 350 cubic meters of water flow through the facility per hour, circulating via a treatment system. An exhaust air system cleans the air in the building, which is off limits to personnel without respiratory protection. The vehicles that deliver the polluted material are fitted with sealed cabs, and the route they take out of the facility leads them over a wheel-washing system.

The daily input of contaminated material can reach 1,200 metric tons. Less than 10% of that needs to be disposed of as waste. The vast majority of the cleaned soil is sorted by the system's screens, transported outside on conveyor belts and put back into the hexagonal "honeycomb" holes on the site. Due to the high water table, ARGE IN-Campus GbR will be raising the ground level by roughly one meter on average across the site once remediation is complete. The soil needed for this will come from construction sites in the region.

► **Making certain: Working together with experts and authorities**

The remediation of the IN-Campus site is one of the largest ongoing projects of its kind in Germany and the first complete remediation of a refinery site ever to take place in Bavaria. Audi's environmental protection and construction departments, in tandem with the city of Ingolstadt, are in unfamiliar territory in this respect, which is why they have made sure to get some experts on board. There is a team of independent technical experts who visit the site almost every day and are monitoring the progress of the remediation work and documenting it



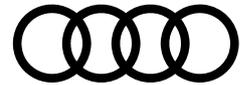
in a geospatial information system. Furthermore, IN-Campus GmbH is in constant contact with the environmental office of the city of Ingolstadt, which in turn is cooperating with additional authorities and experts.

The Audi project has prompted plenty of interest from the academic world, as well as citizens' initiatives, several industrial sectors and a range of municipalities that have their own battles with contaminated land. The site frequently receives visitors from as far afield as China and Mongolia, who come to find out about how the brownfield operation works. AUDI AG is particularly committed to making sure that the expertise that is built up over the course of this project is passed on for the common good.

The Remediation Objectives

Apart from groundwater treatment, the remediation work is due to finish by the end of 2022, at which point it will be possible to enter the site on the Bavarian state register of contaminated land as "remediated for use." IN-Campus GmbH will then use 60 hectares of the land for business and industrial purposes, while the remaining 15 hectares in the north and east will be set aside for ecological compensation. Here, there will be a fluid transition from the campus to a near-natural alluvial forest, containing calcareous grassland, willow and maple trees and habitats for various types of wildlife, including a number of endangered species. Plans are being coordinated with associations such as Friends of the Earth Germany or the Landesbund für Vogelschutz in Bayern, an association for the protection of birds.

Construction of the IN-Campus began in the northwestern section of the site—an unpolluted zone where the office buildings for the refinery once stood—in fall 2018. The first building is the "Project House," which will cover 44,000 square meters. This complex of four blocks is due to be completed by the end of 2020, ready to accommodate around 1,400 Audi employees and development partners working in the field of new technologies. It will gradually be followed by additional structures including a vehicle safety center, an IT center and an energy management center. Work is already ongoing during the current winter 2018/19 period to set up the infrastructure, such as the access roads, lines and pipes.



Statements on IN-Campus

Dr. Christian Lösel, Mayor of the city of Ingolstadt: “What is gradually being created here is a center for advanced and pioneering technologies and innovations. I am particularly pleased that after extensive remediation, the old refinery site will find its place as an important element in the future of Ingolstadt. That is a win for the city and the environment.”

Thomas Vogel, Managing Director of IN-Campus GmbH (AUDI AG): “I view the project as an enormous opportunity. In developing this area, we are making a hugely important contribution to the future viability of Ingolstadt as a high-tech hub and for the wider region.”

Norbert Forster, Managing Director of IN-Campus GmbH (IFG Ingolstadt): “Once IFG and AUDI AG have gotten the freight handling center – already one of the most state-of-the-art logistics facilities in Europe – up and running, we will make the IN-Campus project another milestone in digitalization and innovation.”

Klaus Mittermaier, Chairman of the General Works Council of AUDI AG: “The sustainable remediation of the site is a logical step toward the future. We are turning an industrial wasteland into an innovative industrial center that can secure jobs in the region and take some of the strain off Ingolstadt’s infrastructure.”

Dr. Rüdiger Recknagel, Head of Environmental Protection at AUDI AG: “What we are carrying out here is an environmental project par excellence. We are making a commitment to Ingolstadt as a location and writing city history at the same time. We are proud to be conducting the first comprehensive remediation of a refinery site in Bavaria with this eco-friendly remediation project. In so doing, we are giving something back to both society and nature.”