

Upgrades to Aging Mobile Substation Trailer Add Improved Protection & Operational Ease For Oil & Gas Provider

Customer:
Petroleum Production Company

Location:
Texas

Sector:
Temporary Distribution Power for Oil Services

Background

A leading oil and natural gas producer in the United States had a mobile substation trailer, built in 1980, with a high side voltage of 138kV. The trailer included a manually operated center break disconnect switch mounted on a racking mechanism that had experienced significant weathering and, as a result, would not function properly. On the same trailer, power fuses were installed for short circuit protection on the primary of the transformer. The customer wanted to upgrade the primary switching and protection to improve ease of use and, at the same time, the level of protection provided.

Solution

The customer removed all equipment from the trailer, scrapped the disconnect switch and power fuse, and sent the transformer to be refurbished. The trailer body was sand blasted, repainted, and shipped to the Southern States factory. It was agreed by both parties that the Southern States Type CSH-B horizontal design circuit switcher would provide the most advanced level of protection and switching for the application. The CSH-B circuit switcher included an integrated disconnect switch, the highest interrupting rating available for mobile applications, and had a total weight comparable to the original disconnect and power fuse.

From there, Southern States' design team adapted the circuit switcher racking mechanism to the trailer bed where the disconnect and power fuse had previously been located. This adaptation was accomplished using advanced 3D solid modeling software. The 3D design enabled Southern States to confidently implement the required modifications to the trailer without interfering with any of the existing trailer infrastructure or systems, such as key frame components, wires, brakes, stabilizers or suspension.

The 3D design approach resulted in a clean and timely implementation. Modifications to the trailer were accomplished using components manufactured in-house and by local suppliers.

The design included:

- A 138 kV CSH-B circuit switcher mounted on a racking mechanism with 8-foot phase spacing
- A motor operator, supported off the rear with a vertical bearing support rigidly attached to the trailer frame, that allowed for both automatic and manual operation
- A storage cabinet for the racking mechanism braces when the switch is being transported
- Control wiring from the motor operator that was protected and hidden under the trailer deck in rigid steel conduit
- Shipping braces for the CSH-B, painted red for easy identification, to prevent damage during transit

The final design allows for deployment of the circuit switcher in an hour by a qualified crew – with nothing more than a few wrenches and a step ladder.

Results

The end-user was very pleased with the upgraded protection and usability features provided by Southern States. They are confident that the refurbished and upgraded mobile substation will allow them to respond during emergencies and required system maintenance with a reliable, easy to deploy solution that can provide greater system reliability and high side protection.

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