

BILFINGER NOELL GMBH



BILFINGER

HERMINE™
TREATMENT OF SOLID
RADIOACTIVE WASTE

NUCLEAR TECHNOLOGY

WASTE TREATMENT CENTRE HERMINE™

The Highly Efficient Reduction of Radwaste in a Modular Intelligent Nuclear Environmentally Friendly Facility

HERMINE™ BENEFITS:

- Efficient and economic treatment, simple and logical arrangement
- Superior radiation protection at its best
- Modular arrangement
- Minimising of radioactive waste
- Clear-cut definition of interfaces
- Long-term economic conditions
- Fast operational readiness
- Comprehensive environment protection
- The radwaste facility is not subject to the Atomic Energy Law
- Transport of contaminated material is avoided
- Non-interaction with the operational dismantling
- Simplified dismantling strategy

MASSIVE COST SAVINGS

HERMINE™ stands for:



SAFETY



AVAILABILITY



QUALITY



COST EFFECTIVENESS





BILFINGER NOELL HAS AN EXTENSIVE KNOW HOW IN THE TREATMENT AND CONDITIONING OF RADIOACTIVE WASTE

Aimed at minimising the volume of waste using preferably sorting and decontamination processes, by applying compaction technologies and reducing the potential hazard of the waste by conditioning it into a stable solid form to ensure that the waste can be safely handled during transportation, storage and final disposal.

Conditioning processes such as cementation are used to protect the surrounding environment from radioactive pollution. The choice of the process depends on the type (classification) of waste and its level of activity. Each country's nuclear waste management policy and its national regulations have also an impact on the approach taken.

MECHANICAL DECONTAMINATION UNITS **HERMINE™**

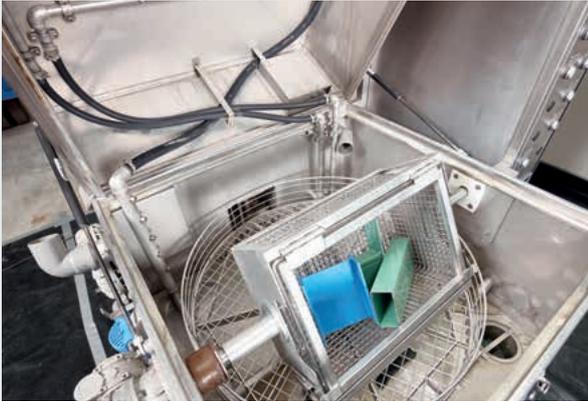
Bilfinger Noell develops individual solutions like grinding and brushing. With this technologies, components can be decontaminated below the release limit and can be recycled as normal metal scrap.

BENEFITS

- Return of metals to the conventional economic cycle
- Conservation of resources

DECONTAMINATION WITH THE PHADEC™ PROCESS **HERMINE™**

PHADEC™ is a phosphoric acid decontamination, leaving only very small amounts of contaminated waste. 98 % of the treated materials can be recycled conventionally



Washing of the contaminated parts



Acid-/base bath

BENEFITS

- Operating costs 50 % less compared to dry blasting processes
- Massive work simplification compared to dry blasting processes
- ALARP principles fulfilled to the maximum



REFERENCES

NPP Gundremmingen, Germany
NPP Caorso, Italy

Phadec™ facility

SORTING PROCESS HERMINE™

Sorting solutions tailored to customerspecific requirements



Sorting facility for waste treatment in the NPP Grafenrheinfeld, Germany



REFERENCES

- NPP Hinkley Point C 1 & 2, UK
- NPP Taishan 1 & 2, China
- NPP Fangchenggang, China
- NPP Grafenrheinfeld, Germany
- NPP Beznau, Switzerland
- NPP Gundremmingen, Germany
- NPP Krümmel, Germany
- Ignalina, Lithuania
- Swierk, Poland



BENEFITS

- Sorting out recyclable materials
- Sorting by waste groups to reduce storage costs and for recycling

Sorting facility for waste treatment in the NPP Fangchenggang, China

DISASSEMBLING & PACKING **HERMINE™** OF CONTAMINATED AND ACTIVATED ITEMS IN HOT CELLS

Tools and components for the disassembly and volume reduced packaging of activated parts

REFERENCES

NPP Hinkley Point C 1 & 2, UK
SKB Encapsulation Plant, Sweden
ICEDA Lyon, France
ISF 2 Chernobyl, Ukraine
PAMELA, Belgium
Ignalina, Lithuania
Pilot Conditioning Plant (PKA) Gorleben, Germany
Vitrification Plant Karlsruhe, Germany



Saw for box-shaped containers (sheets)



Cutting machine for rods



Waste disassembly Line 1 & 2



BENEFITS

- Reliable operation
- Modules such as gripper, saws, cutting and pressing devices available
- Remote handling

SUPER-COMPACTOR SYSTEMS HERMINE™

Bilfinger Noell is a market leader in the design and supply of Super-Compactor Systems. Super-Compactors have a capacity up to 20,000kN for the volume reduction of solid, low level (LLW) and intermediate level waste (ILW)

BENEFITS

- Reduction of the radioactive waste volume up to a quarter of its original volume
- Worldwide exclusive supplier of ILW and PCM Super-Compactors
- High reliability
- Experience since 1978, more than 25 nuclear Super-Compactors in operation worldwide
- The most commonly used Super-Compactor technology worldwide
- Adaptable to different drum sizes

Any auxiliary equipment, necessary for handling processes or radiological characterisation can also be supplied by Bilfinger Noell as well as for example

REFERENCES

Dounreay, UK
 Belgoprocess, Belgium
 NPP Haiyang, China
 ANSTO, Australia
 Pilot Conditioning Plant (PKA)
 Gorleben, Germany
 China Academy of Engineering Physics,
 Mianyang, China



GROUTING FACILITIES HERMINE™

Bilfinger Noell – Specialist for all types of grouting



Cementation device Fangchenggang, China



Roller conveyor with integrated decapping / capping station



Cementation device NPP Gundremmingen, Germany

REFERENCES

- NPP Hinkley Point C 1 & 2, UK
- SKB Encapsulation Plant, Sweden
- ICEDA Lyon, France
- NPP Fangchenggang, China
- NPP Taishan 1 & 2, China
- NPP Gundremmingen, Germany
- NPP Mühleberg, Switzerland



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BENEFITS:

- Different recipes with different viscosities can be produced in one and the same machine
- Remote operating and cleaning of cementing plants



FACILITY PLANNING

Turnkey solutions for hot cell equipment according to our customers specifications



BENEFITS:

- Everything from one source
- More than 50 years experience
- Engineers and radiation-exposed specialist personnel
- Integrated solutions for the entire life cycle of nuclear waste treatment plants

REFERENCES:

SKB Encapsulation Plant, Sweden
 NPP Hinkley Point C 1 & 2, UK
 ICEDA Lyon, France
 ISF2 Chernobyl, Ukraine
 Pilot Conditioning Plant (PKA) Gorleben, Germany
 Vitrification Plant Karlsruhe, Germany

TURNKEY NUCLEAR FACILITIES

- Planning
- Static and dynamic calculations
- Project management
- Preparation of preliminary test documents
- Creation of approval documents
- Studies
- Constructions
- Manufacturing
- Installation, commissioning
- Handing over to the customer



CERTIFICATES



SCOPE OF SERVICE

Scope of Services Nuclear Technologies

- Studies
- Basic & Detail Design
- Static & Dynamic Analyses
- Manufacturing & Assembly
- Quality Assurance
- Commissioning
- Operation

Components for Nuclear Power Plants

- Containments & Containment Liners
- Stainless Steel Liners for Pools & Tanks
- Personnel Airlocks & Equipment Hatches
- Core Melt Stabilisation Systems
- Filter Exchange Machines
- Reactor Pressure Vessel Closure Head Handling

Equipment

- Special Tools and Equipment
- Fuel Transfer Facilities
- Storage Racks
- Sluice and Swivel Gates
- Waste Handling Systems

Hot Cells

- Remote Handling Equipment
- Manipulator Carrier Systems
- Cranes
- Transport Systems
- Stainless Steel Lining
- Radiation Shielding Windows
- Double Lid Systems
- Shielding Doors
- Grippers
- Air Filter Systems
- Penetrations
- Special Components acc. to Customer Requirements
e.g. Cutting Device, Cementation Unit, Compactor, etc.

Waste Handling

- PHADEC™ Decontamination System
- Conditioning of Solid and Liquid Waste
- Super-Compactor
- Grouting Systems
- Sorting Stations

Dismantling of Nuclear Facilities

- Development of Dismantling Technologies
- Remote Handling Manipulator Systems
- Dismantling Tools
- Underwater Technologies
- Machines for Dry Reloading
- Shielding Caissons for Dismantling
- Sawing Technologies

Final Disposal

- Transfer Machines
- Transport Systems for Waste Packages
- Encapsulation Systems

Special Components

- Manipulator Systems for Fusion Experiments
- Transport Systems for Special Requirements
- High Accuracy Handling Equipment
- Airlocks & Containments for Chemical Plants



Technologies

Bilfinger Noell GmbH
Alfred-Nobel-Straße 20
97080 Würzburg
Germany
Phone +49 931 903-6003
Fax +49 931 903-1018
noell.nuclear@bilfinger.com
www.noell.bilfinger.com