

Holtec's U.S. Manufacturing Facilities Prepare for Increased Production of HI-STAR Casks for Spent Fuel Storage and Transportation in Europe

Holtec's U.S. manufacturing facilities in New Jersey, Pennsylvania and Ohio are gearing up for increased production rates of Holtec's fleet of HI-STAR Casks upon receipt of recent regulatory approvals and new orders in Europe. ENRESA (Spain) awarded Holtec with the contract for the design, engineering, licensing and manufacturing of five HI-STAR 150 casks for Cofrentes Nuclear Power Plant in August 2017, after an international public tender. The Spanish Nuclear Safety Council (CSN) granted the favorable evaluation of the HI-STAR 150 design for storage on April 28, 2021, and subsequently, on May 23, 2021, the HI-STAR 150 received the storage license from Spain's Ministry of Ecological Transition and the Demographic Challenge. The first HI-STAR 150 was loaded at the Cofrentes Nuclear Power Station in Spain and placed into the storage facility on June 23. This is Holtec's first dual-purpose metal cask loaded in Europe. On July 2, Holtec was awarded a contract by ENRESA to produce an additional ten HI-STAR 150 casks that will be produced in the United States. The HI-STAR 150 cask is licensed for storage of up to 52 BWR spent fuel assemblies, including damaged fuel assemblies; extension of the license to increase the number of fuel assemblies with Crud-Induced Localized Corrosion (CILC) is ongoing. Holtec's HI-STAR 180L, a higher capacity version of the HI-STAR 150 designed for up to 69 BWR spent fuel assemblies, has also recently received the approval by the USNRC for transport, receiving the Type B(U)-96 certification on April 27.



Holtec's HI-STAR 150 Placed into Storage at Cofrentes Nuclear Power Station on June 23, 2021

In Belgium, the Federal Agency for Nuclear Control (FANC) approved the HI-STAR 180D for transportation on June 18 after a lengthy review process. FANC's Type B(U)F-96 certification is Holtec's first dual-purpose storage and transportation cask (with no internal canister) licensed for transport in Europe. Holtec is in advanced stages of production of the initial batch of two HI-STAR 180D casks in our U.S. manufacturing facilities with additional orders pending. The HI-STAR 180D casks are destined for Doel Nuclear Power Station in Northern Belgium with

the first cask expected to be loaded next year after authorization from Bel-V, the subsidiary of FANC with regulatory oversight for storage, who has already closed their review of the HI-STAR 180D cask file.

The HI-STAR 180D is the sister cask to the HI-STAR 180, which has been under review by ENSI in Switzerland for storage and transportation since 2009. The HI-STAR 180 was first approved by the U.S. NRC in 2009 for transportation, the first cask licensed with Holtec's proprietary Metamic-HT fuel basket, an aluminum-based material with imbedded nanoparticles that enable the material to maintain a yield strength close to that of stainless steel at the elevated temperatures typical of transportation.

The HI-STAR 100MB is designed based on the HI-STAR 100 and HI-STAR 190 transport casks for retrieval of large-diameter canisters from nuclear power plants with onsite storage facilities. The HI-STAR 100MB is the counterpart that will retrieve medium sized canisters containing fuel with high burnups and shorter cooling times than allowed by the HI-STAR 100. The HI-STAR 100MB also includes the option to transport unpackaged fuel without a canister. The cask with the bare basket design is adopted as one of the main work forces for spent fuel fleet transportation in China. HI-STAR 100MB is now under the final stage of licensing approval for transportation by China's NNSA based on the NRC's transportation license.

Holtec's HI-STAR manufacturing program has been gaining momentum with production of over 25 HI-STAR casks in the last five years. In addition to the five HI-STAR 150 casks delivered to Spain, 14 HI-STAR 100 casks were delivered to South Africa, three HI-STAR 190 casks were delivered to Ukraine, and seven HI-STAR 100MB casks are now destined to China. Holtec's shop floor currently has over ten HI-STAR casks in production to add to the delivery record, not including the above-mentioned HI-STAR 150 order. The additional deliveries include clients in Sweden and Switzerland. Despite significant impacts during the pandemic, Holtec's manufacturing centers continued to operate at partial capacity, designated as a critical business by the State to support the energy sector. Holtec has enabled the technology to support remote client oversight during production and has leveraged several innovations in welding to increase productivity. Of particular note is the Hybrid Laser welding technology developed under a U.S. DOE-funded program that will go into first commercial operation this year for copper-to-copper welding of Holtec's HI-STAR 80 casks destined for Sweden. Holtec has also deployed the industry's largest welding robot to perform welding on Holtec's HI-STAR 100 and HI-STAR 100MB casks that weigh more than 80 tons, substantially reducing production time and improving quality. The welding processes have been qualified to ASME and EN norms. Holtec's Senior Vice President of International Projects, Dr. Richard M. Springman, commented, "Although our manufacturing facilities have been critically impacted by the pandemic and we are still dealing with its



Full Scale Mockup of Copper Weld Joint for the HI-STAR 80 with Single Pass Hybrid Arc Laser

aftereffects, we remain absolutely committed to meeting the needs of our clients. As an innovation company, we have naturally turned to technology and innovation to support fulfilling our delivery backlog with improved productivity and quality.”

Holtec is also preparing to start manufacturing a series of HI-STAR ATB1T (or HI-STAR 330) casks licensed by the U.S. NRC as a Type B transport cask on June 24. This rectangular cask developed for high activity waste generated during reactor dismantling has been licensed for transport without any external impact limiters to improve operations and transportability. The first production run is to fulfil an order in Sweden and the second production run is for Holtec’s U.S. decommissioning fleet with first deployment at Oyster Creek. The manufacturing will begin at Holtec’s manufacturing facilities later this year.