MISTRAS

One Source for Asset Protection Solutions

SERVICES DIVISION

Unprecedented Savings and ASME Code Case Compliance in Fossil Power

Ultrasonic Phased Array Inspection

CONDITION

After a recent large fossil power plant outage in the Midwest, MISTRAS was requested by the utility to provide linear phased array inspection services to comply with ASME Section I, Code Case 2235 for the use of Ultrasonic inspection in lieu of radiography on newly welded boiler internal components. MISTRAS, working in conjunction with the utility and with oversight provided by the Electric Power Research Institute (EPRI) and authorized inspectors from two national insurance firms, undertook the project in order to prove the technology and provide unprecedented costs savings for the utility. MISTRAS was required to prove, through monitored performance demonstrations, their ability to locate and size embedded flaws in welded mock-ups. The resulting success enabled the utility to demonstrate the viability of Phased Array technology for the project.

RESULTS

During the outage, Phased Array technology was used for Code acceptance of approximately 150 boiler header welds fabricated from SA-335, P22 (2 ¼ Chrome) material. The header sizes consisted of both 7.5" O.D x 1.375" MW and 10" O.D. x 2.5" MW welds. All welds were inspected both before and after post weld heat treatment. The use of advanced ultrasonic technology eliminated the need for performing radiography using Cobalt 60, thereby minimizing radiation exclusion zones and allowing for increased construction trade involvement during the inspection windows. In addition to phased array technology, nearly 14,000 boiler tube welds were inspected using digital radiography, which dramatically increased nightly production. This was achieved by allowing more radiographic crews in the boiler during inspection windows.

The Phased Array technique, in lieu of Radiography, was also used to inspect a significant number of heavy wall pipe welds in accordance with ASME/ANSI B31.1. Additionally, a number of Main Steam piping welds (12 – 18" O.D. x 3.375" MW and 4 – 14" O.D. x 2.25" MW) were inspected, as well as Boiler Feedwater welds (22" O.D. x 3.00" MW). The Main Steam piping material was a combination of 2 ¼ Chrome and 9 Chrome, while the Feedwater piping was fabricated from grade B Carbon Steel. As was the case with the boiler header welds, all piping welds were inspected before and after post weld heat treatment. Due to long-term service related concerns, these piping spools had been furnished without RT gamma ports. Had Radiography been employed for inspection using the "contact" technique, the inspection time would have exceeded seven (7) full days, using 100 curies of Cobalt 60.

The utility estimates that the inspection plan utilizing phased array and digital radiography technologies allowed them to shorten their outage by fifteen (15) full days. The utility estimates the **total cost savings at nearly $15,000,000.00**, based on the unit's total generating capacity of 1300 MW and the additional fifteen (15) days of production gained by using this technology combination.

MISTRAS Services is dedicated to providing innovative solutions to the utility industry that helps increase the productivity of our NDT inspectors, as well as various construction trade personnel. These approaches yield tremendous benefits to the owners in terms of time and money.

WORLDWIDE HEADQUARTERS:
195 Clarksville Rd •
Princeton Jct, NJ 08550 • USA
T: +1.609.716.4000 • F: +1.609.716.0706
E-MAIL: sales@mistrasgroup.com

Visit our website for an office near you
www.mistrasgroup.com

Local Presence, Global Reach!