**Background**

Narrow groove welding has developed significantly over the past decade, and its benefits are becoming widely recognized. Reduced weld (70 percent or more, compared to conventional grooves), improved production rates and reduced residual stresses are among the many advantages of this technique.

**Description**

Narrow groove welding processes use a groove with 0 to 5 degree sidewalls instead of the traditional 37.5-degree weld prep. This narrow groove requires far less filler metal and time to complete the weld, and lowers the residual stress resulting from cooling of the weld metal.

Recognizing the inherent benefits of narrow groove welding, WEC Welding and Machining, a subsidiary of Westinghouse, pioneered an equipment development effort focused on delivering high quality narrow groove welds. The result was the delivery of the nuclear industry’s first narrow groove reactor coolant system welds for a steam generator replacement (SGR) project.

**Benefits**

Westinghouse narrow groove welding equipment was designed for both high weld quality and optimal usability and provides a number of benefits, including the following:

- Custom weld heads exclusively employ the industry leading Eclipse II® Vision System, which provides optimal visibility of the molten weld pool
- The High-Dep® gas tungsten arc welding (GTAW) system works in all positions with all joint designs, is cost effective and produces high quality welds
- The innovative argon flood cup protects the molten weld pool
- An integrated gas system integrity check instantly identifies the integrity of the argon gas delivery system
- In-house research has culminated in an optimized gas flow envelope that provides optimal shielding and improved resistance to external air movement/turbulence
- Welding equipment designed for remote operation enables welding operators to perform weld installation outside of adverse welding environments

Equipment and technology are core components of Westinghouse success in the narrow groove welding marketplace; another component is the focus on welder skills. Westinghouse maintains an industry leading program of welder training, hands-on process education and welding operator skills assessment. Westinghouse can quickly and easily match qualified welders to the special needs of any job and technicians are re-qualified, as required. Key components to
the quality of Westinghouse welder skills include the following:

- The Westinghouse training program incorporates extensive lessons-learned application-related experience into the education process
- Welding technicians are fully certified according to American Society of Mechanical Engineers (ASME) Section IX standards
- Certification is kept current at all times through a computerized library of Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR)