

APPLICATION REPORT



# Consumers Energy Stockpile Stacker Replacement

**Company**

Karn/Weadock Generating Complex  
(www.consumersenergy.com)

**Industry**

Electric Power Generation

**Location**

Hampton Township, Michigan

**Scope**

Design, build and delivery of a complete replacement stockpile stacker unit.

The Consumers Energy Karn/Weadock generating complex sits at the mouth of the Saginaw River along the Saginaw Bay shoreline in Hampton Township, Michigan. The complex consists of two generating facilities, Karn and Weadock.

The facilities date back to 1940. Karn/Weadock is Consumers Energy's largest power production site consisting of three separate plants: the 310-megawatt coal-fueled Weadock plant; the 511-megawatt coal-fueled Karn 1 and 2 plant; and the 1,276-megawatt natural gas and oil-fueled Karn 3 and 4 plant.

Together, the six Karn/Weadock units can generate up to 2,101 megawatts, enough to meet the electric needs of more than 1.3 million people. The total output accounts for about 25 percent of the company's annual electricity

production. The site uses 3 million tons of coal per year, which it receives by ship and rail.

In the early summer of 2007, the coal supply for the complex was placed in severe jeopardy. The existing coal stockpile stacker was damaged by extremely high winds causing structural deformation so significant that a complete replacement was deemed essential. Time was of the essence with such important generation capacity potentially at risk from de-rating or being taken off line. After competitive bidding and detailed discussions, Consumers Energy awarded the design and supply contract for a replacement stacker to Stock Fairfield Corporation.

Stock Equipment Company acquired the Fairfield organization in early 2007. Simon Shipp, Stock Equipment's Director of Bulk Material Handling said, "Fairfield provides a natural addition to our product and service capability range and allows us to further extend the scope of support we can offer our customers." The combined capabilities of Stock Fairfield and Stock Equipment are unique. This is the only domestic equipment manufacturer that offers the full range of design and equipment supply from fuel yard intake through the boiler feeding system. The company targets its' products and services towards power generation facilities internationally. Core products include a range of unloading, material reclaim, transfer and boiler feed options. Stock Equipment has installations at almost every power generation facility in the USA, including Consumers Energy.

The scope of the Consumers Energy stacker project included design, build and delivery of a complete replacement unit. A unique aspect of this project was the pressure to reinstate coal unloading by rail as quickly and practically possible. The replacement stacker takes coal from the existing rail car unloading conveyor system to create a large stockpile which feeds the boilers. The replacement unit was about 240 feet in length and was fitted with a 60 inch width belt conveyor capable of transporting coal exceeding 3000 tons per hour. The machine is fabricated from over 300,000 pounds of steel with the conveyor driven by a 4160v 350 hp shaft mounted drive arrangement. Kramer Bowden, Stock Fairfield's Chief Applications Engineer said, "The structural restriction and design criteria were extremely rigid and comprehensive on this project, we had to consider all possible use scenarios and conditions on the site." Located at the mouth of the Saginaw River, the site is prone to prevailing weather conditions that can range from steady



**Fig. 1 Stock Fairfield radial stacker at Consumers Energy Karn/Weadock Facility in Michigan.**

calm to high winds and blizzard conditions. The conveyor itself is designed to withstand this unique and difficult environment and has been built with the site location and widest possible operational range in mind.

To further add to the technical complexity of the project, the unit was slated to utilize a radial design. This allowed the placement of the pile over a 190 degree range of movement, increasing the pile size and therefore stock out efficiency considerably. The unit is driven across the rails using twin 15hp braked drives and has a rail clamp to provide a holding force once the limits of travel are reached. The unit was delivered in sections all match marked and detailed to allow for minimum site location and erection time. Building a large structure in the field with individual sections up to 40 feet in length in severe winter weather created some unique engineering and installation challenges.

Concentration of the supply aspect was placed directly on delivery. Advantages and cost reductions for the site were significant when the earliest possible start up could be achieved. This requirement drove the entire project start to finish. Certainly no aspect of the unit's operational or design integrity could be compromised, however prompt delivery was critical. The unit was installed during a particularly cold and difficult period of winter weather. By early 2008, the installation teams and Consumers project group had endured bitter cold, high winds and snow to make the final start up as early as possible. Work was conducted under floodlights to keep up with the schedule. Stock Fairfield made a significant number of steel deliveries on weekends and outside normal working hours to ensure the site crews were kept working at all times.



**Fig. 2 Stock Fairfield 3000 t/h radial stacker supplied to Consumers Energy Karn/Weadock.**



**Fig. 3 Work continues under flood light at Karn/Weadock site despite deep snow cover.**

The level of co-operation between Consumers Energy and Stock Fairfield was exceptional. In order to accomplish the end result in such a short time frame, no other way of working would yield an acceptable outcome. A huge amount of time was invested by John Gose, Consumers Energy Major Projects and Construction Manager, and his core project team Gary Davis and Ted Webster. Stock Fairfield's Customer Service Manager Don Wolf said, "Consumers is a very special customer to us, we shared all the ups and downs through this projects as one team" he went on to add "the professionalism of John Gose and his team was second to none". The joint approach paid off and after some weeks of testing and final installation in early February the new stacker started commercial operation.

Completing a huge project undertaking with major potential risks for late start-up presented unique and high pressure challenges. According to Gose, "Today the stacker has continued to operate without fault." The unit has become quite a landmark locally attracting attention from passing walleye fisherman as they come in and out of the Saginaw River mouth. The unit stands more than eight stories high and truly dominates the Karn/Weadock Shoreline.



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