

GNS.

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English Edition



The Oldest CASTOR®
40th Anniversary at Zwiilag

Recycling During Dismantling
Melting Down in the USA

Award at PATRAM
Outstanding Presentation of Missile Test



Excellence for Nuclear.

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The world's longest-serving CASTOR® cask in the Zwiilag in Switzerland. Photo: Valérie Deckers, Zwiilag

GNS Takes Over Remaining Shares of Höfer & Bechtel

With the acquisition of the remaining shares not previously held by GNS on 1 January 2023, Höfer & Bechtel GmbH has become a wholly owned subsidiary of GNS.



Dr. Jens Schröder and Georg Büth signing the contract with Hagen Höfer and Sascha Bechtel (from left to right).

At the beginning of 2019, GNS had already acquired 51 % of the company shares of the nuclear technology and dismantling specialist from Mainhausen (see GNS magazine 11). As part of this share acquisition, it was contractually agreed that the remaining 49 % would also be acquired by GNS at a later date. This step has now been completed with effect from 1 January 2023.



Editorial



Dear Readers,

On 15 April 2023 it has become reality: With the shutdown of the last three nuclear power plants that were still in operation, the use of nuclear energy in Germany is history.

A national fleet of plants which, thanks to its outstanding reliability, safety awareness that continues to be beyond doubt, and the exemplary commitment of all employees in the nuclear industry, year after year occupied top positions among the world's production champions, has now finally become the world's largest decommissioning programme.

The challenges for the operators and the supporting companies are immense, just as they are for the authorities and experts, since new ground has to be broken again and again and capacities cannot be expanded at will. We at GNS have consistently strengthened our corporate group as a partner for dismantling in recent years and are now the largest dismantling and disposal services company in Germany. Our GNS family has grown to around 1,000 employees in recent years.

Eisenwerk Bassum (EWB) is making a special contribution to this. With a view to our customers' needs, we are currently working on the largest investment project in GNS history. Through site expansions and new hires, the capacities for the large numbers of steel sheet containers needed in dismantling are to be tripled by the end of 2024 (p. 10). Likewise, the capacity for MOSAIK® casks in the GNS cask manufacturing center in Mülheim will be further expanded. This is because only GNS casks and EWB containers can be used for packaging dismantling waste suitably for final disposal in Germany.

With a new management team, a focussed structure and new employees, WTI is also preparing itself for the further challenges of dismantling (p. 16). In many other areas, we are adapting our staffing levels to the growing tasks, for example in the documentation of waste and containers, which is indispensable for preparing for final disposal.

In our Cask Division, supporting the "defueling" of the German power plant fleet is a high priority. More and more plants are already completely defueled and for the remaining nuclear power plants the timetable is set until really all fuel elements and quivers have been loaded into our casks and brought to the on-site interim storage facilities (p. 28). An important milestone for our customers. Because with the removal of the spent fuel, the majority of all radioactivity at the site is safely packaged and the dismantling can really get started.

In our large-scale dismantling projects already underway, we are making good progress at all sites. In Unterweser NPP, following the dismantling and packaging of the reactor internals as part of the ZerKon consortium (see GNS magazine 13), the dismantling and packaging of the reactor pressure vessel itself is already nearing completion – the ReaDi consortium working here consists exclusively of companies from the GNS Group, and during the actual dismantling of the reactor pressure vessel, which weighs several hundred tonnes, the unique large band saw system from Höfer & Bechtel – affectionately called "The Beast" – is impressive (p. 18). The fact that our competences can also cause a stir internationally is proven by the award for the best lecture at this year's PATRAM for the presentation of a spectacular missile test (p. 17) for a CASTOR® cask developed for international customer requirements. In addition to the long-running major orders with customers in Belgium and Switzerland, we are aiming at further international markets with further developments based on our proven cask technology.

We are particularly proud that we will be able to expand our commitment in Switzerland at the beginning of 2024 with another CASTOR® supply contract for the Leibstadt NPP.

In all markets, our efforts are equally focused on the needs of our customers. We have been conducting continuous customer satisfaction surveys since 2021. We are pleased with the satisfaction score of 84 % achieved for 2022 and would like to express our sincere thanks for the feedback we received. The detailed evaluation shows us which improvement requests our customers have. We are consistently addressing the points in order to fully meet our own claim: Excellence for Nuclear. We want to deliver outstanding results and satisfy our customers. You can discover what we are doing to sustainably achieve our vision in this GNS magazine!

Daniel Oehr
Chairman of the Management Board of GNS

Consistent appearance of all companies of the GNS Group

Stronger Together



After the spin-off of the interim storage activities with two sites and a total of 150 employees in 2017, the workforce of GNS Gesellschaft für Nuklear-Service mbH has grown significantly again in recent years. And through the strategic acquisitions of Eisenwerk Bassum and Höfer & Bechtel, the number of employees of all companies in the GNS Group has now risen to around 1,000. The two companies added in

recent years complement the portfolio of GNS and its long-standing subsidiary WTI with capacities and competences that play a decisive role, especially in dismantling. In order to underline the unity of this powerful group of companies, they also present themselves in a consistent manner – under the sign of the common symbol for the safe containment of radioactive materials.

Excellence for Nuclear.

At the centre of all the activities of the GNS Group is the jointly formulated claim for all products and services: Excellence for Nuclear. In order to be able to prevail in the increasing competition in Germany and even more so in international markets, we want to stand out from the competitors with innovative solutions and deliver outstanding products – to satisfy all our customers. This is what “excellence” means: Our promise to our customers and our claim to ourselves.



GNS2022 EXCELLENCE AWARD

Excellence within a company is only possible in the long term as a team. As an incentive and recognition for outstanding team performance, GNS has created the GNS Excellence Award, which will be awarded annually in three categories to the outstanding projects of the previous year.

The best projects in these three key categories will be identified:

- Excellence in Innovation
- Excellence in Customer Orientation & Sales
- Project of the Year

Every GNS employee can nominate one project per category for the Excellence Award, self-nominations are not possible. From all nominations, a jury will draw up a short list of five nominations per category. The teams on the short list will write a letter of application. On this basis, the jury will select one team per category as the winner.

The best projects for 2022 have already been shortlisted and the three outstanding projects will be honored at an award ceremony to which the team members of all projects on the short list are invited. After all, they have all done excellent project work and are therefore already winners!



Excellence in Innovation	Excellence in Customer Orientation & Sales	Project of the Year
IT tool status query for project control	AXPO Beznau – Concepts for Complete Defueling	BKW Mühleberg – Approval and delivery of CASTOR® V/52 Switzerland
Multitool for optimised cask handling	AXPO Leibstadt – CASTOR® geo69	MOSAIK® Type approval KONRAD
Sandwich baffle plate for weight reduction	Engie Electrabel – Disposal of core internals	Production readiness CASTOR® HAW28M
Interlocking-Grid-Baskets for capacity increase	Projekt 2031 – long-term safeguarding of melting capacities	GKN I – Dismantling and packing of the RPV and RPV internals
Future model of the Jülich facility (business area innovation)	Synatom – Completion and handover of initial CASTOR® geo24B	Kopernikus – Introduction of SAP HANA

Cover story

The Oldest CASTOR® Celebrates 40 Years of Service

CASTOR® casks from GNS have been providing safety in transport and storage for decades. More than 1,600 of them are loaded in more than 20 interim storage facilities on three continents. The longest-serving of them all recently celebrated its 40th anniversary: The CASTOR® Ic DIORIT at Zwiilag in Switzerland looks back on a surprisingly eventful history.



The world's longest-serving CASTOR® cask in the Zwiilag in Switzerland. Photo: Valérie Deckers, Zwiilag



Historical photograph of the DIORIT research reactor in Würenlingen. Source: Paul Scherrer Institute

Today, you could easily overlook it in Zwiilag, the central Swiss interim storage facility in Würenlingen in the canton of Aargau, as it is dwarfed by its brand-new great-grandchildren of the CASTOR® V/52 (CH) type. For more than 20 years, however, it stood all alone in the neighbouring Paul Scherrer Institute (PSI).

But let's start from the beginning: The DIORIT was a research reactor developed in Switzerland by the Swiss Federal Institute for Reactor Research (EIR) in Würenlingen, which was founded in 1960 and used heavy water as moderator and coolant. It used both natural and enriched uranium and was in operation for 17 years until it was finally shut down in 1977.

In Germany, at about the same time, namely at the beginning of 1978, GNS was commissioned by the German nuclear power plant operators to develop a cask which, for the first time, was to be used for the transport as well as the long-term interim storage of irradiated fuel elements. A worldwide novelty and the birth of the CASTOR® cask.

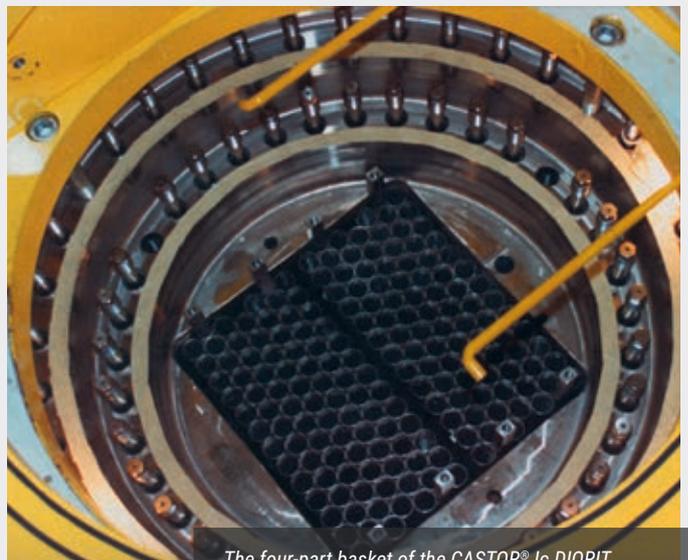
The first large CASTOR® order

As early as 1980, the first casks developed by GNS were approved for use in Germany. The utility PreussenElektra ordered seven CASTOR® casks as a reserve for unloading its Würgassen nuclear power plant in case transport to reprocessing in France was not possible as planned – the first large CASTOR® order from GNS. The designation of the casks was "1c", where the Roman "one" stood for the minimum decay time of the fuel elements before loading and "c" for the variant for boiling water reactor fuel elements.

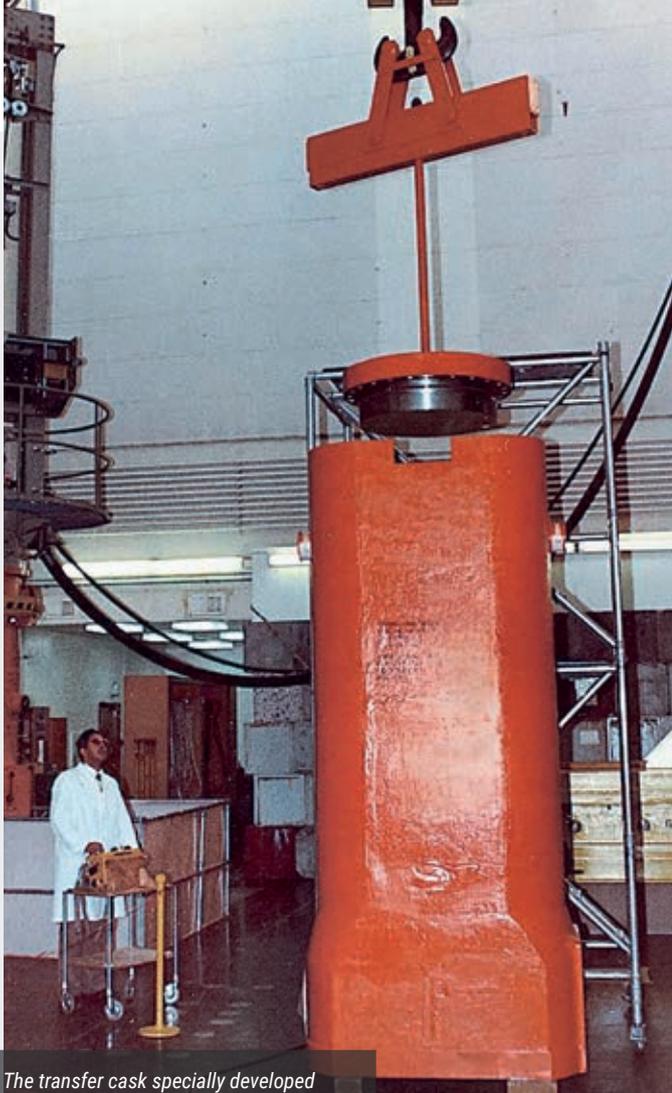
Meanwhile, in Switzerland, as part of the preparations for the dismantling of DIORIT, the EIR was looking for suitable packaging to remove the 349 fuel assemblies, each two metres

long, from the DIORIT. In the process, they came across the world's first dual-purpose cask from Germany.

However, the CASTOR® 1c, which was actually well suited for the fuel elements of the DIORIT, was quite a bit too heavy. With its almost 80 tonnes, it exceeded the capacity of the reactor crane and thus could not have been loaded at the fuel pool. To circumvent this restriction and not have to bring in the CASTOR® itself at all, the GNS cask specialists developed a separate transfer cask. And in order not to exceed the capacity of the reactor crane, the original basket was quartered. The fuel elements could now be taken out of the reactor building in the respective quarters with the help of the transfer cask and loaded into the CASTOR® 1c DIORIT in a neighbouring building.



The four-part basket of the CASTOR® 1c DIORIT.



The transfer cask specially developed for unloading the DIORIT.

For this purpose, novel technology such as a mobile loading cell and remote-controlled handling systems were used. Despite all these technical challenges, the loading was completed in twelve days and the entire project was finished after just 22 months in April 1983. The first CASTOR® cask for longer-term interim storage was loaded and stored.

Repeated leak tests

Ensuring the leak tightness of the cask played a decisive role in all steps of the work. Even before its delivery in 1982, the function of the safe enclosure was verified at the GNS production site in Mülheim. This was repeated after the fuel was loaded in 1983 at its first storage location at the DIORIT reactor. To make room for dismantling, the cask was moved two years later to another storage spot at the same location, where it was leak-tested again.

In the summer of 2004, after the EIR had been merged into the newly founded Paul Scherrer Institute (PSI), the CASTOR® Ic DIORIT was transferred from the PSI to the central Swiss interim storage facility Zwiilag, which had been built in the neighbourhood. Leak tests of the cask in August 2004 confirmed the measurements of 1982, 1983 and 1985 without any deviation. The cask was and is constantly connected to

a monitoring system during its storage and has at no time deviated from its design pressure limits.

In good company at Zwiilag

At Zwiilag, things have been a little quieter around the veteran cask recently. Over the years, numerous casks of younger generations with irradiated fuel elements from Swiss nuclear power plants and waste from reprocessing have been added, including casks from GNS of the CASTOR®HAW 20/28 CG, CASTOR® HAW28M and CASTOR® V/52 (CH) series. And in the not too distant future they will be joined by the first CASTOR® geo casks developed for Switzerland.

This proves all the more true the statement made by PSI during PATRAM 2004 after the relocation to Zwiilag: "Against this background, the CASTOR® Ic DIORIT cask has proved to be a pioneering milestone on the way to a long-term solution for nuclear waste management."

The new-generation casks clearly surpass their forebear. Photo: Valérie Deckers, Zwiilag



GNS supplies all Swiss nuclear power plants

CASTOR® geo69CH for **Leibstadt**

GNS has signed the first contract with Kernkraftwerk Leibstadt AG for casks of the CASTOR® geo series for a boiling water reactor, thus completing the supply of all four Swiss nuclear power plants.



Dr. Bruno Zimmermann and Roland Schmidiger (AXPO) with Daniel Oehr and Dr. Linus Bettermann.

Up to 65 CASTOR® geo69CH casks are included in the contract GNS signed with Switzerland's newest nuclear power plant, Leibstadt, at the beginning of 2023.

The operators' strategy envisages awarding the contract for the Leibstadt nuclear power plant to two suppliers. Both companies will initially deliver a proof of concept (POC), consisting of obtaining transport approval in Switzerland and type approval

for the interim storage of the casks in the Zwiilag central interim storage facility, as well as the delivery, loading and storage of two transport and storage casks including associated equipment. If the first two casks are delivered on time in 2030, another four casks will automatically be called.

The maximum scope of supply comprises a total of up to 65 casks with delivery into the 2040s.

Eisenwerk Bassum continues to grow



Tripling the Production

Eisenwerk Bassum GmbH's (EWB) investment programme for the period 2022 to 2024 comprises more than 20 million euros, more than tripling the number of containers produced: After 500 KC equivalents* were manufactured in 2021, 1,650 are already on the schedule for 2025. To achieve this, the locations are being expanded and new jobs created.



More space – more production capacity: At the end of the year, production is scheduled to start in the new 4,500 m² hall in Sulingen (right in the picture).



By taking over neighbouring land and buildings (pictured above), the area of EWB's headquarters in Bassum has almost doubled.

EWB has all the necessary test certificates for the production of the so-called Konrad containers (KC), steel sheet containers in five different sizes for the final disposal of radioactive waste in the German repository for ILW/LLW, Konrad. Against the background of the ongoing dismantling of the German nuclear power plants, the demand for steel sheet containers has increased sustainably. In order to be able to reliably meet this demand, EWB invests in existing and new locations and hires new employees.

Expansion in Bassum

In 2022, EWB purchased the premises directly adjacent to the EWB headquarters in Bassum, including the production halls of Bremer GmbH, and took over the welding production there, including all 29 employees working in this part of the plant. The former Bremer production facility was integrated into the EWB plant, which has almost doubled in size as a result.

New production hall in Sulingen

At the Sulingen site, the former headquarters of Maschinen-Meyer GmbH & Co. KG is also investing heavily. On the 4,500 m² area of a newly built production hall, an automated sheet metal storage system is currently being set up for the two newly acquired laser cutting machines. Sheets up to a size of four by two metres can be automatically retrieved from the storage area and fed to the laser cutting machines. Production is scheduled to begin in the new hall at the end of 2023, by

which time various machines will have been moved from the previous production facility. The space freed up there will be used to expand the production of steel drums, which are also used in nuclear waste disposal. In addition, a stainless steel workshop will be built to meet the growing demand for stainless steel components.

More space, more employees

The number of employees is also being increased. Currently, there are about 270 employees at the Bassum, Sulingen and Peenemünde sites, including ten trainees and 15 employees from temporary employment agencies. Reinforcement is being sought at all locations and in all areas. "We expect to have about 300 employees by the end of the year," the three Managing Directors Georg Büth, Harmut Grunau and Alexander Beckedorf are sure.

"We are really writing a success story here," Beckedorf notes. This is because the comprehensive investment programme is backed up by long-term supply contracts for containers and drums until the mid-2030s.

** A KC equivalent corresponds to a standard container with single- or multi-layer concrete liners. Special containers correspond to 1.6 KC equivalents.*

Modular Construction in Deconstruction



Since 1995, the five units of the former Greifswald nuclear power plant in Lubmin/Rubenow have been undergoing dismantling. In the course of the dismantling by EWN Entsorgungswerk für Nuklearanlagen GmbH, the current personnel locks for access to the controlled area will be eliminated in the medium term, but must be replaced as economically as possible for the duration of the further dismantling. No new territory for WTI: The Jülich Entsorgungsgesellschaft für Nuklearanlagen (JEN mbH) has already commissioned WTI to plan a new access to the controlled area in modular design for the experimental nuclear power plant AVR Jülich and WTI was able to use synergies in planning from this project for the EWN contract.



3D visualisation of the access building at AVR Jülich.

Adapted to the needs

In the control area accesses, security gates with whole-body contamination monitors and access control, sanitary areas, personal dosimetry system, ventilation systems in the monitoring and control area and decontamination facilities for the staff including waste water collection are to be provided. In particular, the security gates with the contamination monitors have high traffic loads that must be taken into account when planning the modules. The modular construction method combines the advan-

tages of the solid reinforced concrete construction method and the standard container construction method.

In addition to an individual design of the construction and short construction time, sustainability through possible reuse of the modules at another location is also an advantage of the modular construction method.

The production of the modules includes prefabrication at the manufacturer and subsequent assembly at the construction site.



Prefabrication of the modules at the manufacturer.

Steel frames form the load-bearing structure of the modules. The degree of prefabrication is approximately between 50 and 80 percent and depends on the boundary conditions of the project. Parallel to prefabrication, the floor slab can be constructed on the building site.

The modules are then mounted on the floor slab and the remaining work for the interior fittings, the technical building equipment and the function-related fittings can be completed. Once the dismantling of the nuclear facility is complete, the modules can be disassembled and reused in other projects. The requirements regarding plant safety for nuclear buildings can also be completely fulfilled by modular construction.

Access building for 110 people in Lubmin

To implement the various requirements from laws, regulations and customer wishes, a new three-storey building is required in Lubmin, which separates the supervised area from the controlled area and includes changing rooms as well as the necessary radiation protection instrumentation and the connecting corridor to the existing building (controlled area).

Break room and infrastructure such as radiation protection office, technology and operating rooms as well as the safety and radiation protection equipment required for entering and leaving the controlled area are also located there. A lift connects the ground floor and the first floor. The lift can be used to transport non-contaminated laundry and equipment. Another lift connects the ground floor with the second floor for the transport of contaminated laundry and equipment. The building is designed for about 110 people, with changing capacities for ten women and 100 men.

Interior fittings in Jülich

A two-storey building was constructed for JEN for the experimental nuclear power plant AVR Jülich, which is designed for about 30 people. WTI has been commissioned by JEN for all

planning phases, i.e. WTI is responsible for everything from design and construction supervision to handover to the customer.

In addition to sanitary and changing rooms, the access to the controlled area with the associated facilities is located on the ground floor. Before entering the controlled area, a security revolving door must be passed. Access to the reactor building is via a connecting corridor that links the controlled area access building with the reactor building.

After working in the reactor building, the hand-foot-clothing monitor must first be passed before leaving the controlled area and before crossing the shoe threshold. After that, the full-body contamination monitor must be passed. On the first floor there are rooms for radiation protection, offices and meeting rooms for the staff.

The project is currently in the construction phase: With the granting of the building permit and approval by the nuclear supervisory authority, the reinforced concrete floor slab has been constructed and the prefabricated modules erected. At the moment, the interior work is being carried out and the facade is being completed.

Setting up the modules on the concrete floor slab at AVR Jülich.



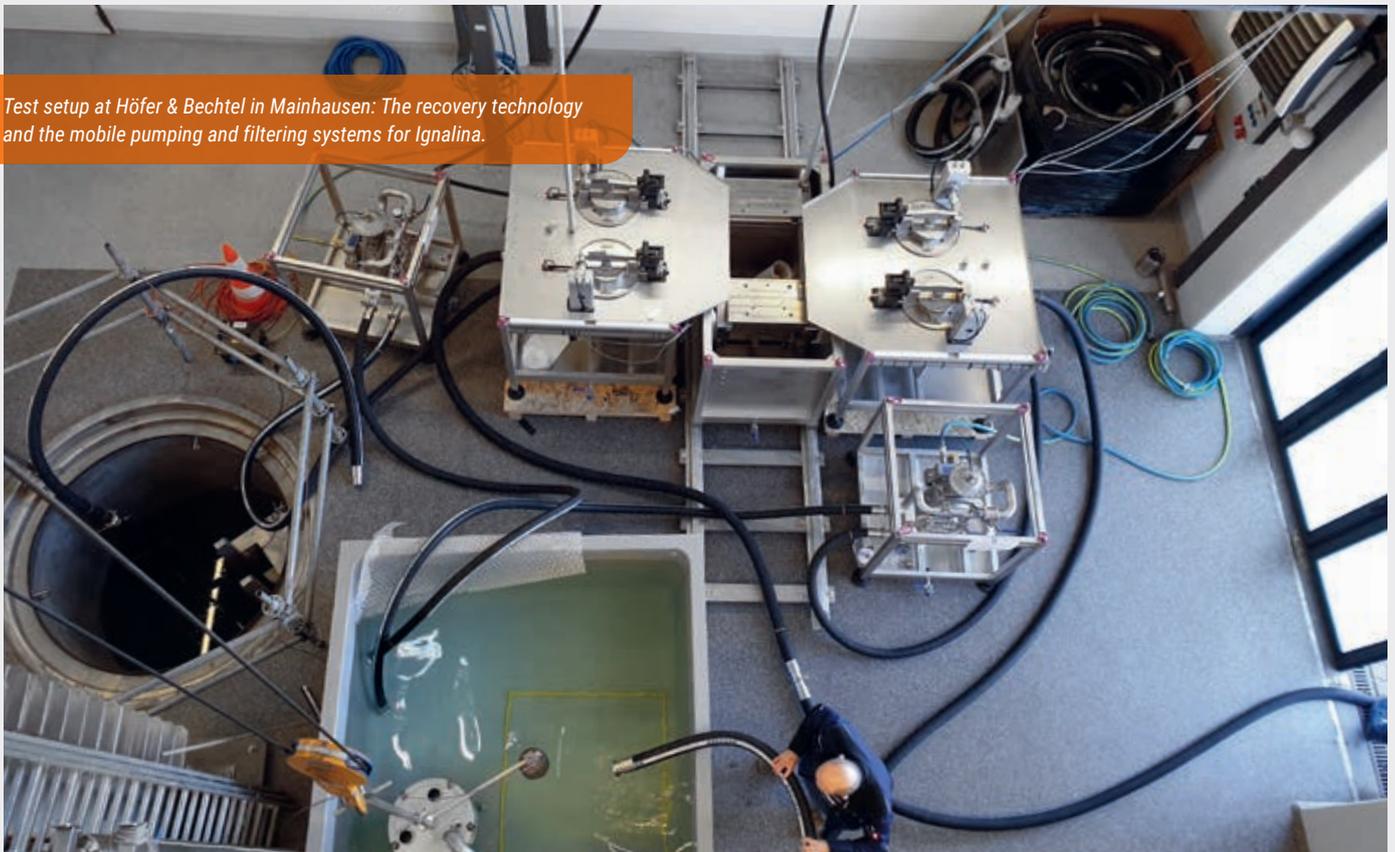
Höfer & Bechtel supports dismantling in Ignalina



Nuclear Fuel-Free Storage Pools

The Lithuanian nuclear power plant Ignalina, or INPP for short, has been one of the customers and users of disposal solutions from the GNS Group for three decades. No other site outside Germany has so many loaded large casks from GNS. Already during the operational phase, more than 100 CASTOR® and CONSTOR® casks were loaded with irradiated fuel elements from what was then the world's most powerful nuclear power plant. After the shutdown of the two power plant units in 2004 and 2009, GNS developed a CONSTOR® cask type with extended capacity especially for the remaining fuel elements from Ignalina. Of these, 190 were loaded and stored on site. In addition, fuel experts from GNS subsidiary Höfer & Bechtel have been working with INPP since 2007 to ultimately achieve the plant's nuclear fuel-free status. For the disposal of defective fuel from the reactors, they supplied the overpacks and the associated special equipment to INPP. And last but not least, the Mainhausen-based company was on site last year to produce a nuclear fuel-free condition for the storage pools. This makes the Ignalina power plant currently the only RBMK plant in the world that has completely removed its fuel assemblies and all fuel residues from the pools – also thanks to technology from the GNS Group!

Test setup at Höfer & Bechtel in Mainhausen: The recovery technology and the mobile pumping and filtering systems for Ignalina.





Decommissioning and Dismantling of INPP

The decommissioning of what was once the world's most powerful nuclear power plant in north-eastern Lithuania was a prerequisite for Lithuania's accession to the European Union in 2004. The programme to decommission and dismantle the two units that were shut down in 2004 and 2009 is financially supported by the Ignalina International Decommissioning Support Fund (IIDSF) supported by the European Union and administrated by the European Bank for Reconstruction and Development.



Video recording while the Corona restrictions were still in effect: The remote replacement of the bag filters as part of an online training session.

"Ignalina Nuclear Power Plant is pleased to announce the successful completion of the Fuel Debris Recovery Project," INPP announced with pride at the end of January 2023. "An important nuclear safety related activity of the ongoing Programme of Nuclear Decommissioning at INPP commenced on August 10th 2020 and completed on December 30th 2022, supported by the specialist expertise of main contractor Höfer & Bechtel GmbH."

Initially, the conditions to clean the bottom of the Storage Pools in the Units 1 & 2 were very difficult due to a significant quantity of large parts submerged and covered in a sludge layer on the pool floors including a number of long rods, parts of radioactive special tooling, different forks, graphite rings, lead sheets and shots used as a weighing material of canisters and other miscellaneous scrap materials. All of the above-mentioned pieces were covered by a layer of sludge, several centimetres thick and consisting of organic matter, dust and metal particles formed during the many years of operation of the Storage Pools. The real conditions for the Fuel Debris Recovery Project only became apparent during the first video inspection made using modern, advanced underwater high resolution video systems and powerful underwater floodlighting provided in the scope of supply by Höfer & Bechtel.

Based on the initial Fuel Debris Recovery Project Programme, following approval by INPP of the Höfer & Bechtel Technical Design documentation and manufacturing, testing and supply of necessary equipment, the activities to clean the Storage Pools in the SPH Unit 1 and perform underwater video surveys commenced in September 2021 and were completed in September 2022 using Höfer & Bechtel specially designed underwater filtration cleaning systems and tools.

The activities to clean the Fuel Storage Pools in the Storage pools of Unit 2 commenced in July 2022 and were completed in December 2022. "The duration of works performance required was reduced by half as a result of the experiences and improved efficiency of the INPP team in preparing the Storage pools," INPP explains the reduced time required in Unit 2.

The total area of the basins that were cleaned under video surveillance was 185 m² per power unit, with a water depth of 18 m and a water volume of 3,000 m³. A total of about 2,500 bag filters were needed to collect the sludge deposits in both units. 1,000 pieces, 400 in Unit 1 and 600 in Unit 2, with a total weight of 500 kg were safely removed from the bottom of the pools. No accidents, incidents or near misses were recorded during the work.

Looking back, INPP summarises: "Close cooperation between the Höfer&Bechtel GmbH and the INPP team in reviewing of real time survey information, survey images and in preparation and review of survey reports enabled the timely completion of the Fuel Debris Recovery Project within time and budget."



Remote replacement of the bag filters.

New Management Strengthens **WTI's Position** for the Future

WTI Wissenschaftlich-Technische Ingenieurberatung GmbH has started the year 2023 with a newly formed management. The first-time establishment of a two-member management board with Dr. Linus Bettermann as Chairman and Roger Vallentin as additional Managing Director is the basis for a restructuring of the organisation and a further increase in personnel in Jülich. This takes into account the growing importance of WTI's tasks, especially in the growth market of decommissioning and dismantling.

On 1 January 2023, Dr. Linus Bettermann took over as CEO of WTI. The nuclear physicist has been employed at WTI's parent company GNS Gesellschaft für Nuklear-Service mbH in Essen since 2011, initially in cask development, later in sales and, since 2021, as Divisional Director Sales & Marketing at GNS. He will exercise the management mandate at WTI in addition to his function at GNS.

Roger Vallentin has also been Managing Director of WTI since 1 January 2023. The mechanical engineer, specialised in reactor technology, has been with WTI since 1992 and was previously Technical Director. Birgitt Sentis, WTI's Commercial Director of many years, now reports to the Chief Executive Officer in her function.

The reorganisation of WTI does not stop at the management: WTI's technical departments have been restructured in the meantime and assigned to the two managing directors. In the course of this reorganisation, reporting lines were also shortened and several competence centres were defined in order to be able to serve customers even more flexibly and in a more customised manner.

Daniel Oehr, Chairman of the Management Board of GNS and until December the only Managing Director of WTI, has resigned from his WTI mandate as of 31 December 2022 and taken over as Chairman of the Shareholders' Meeting of WTI. He explains the organisational measures as well as the additional tasks of WTI and its new management: "The competences and capacities of WTI play a decisive role for the success of the entire GNS Group. Especially in the business fields of dismantling services and waste disposal documentation, WTI will provide even more services in the future and create additional jobs in Jülich. I am pleased that with Dr. Linus Bettermann and Roger Vallentin we have found two experienced colleagues from the GNS Group who will continue the initiated transformation course and lead WTI into the future".



The newly formed WTI Management Board with Dr. Linus Bettermann as Chairman (left) and Roger Vallentin (right) as additional Managing Director together with GNS CEO Daniel Oehr.

Outstanding Presentation at PATRAM

At this year's PATRAM, the leading international Symposium on the Packaging and Transportation of Radioactive Materials, the GNS Group was not only prominently represented as usual with its own exhibition booth and numerous technical presentations. The presentation of a spectacular missile test by Frank Jüttemann was also awarded as one of the outstanding lectures from the conference programme of more than 250 lectures.



The PATRAM team of the GNS Group in Juan-les-Pins.



Award ceremony for the best presentation.

As a rule, PATRAM, short for "Packaging and Transport of Radioactive Materials", takes place every three years at changing locations in Europe, America and Asia. Due to the pandemic, the 2022 PATRAM had to be postponed by one year. At this year's catch-up event in Juan-les-Pins, France, with 750 participants from 28 countries, the GNS Group contributed seven technical presentations and a poster to the five-day conference programme. Traditionally, the organiser WNTI, the World Nuclear Transport Institute, awards prizes for the various contributions to the symposium at the end of each PATRAM. The Aoki Awards recognise speakers for outstanding presentations.

Frank Jüttemann, Head of the Cask Development Department at GNS, was able to convince the jury with his presentation on the missile test with a CASTOR® geo test specimen to prove the required cask tightness after an aircraft crash (see GNS magazine 13). Out of the 259 papers presented at the conference, his contribution was awarded the prize for best paper. Every year, three

presentations are awarded equal prizes as "best". And this was certainly not only due to the spectacular film and image material of the steel projectile hitting the cask body at 1,200 km/h. Above all, the convincing result of the subsequent leak tests made the missile test and thus also the PATRAM presentation a complete success.



Frank Jüttemann presents the spectacular missile test from 2021.

The Heart Disappears

The heart of any nuclear power plant is the reactor pressure vessel (RPV), which weighs several hundred tonnes. Its internals are the first to be dismantled and disposed of during decommissioning. This is followed by the dismantling and packaging of the actual RPV and the RPV head.

GNS is still working in the ZerKon consortium, consisting of GNS as consortium leader, Westinghouse Electric Germany and Westinghouse Electric Sweden, on the dismantling and packaging of the reactor pressure vessel internals (RPV-I) and the core scrap (CS) at four of the six PreussenElektra (PEL) sites that were initially contracted.

In the ReaDi project GNS was commissioned with the dismantling and packaging of the RPV and the RPV head at three sites of the PEL fleet together with the GNS subsidiary Höfer & Bechtel.

ZerKon: Further call-off orders for the sites KKI 2, KBR and KWG

In 2022, PreussenElektra had awarded the ZerKon consortium the contract for dismantling and packaging the RPV-I and the CS of the Isar 2 (KKI 2) and Brokdorf (KBR) nuclear power plants as the fourth and fifth plants in the PreussenElektra fleet, respectively.

The planning phase at KKI 2 has been underway since September 2022.

At KBR, the planning phase started in August 2023, at KWG it is expected to start at the beginning of 2024.

ZerKon: Grafenrheinfeld nuclear power plant (KKG)

In 2019, ZerKon had been awarded the contract to dismantle and pack the RPV-I and the CS of the KKG by PreussenElektra. After 24 months of planning and 18 months of execution, the work was completed on time and the basin floor was cleared two days before Christmas Eve 2022. Prior to this, ZerKon dismantled approx. 155 t of RPV internals and core scrap, packed them into 140 containers and handed them over to the customer. After KKG had removed the fuel assembly storage racks still present in the fuel pool at the beginning of 2023, ZerKon had been back on site since the end of April 2023 and was carrying out final cleaning work and last packaging activities on the areas that were now accessible. At the beginning of August 2023, ZerKon handed over the pool floor to ReaDi for the subsequent dismantling of the reactor pressure vessel.

ZerKon: Isar 1 nuclear power plant (KKI 1)

The dismantling and packaging of the RPV-I and CS of the only boiling water reactor of the PEL fleet is progressing well at the Isar nuclear power plant. The dismantling and packaging of all compo-



Reason to celebrate: Completion of the dismantling work by ZerKon at KKG.



The Mammoet lifting frame was used to move the RPV, which originally weighed 530 t, onto the dismantling frame for the calotte.



"The Beast" during the dismantling of the RPV flange area in the KKU.

nents is expected to be completed in October 2023. As early as September 2023, the team is to begin cleaning and demobilisation work, i.e. the dismantling and removal of tools. It is expected that ZerKon will be able to hand over the basin floor to the customer on schedule in the first days of 2024. During the implementation phase, ZerKon will dismantle a good 190 t of reactor pressure vessel internals and CS, pack them in about 200 containers and hand them over to the customer.

ReaDi: Unterweser nuclear power plant (KKU)

In 2019, PreussenElektra commissioned the ReaDi consortium, consisting of GNS and Höfer & Bechtel, with the dismantling and packaging of the RPV and the RPV head of the KKU. After the ReaDi planning phase and the completion of the work on the dismantling and packaging of the RPV-I and the CS by ZerKon at the end of 2021, the dismantling of the RPV could begin in March 2022. From November 2022, the RPV was dismantled with the large band saw system developed by Höfer & Bechtel – internally called "The Beast" – and the dismantling of the RPV calotte bottom and lid took place in parallel. By the end of April 2023, all RPV cut pieces had been packed into more than 60 steel sheet containers, and the dismantling and packing of the RPV calotte was completed by the end of June 2023. The dismantling and packaging of the RPV head is still to be completed.

However, the "Beast" will not be given a break, because it will continue directly with the implementation phase in Grafenrheinfeld.

ReaDi: Grafenrheinfeld nuclear power plant (KKG)

The implementation phase at the KKG started on schedule at the end of July 2023. With the support of the Mammoet lifting system, the RPV was lifted into the fuel pool where it is dismantled with the large band saw.

As in the KKU, GNS has already disposed of the RPV-I and CS at the KKG site together with consortium partners as part of the ZerKon project and was able to build on the experience gained here during the planning phase. In addition, experience from the ReaDi pilot project could also be implemented in the KKU. The IP2-compliant adjustment aids already established there were supplemented together with EWB and H&B by a variable component that makes it possible to react flexibly to cut deviations and dimensional deviations of the RPV. This avoids structural adjustments to the adjustment aids during the implementation phase. In addition, loose adjustment aids were used, which do not have to be anchored in the vessel during vessel production. This made it possible to decouple the production of the container and the adjustment aids.

Dismantling of the RPV with the large band saw system in fast motion

The QR code will take you to a YouTube video from PreussenElektra showing the dismantling work in the KKU in fast motion.



Taiwan

Testing the T-Box

Since 2019, GNS has been developing Taipower boxes, so-called “T-boxes”, for the Taiwan Power Company (TPC) (see GNS magazine 12). These are based on the GNS S-Box® and the Type-IV steel sheet container product line. The T-Box variants are designed for low and intermediate level waste and are developed and manufactured based on US nuclear QM standards for the decommissioning of the Taiwanese nuclear power plant fleet.



Mobile crane at the Nemo 33 diving centre.

package. According to the regulations, the T1 box was for example subjected to an experimental water immersion test, for which the test sample had to be immersed in at least 15 m of water for 8 hours.

This was no easy task, as first of all a body of water had to be found which, on the one hand, had the necessary depth and, on the other hand, also offered the stability on the shore for a mobile crane that could lift the approximately 28.5 t of the test specimen. The GNS “Testing” group found what they were looking for in Belgium: The Nemo 33 diving centre has one of the deepest artificial diving pools in the world with its 35 m deep

The five different box types all have the same external dimensions and attachment points and can therefore all be handled with the same equipment. The difference between the different types is mainly the shielding, which increases from T5 to T1. T5 to T2 are approved as IP-2 packages, T1 as Type-B package.

As part of the development, the customer commissioned various tests from GNS, for which the boxes were each manufactured once. While the T2 to T5 boxes had to pass the less demanding tests for industrial packages, such as the 0.3 m drop, the T1 box had to withstand a few more as a Type-B



The diving robot from Höfer & Bechtel delivers images even from a depth of 15 metres.



A mobile crane is used to lower the T-Box into the diving pool.

basin. During their dive, the box was joined by a diving robot from Höfer & Bechtel, which provided film and photo footage.

Then it was off to the top: In the drop test facility of IABG in Lichtenau near Paderborn, a test stand was built in accordance with the IAEA regulations and a drop release device developed by Höfer & Bechtel was used to carry out both the 9-m drop and the 1-m pin-drop.

After passing the mechanical tests, the T1 box was subjected to the final fire test. At the test site of the Bundesanstalt für Mate-



The drop test facility of IABG.

rialforschung und -prüfung (BAM) in Horstwalde near Berlin, where Germany's only test facility for thermal tests for samples of this size is located, the T1 box was subjected to flames at 800 °C for 30 minutes.

The T1 box also survived this test undamaged, which was confirmed by the subsequent leak test.

The delivery of prototypes of all T-Boxes and equipment is planned for 2024. The boxes and equipment will then be used for training and cold trials at Taiwan's ChinShan nuclear power plant. Series production under the customer's responsibility is planned later with the start of the actual Taiwanese decommissioning projects.



Glowing but undamaged: The T-Box after the thermal test.

Second pilot plant for Japan

Resin Conditioning for the Japanese Market



Commissioning of the FAFNIR test plant at the Chita site in Japan.

Since 2018, the Japanese company NGK Insulators Ltd. and GNS have been working together on a complete resin conditioning solution for Japanese nuclear power plants. This is intended to enable them to store spent resins temporarily until conditioning suitable for final disposal using a hydrolysis reactor is available.

In December 2018, a first test plant was shipped to Japan (see GNS magazine 12), and in 2021 NGK placed an order for the delivery of another test plant. The FAFNIR test plant is intended to make it possible to adapt the FAFNIR and NEWA process technology proven in Germany for decades to the Japanese framework conditions.

At the beginning of 2022, GNS started production of the plant, which was completed on 23 December with the Factory Acceptance Test (FAT) at the GNS site in Mülheim and was then transported to Japan by ship. At the NGK site in Chita, the FAFNIR test plant was reassembled and commissioned by three GNS employees who trained the future operating personnel in parallel.

In June 2023, the plant was accepted by NGK as part of the final Site Acceptance Test (SAT) and has since undergone intensive testing. NGK and GNS are using the knowledge gained to further develop the system for the Japanese market.

Butting Manufactures 500th Fuel Basket for GNS

Almost ten years to the day after the acceptance of the 100th fuel basket for a CASTOR® V cask at H. Butting GmbH & Co. KG in Knesebeck, the 500th fuel basket has now been accepted.

GNS and Butting can look back on almost 30 years of cooperation; the first V/19 fuel basket was accepted in November 1994. While in the early days of the cooperation, five fuel baskets were manufactured for GNS per year, there are now about 30 fuel baskets for the various CASTOR® types.

In addition to fuel baskets, Butting manufactures complex welded stainless steel constructions and special fittings for baskets such as dummy elements or insert elements for GNS.



The Butting team from Knesebeck with its 500th CASTOR® fuel basket.

Core scrap in Gundremmingen

Dismantling in Shift Operation

Before the "heart" of the reactor, the reactor pressure vessel, can be dismantled, the so-called core scrap, e.g. control elements, fuel assembly channels and other structural parts, must be removed from the spent fuel pool.

To this end, core scrap has recently been disassembled in Block B in two shifts, by GNS employees six days a week using the GNS under water disassembly and packaging plant (ZVA) and, especially for neutron flux measuring lances the GNS Universal Hydraulic Shears (UHS), while filters and small parts were repacked into insert baskets for containers. In Block B alone, almost 60 MOSAIK® casks have been loaded and dried. After the campaign in KGG Block B the GNS

team recently moved on to Block C. The completion of the campaign there is scheduled for summer 2024.

Parallel to the campaigns, the loaded and conditioned casks from Units B and C will be transported to the Mitterteich interim storage facility.

In the course of the campaigns, additional dismantling steps are already being prepared: Insert baskets will be deposited in the two fuel pools in Units B and C, which will be filled in 2026/27 after the RPV-I campaign, to be loaded into steel sheet containers and MOSAIK® casks and for storage in the Gundremmingen on-site interim storage facility (TLG).



The MOSAIK® cask type has already proven itself many thousands of times over and will also be used in the dismantling work at Gundremmingen.

Concreting of waste packages for final disposal

New Concrete Variety

For the production of waste packages suitable for final disposal in the German repository for ILW/LLW, Konrad, in many cases it is necessary to fill the residual cavities of waste packages in order to fix the waste. The fixation material is not specified, so that cement, concrete, bitumen or even plastic can be used for this purpose. GNS has chosen concrete as the fixing agent because it comprehensively fulfils decisive criteria such as non-flammability, sufficient flowability and compressive strength. For this purpose, GNS has developed a suitable concreting process, had it confirmed as a qualified process by the federal company for radioactive waste disposal BGE and has already established it in initial campaigns. In the concreting campaigns already carried out, a standard concrete and a lightweight concrete from a single manufacturer were used. To increase delivery reliability, GNS has started a project to qualify further concretes.



Pumping tests with a new concrete.



Setting up the concreting plant as part of the concrete qualification.

In the GNS project, which started in June 2021, new concretes available in the long term are identified and qualified in order to create redundancy. These must be approved for use by the BGE.

Depending on the application, the concretes have to fulfil different requirements in full or at least in part, depending on the combination of the container, the associated test certificate, as well as the waste products and the concreting target. "Accordingly, it makes sense to have concretes with different properties available and not just to use those that fulfil all possible requirements at once," explains Pascal Niehoff, project manager for this special project. "Through the 'performance approach' newly established in the project, the possibility of partial qualification is realised: New concretes can be identified and qualified for specific applications with lower requirements."

Finally, the concretes are assigned to one or more application areas depending on their performance. This clear assignment of the concretes to application areas is intended to reduce the official testing effort for future concreting applications.

For the concrete qualification, GNS and BGE have agreed on a methodology including a test programme with a defined scope of samples and tests, so that the release of new concretes will also be accelerated in the future.

The first concrete is already about to be approved by the BGE and should then be directly available for upcoming conditioning campaigns. There is enough to do: GNS's two mobile and two stationary concreting plants are ready for the concreting of almost 1,000 steel sheet containers, which has already been ordered. And that is just the beginning.

Melting down in the USA

Recycling During Dismantling

Many of the “wastes” produced during the dismantling of a nuclear power plant can be recycled – after appropriate clearance measurement. Also activated metallic residues can be recycled sustainably. GNS has been commissioned by the German Unterweser nuclear power plant to dispose of around 1,000 tonnes of metallic residues. These are melted down at EnergySolutions’ Bear Creek Processing Facility for reuse in the nuclear sector.



The first stage by rail: From KKU to the seaport.

Most recently, around 260 tonnes of metallic residues from the dismantling of the Unterweser nuclear power plant (KKU) were transported to EnergySolutions in the USA in 18 20' containers in December 2022. The metals came mainly from the primary cycle of the KKU.

Parallel to the loading, which lasted from January to August 2022, the radiological data for each of the fully loaded containers were compiled by KKU, checked by GNS and transferred to EnergySolutions.

In addition to KKU, GNS involved freight forwarders, customs, Deutsche Bahn, shipping companies and EnergySolutions in the logistical planning of the transport by rail from KKU to a German seaport and then by ship to the USA.

After the containers arrived in the USA in January 2023 and were cleared by US customs, the 18 containers were transported by truck to the smelting plant in Oak Ridge, Tennessee. Here, before being fed into the smelting furnace, the materials are cut to

furnace size and pre-treated so that, for example, no paint residues or other surface coatings remain.

The melted metals can be used to make new products, such as shielding blocks for accelerator facilities, which are used worldwide. Through this controlled recycling, the metals can be returned to the economic cycle and waste can be avoided.



The 18 containers – safely stowed in the hold of the container ship.

Italy

MOSAIK®-Casks and Drying Facility for Garigliano NPP

In 2020, GNS received an order from Società Gestione Impianti Nucleari (SOGIN), the Italian state-owned company responsible for the decommissioning of Italian nuclear power plants and the disposal of radioactive waste, to supply MOSAIK® casks and a drying facility to the Garigliano NPP, which was decommissioned in 1982.

In addition to the delivery of the five MOSAIK® II-15 U EI casks (type IP-2) with verification documents for interim storage and final disposal in Italy as well as the GNS KETRA drying system including turning device, handling and storage equipment, the training of personnel at the Garigliano NPP was ordered.

The MOSAIK® casks were delivered to the NPP not far from Naples as early as May 2022. After a factory acceptance test at the GNS facility in Mülheim and subsequent delivery to Italy, the KETRA drying system was set up at the NPP in August 2022.

Three GNS employees – supported by an interpreting colleague – trained the staff in handling the equipment and drying system on site at the nuclear power plant. In addition to the employees present at the nuclear power plant, four other NPP employees were also connected online. At the customer's request, another equipment training session was held later, for which two GNS employees travelled to Campania.

The project was officially accepted by the customer in September 2022.



Testing of the equipment at the Garigliano NPP, Italy.



At the GNS site in Mülheim, representatives of Sogin (from left to right) took delivery of the drying system and turning rack: Luca Ricci, Alessandro Mattioli (Sogin), Lucas Schröer and Lukas Ix (GNS).

Added value for customers through intelligent systems

Artificial Intelligence in Waste Management

The term “artificial intelligence” or “AI” for short is on everyone’s lips. AI has long been used in GNS software solutions for nuclear waste disposal and also helps to quickly meet the ever-growing customer requirements and create the desired added value as part of the software development process.

DORA II: Storage with artificial intelligence

“We are already using AI systems to offer customised solutions for our customers,” explains Dr. Thorsten Schliephake, Head of GNS Software Development. “For example, for the optimisation of the emplacement sequence of waste packages in the German repository for LLW/ILW, Konrad, AI can be usefully employed to select a very good one from a large number of possible combinations. Here, AI can search for a solution that fulfils all the necessary conditions and makes the best possible use of the optional ones. Mathematically, this is a multidimensional optimisation problem that can be solved automatically using artificial intelligence.”

AVK loading planning as the next step

The assembly of drums for loading Konrad containers is a similar case that could also be optimised using AI. “In contrast to the repository, the parameters are more difficult to weight here: Of course, it should be possible to deliver all packages, and to do so in as few packages as possible or at least at the lowest possible total cost,” says Dr. Schliephake, summarising the challenges.



AI in software development

AI also opens up completely new possibilities in software development. AI systems can analyse large amounts of data and gain insights to make automated decisions or solve complex problems. Through machine learning and so-called deep learning, algorithms can continuously learn from experience and improve. “This allows us to develop software solutions that continuously adapt and optimise to our customers’ needs.”



Dr. Thorsten Schliephake, Head of GNS Software Development.

AI as a miracle tool?

AI is already being used on a large scale in many other fields, for example in the generation, processing or even evaluation of texts or images and films. “The challenge here, especially in the environment of the very specialised tasks of the GNS, is to adapt existing tools to the special needs and to train them,” summarises Dr. Thorsten Schliephake. “Many tasks will remain manual work in the future, but we have new tools available by means of AI to make this work easier for us and our customers.”



Artificial intelligence can be used to optimise the loading of Konrad containers with drums.

Excellence for Nuclear

Expertise in Demand

As one of the leading companies in the field of nuclear waste management and especially in decommissioning, it is not only the services and products of GNS that are in demand, but also the expert knowledge of GNS employees, as the following three examples show.

IAEA: Technical Working Group on Decommissioning and Environmental Remediation

Thomas Eichhorn, Head of GNS Business Development & Innovation, was invited by the International Atomic Energy Agency (IAEA) to participate as a technical advisor in the "Technical Working Group on Decommissioning and Environmental Remediation" (TWG-D&ER). The working group serves to advise the IAEA, but also to exchange information and knowledge on national and international programmes and to prepare and review publications and learning materials.



IAEA Safeguards Traineeship Programme

The participants of this year's Safeguards Traineeship Programme of the International Atomic Energy Agency (IAEA) were again guests at the GNS site in Mülheim, where they were guided through the site by Michael Köbl, Head of Communications, and were given an overview of nuclear waste management in Germany and the disposal services of the GNS.



The eight students from Bangladesh, Georgia, Lesotho, Madagascar, Zambia, Sierra Leone, Sudan and Vietnam spent six weeks in Germany, where they gained a comprehensive theoretical insight into nuclear technology and visited several exciting locations.

The Safeguards Traineeship Programme is aimed at young graduates and junior staff to increase the number of qualified candidates from developing countries for a position as a Safeguards Inspector at the IAEA or in their national nuclear organisation.

Korean television

Dr. Linus Bettermann, GNS Divisional Director Sales and Marketing, has already been interviewed several times by Korean television. The most recent interview on the JTBC television channel was on a subject GNS is very familiar with: The storage of spent fuel and the disposal of nuclear waste.



Spent fuel management in Germany

On the Home Straight

On 15 April 2023, the time had finally come: The last three nuclear power plants still in operation in Germany were taken off the grid for good. Originally, this shutdown had been scheduled for the end of December 2022. Due to the difficult supply situation resulting from the Russian invasion of Ukraine, the operating times of the Emsland, Isar and Neckarwestheim power plants were extended by a three-and-a-half-month stretch.



The last CASTOR® V/52 leaving Unit B in Gundremmingen.

Admittedly, this has no significant impact on the timetable for the disposal of the remaining fuel elements, which has been fixed for a long time. On the way defuel all German plants, the delivery and loading of casks has long been scheduled. By 2028, all fuel assemblies and rods are to be loaded into transport and storage casks, dispatched by the GNS teams and stored in the on-site interim storage facilities.

Fuel element free KGG, Unit B ...

In 2022, the last twelve CASTOR® V/52 casks from the Gundremmingen nuclear power plant (KGG) Unit B were loaded, dispatched and brought to the on-site interim storage facility, so that on 7 September 2022, the last cask was removed from Unit B. Quivers loaded with special fuel rods in Unit B were transferred to Unit C.

... and KKP

Between February 2022 and April 2023, a total of forty CASTOR® V/19 casks from the Philippsburg nuclear power plant (KKP), Unit 2, were loaded and dispatched, so that the last CASTOR® V/19 loaded with nine quivers of GNS IQ® was brought from the KKP to the on-site interim storage facility at the beginning of April 2022.

Full Plan until the goal is reached

There is still a lot to do before all German nuclear power plants are completely defueled: 50 GNS employees in four GNS Cask Service teams are on duty for the loading operations at the six nuclear power plants Brokdorf (KBR), Grohnde (KWG), Neckarwest-

From the Big to the Small

The GNS Cask Service division has significantly expanded its range of services. In addition to taking care of CASTOR® casks and spent fuel casks from other manufacturers at the nuclear power plants, the cask specialists now also focus on other casks from the GNS Group's product range.

The original task of the GNS Cask Service was and still is the dispatching of CASTOR® casks to be loaded in the nuclear power plants. In the meantime, several other tasks have been added. For example, the Cask Service now also takes care of the transport logistics and organisation of up to 400 casks a year from the Mülheim site. The service area for ILW/LLW casks and containers has also been significantly expanded.



Service area for ILW/LLW casks and containers at the GNS site in Mülheim.

In Mülheim as well as at the power plant and storage sites, the cask service offers leak tests and periodic inspections of MOSAIK® casks, and for steel sheet containers periodic inspections at the power plant and storage sites.

The training offer has also been expanded: Handling training for MOSAIK® and container customers is offered both in Mülheim and on site. Another new feature is the "GNS Bus", a service vehicle that can be used to bring tools, equipment, etc. to the site.

heim (GKN), Isar (KKI), Emsland (KLE) and Gundremmingen (KGG). In addition to about 200 CASTOR® casks, the GNS teams also dispatch almost 40 third-party casks.

In addition to fuel assemblies, around 30 GNS IQ® quivers are also loaded which are then placed in CASTOR® casks.

GNS Group Continues to Hire

GNS alone hires about 50 new employees each year, in addition to new hires at the subsidiaries. The fact that the new colleagues are not only young professionals is shown by the average age of the GNS workforce, which is just under 46 years.

To make the start at GNS easier, there is the "Buddy Programme". The Welcome Box sent home to new employees shortly before their first day of work contains the name of the buddy, an experienced GNS employee usually from another division of the company. Buddies are available to answer questions about GNS and the new workplace in addition to colleagues in the work environment.

At the "Newbie Events", the new employees receive an overview of the history and competencies of GNS as well as a direct insight into the products and services of GNS by visiting the GNS sites in Mülheim and Jülich.

Of course, GNS offers not only interesting onboarding, but above all exciting tasks and career perspectives.

**Perhaps you will also find
what you are looking for in one
of our job advertisements?**



New employees visit the GNS site in Mülheim.

Trainees shorten training period

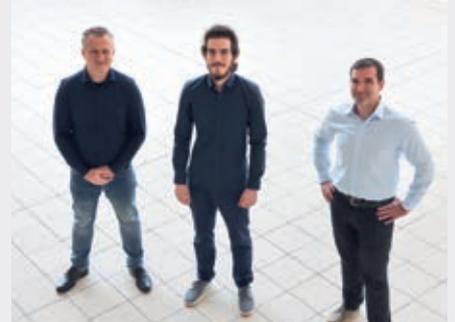
Successful Completion in 2023



GNS Managing Directors Daniel Oehr, Georg Büth and Dr. Jens Schröder congratulate Noah von Schwartzberg (left), Kira Baumgarth and Jonas Ide (right).

GNS offers trainees with very good academic and operational performance the opportunity to shorten their three-year training period by half a year. In mid-January, the three commercial trainees Kira Baumgarth, Jonas Ide and Noah von Schwartzberg were able to obtain their IHK (Chamber of Industry and Commerce) diplomas after only 2.5 years and were each taken on by GNS for a subsequent year.

In the IT sector, Jonas Probst shortened his training as an IT specialist for system integration to three years and passed his final exam in June. The GNS Managing Directors Daniel Oehr, Georg Büth and



Matthias Degener (IT Training Officer), Jonas Probst and Thomas Richter (Training Officer) (from left to right).

Dr. Jens Schröder congratulate and look forward to further cooperation!

Into the Wide World

Being able to look beyond one's own nose also brings valuable new experiences during training that can be incorporated into everyday work at GNS.

In 2022, Kira Baumgarth, then a GNS trainee, went to Korea for six weeks, not for a long holiday, but for an internship abroad. She was already familiar with the country, the people and the language



Kira Baumgarth at the Korean site of GNS.

from previous stays and her studies. Through her assignment at SAMYONG Inspection & Engineering Co., Ltd. and at the Korean offices of GNS, she gained many new impressions of the Korean economy and especially the energy industry. She is now using the experience she gained in sales at GNS.

For GNS trainee Julia Scheele, Studsvik in Sweden became a training location for four weeks. During her internship at Cyclife Sweden AB, she gained a direct insight into the topics of smelting and incineration as well as the dismantling activities at the Barsebäck NPP. A personal highlight was definitely the Swedish Midsummer Festival. The internships abroad were supported by



Julia Scheele spent four weeks of her training in Sweden.

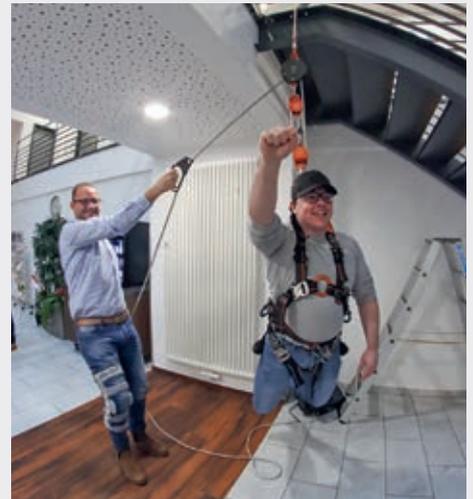
the "Training Worldwide" programme of the Federal Ministry of Education and Research.

Training for field staff

Safety First

More than 40 GNS field staff are constantly on duty in all German nuclear power plants as part of disposal and dismantling campaigns. Traditionally, they all come together in Essen at the beginning of the year to complete the necessary safety briefings and other training courses on safety, occupational

health and radiation protection. In addition to some theory, practical training is not neglected: This year, a special focus is on fall protection. Participation is compulsory, having fun is recommended!



Collecting and Snacking for a Good Cause

GNS trainees supported the "Friedensdorf International" with two campaigns shortly before Christmas 2022: The GNS colleagues could snack and do good at the waffle campaign. Instead of a fixed price, they were asked for a donation of their choice. The considerable sum of 2,013 Euros was collected, which was

topped up to 5,000 Euros by the GNS management.

GNS employees were also asked to donate clothes and shoes in good condition. After the campaign, the trainees were able to deliver two full car loads of donations to the Peace Village, which

will be used in various ways. The Peace Village itself will be equipped and aid shipments to various countries will be put together. Some of the donations are also sold in "Friedensdorf Intershops" or at in-house events to cover part of the Friedensdorf costs.

Friedensdorf (Peace Village) International helps children from war and crisis areas with necessary medical care in Germany. Currently, more than 170 children from eight different crisis areas around the world are given the chance of a healthy future in the Peace Village.

On average, the children from many different countries stay there for six months. The Friedensdorf International is financed exclusively through donations, so the GNS donations make an important contribution.

Further information and donation options: www.friedensdorf.de



Kira Baumgarth, Natalie Broll (Friedensdorf International), Noah von Schwartzberg, Julia Scheele and children from various crisis areas handing over the donations.

Fairs and Events



Every two years, GNS invites customers and representatives of important partner companies to the **GNS Forum** on the disposal of low and intermediate level radioactive waste. After the cancellation in 2020 due to the pandemic, more than 140 guests came to the GNS Forum 2022 in Dortmund after a four-year break. In addition to presentations on dismantling projects and disposal solutions of GNS, Peter Hart from the Federal Ministry for the Environment and Consumer Protection, spoke about the status of waste disposal in Germany and Stefan Klute, BKW, about dismantling in Switzerland. In addition, a joint presentation by JEN and GNS reported on the dismantling of the FRJ-2 research reactor.

Every year, GNS organises the international **CASTOR User Group Meeting**, which took place in Belgium in 2022. The programme included various presentations by GNS and a customer presentation as well as a visit to the HADES Underground Research Lab and the Tabloov Visitor Centre.





GNS had a booth at Europe's largest specialist event for nuclear decommissioning, the **ICOND 22** in Aachen, Germany. Dr. Luc Schlömer, WTI, gave the presentation "GNS Multipurpose Casks for Decommissioning – The Right Cask for Every Case".

"Versatile GNS Box Systems for Decommissioning Waste" were presented at the **Waste Management Symposia 2023** in Arizona by Dr. Linus Bettermann, GNS Divisional Director Sales and Marketing.



After a three-year break, the ninth **Nuclear Decommissioning & Waste Management Summit 2023** took place in London. GNS was represented with a booth and the presentation "The Future of D&D – from Ideas to Solutions", held by Thomas Eichhorn, GNS Divisional Director Business Development & Innovation.



In addition to the expert events, GNS was represented at various career fairs such as the **Hochschule Ruhr West Career Day** and the **Essen Career Day**. For the first time, **KERNTec** was held, an event organised by the **KernD** industry association specifically for young nuclear professionals in Germany.



Safety and Health Week 2023 at GNS

Exercise, Nutrition and **Relaxation**



For an entire week, GNS employees were able to learn about exercise, nutrition and relaxation in exciting workshops and activities. In keeping with the spirit of health and sustainability, a special focus was on road safety by bicycle – and in some cases under extreme conditions.

Freshly prepared smoothies, salads and a selection of fresh fruit were also available free of charge throughout the week. A special highlight: The doubly healthy “Smoothie Bike”, on which you could make your own healthy refreshment using muscle power.



Sporty GNS Employees



Keeps going and going and going ... the GNS team once again performed excellently at the Essen Company Run 2023.

GNS running team at the top

At the first full-fledged company run in Essen after the Corona restrictions, the GNS team once again performed excellently with a total of 30 runners.

In the team rankings, the fastest GNS women's team with Marie Borowycz, Sara Steinbrink and Anja Hoevel took 30th place among the 1,133 teams, and the GNS men's trio with Jan Seewald, Malte Loewecke and Christian Schruoff even came eleventh out of 1,686 teams.

The fastest GNS individual times were run by Marie Borowycz, who finished in 22:42 min in 72nd place out of nearly 3,800 women, and Jan Seewald, who finished in 17th place out of about 5,500 men in 17:10 min over five kilometres.

City Cycling and Cycling to Work

In 2023, GNS is again represented in "Mit dem Rad zur Arbeit" (MdrZA, Cycling to work) and "Stadtradeln" (City Cycling). 18 active cyclists rode 4,875 km during the 21-day "Stadtradeln" campaign, placing 53rd out of 228 teams in Essen.

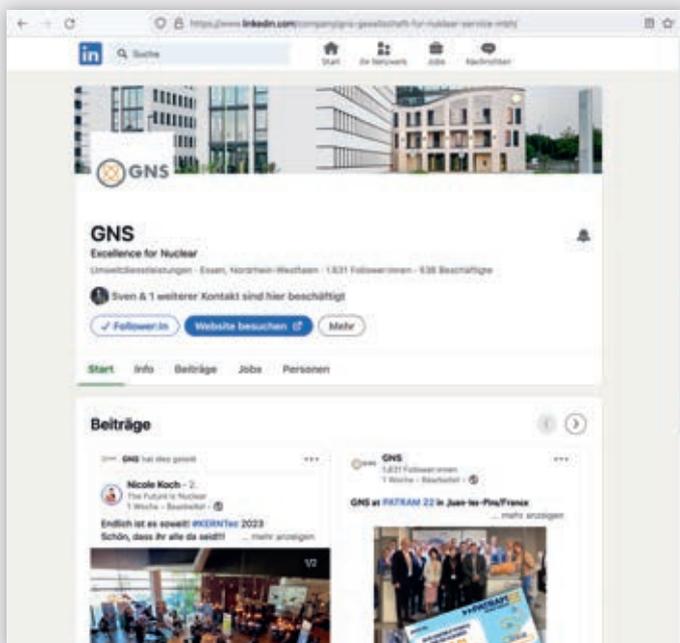
Although MdrZA is still ongoing, a great result is also foreseeable here: Of the eight GNS teams, the team "GNS Mülheim" is already among the top 20 with 4,500 km – a proud achievement with over 600 teams!



GNS in the business network

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It's worth it beyond the interesting news: Among all followers who "react" or comment on the current post about the new GNS magazine, we are giving away five GNS goodie packages.



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