

## Replacement High-Speed Gear Drives

### Background

As nuclear power plants reach 50-year operations milestones, it is critical to assess the aging of components, including the operating condition of high-speed gear drives. Since many gear drives have been in service for decades, it is imperative to have these gear drives assessed for replacement or refurbishment.

A leading supplier of nuclear safety-related products and services, Westinghouse in conjunction with Nuttall Gear offers upgraded high-speed gear drives based on the original design. As the original equipment engineer and only supplier with access to original design-basis documents, Westinghouse supplies each new high-speed gear drive identical to the original design specifications qualified to the specific plant. Westinghouse high-speed gear drives do not require costly reverse engineering work, plant modifications or design changes.

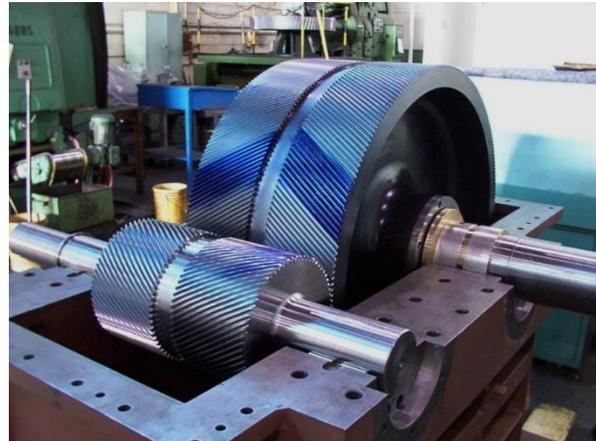
Built on nearly 50 years of operating experience, Westinghouse high-speed gear drives are upgraded with improved material and manufacturing processes, including gear quality AGMA Class 13+ production and modifications to mitigate wear and improve reliability.

### Description

Manufacturing of the new gearboxes and replacement components takes place at the Nuttall Gear facility in Niagara Falls, New York in accordance with the Westinghouse 10CFR50 Appendix B Quality Program.

Westinghouse engineers and technicians oversee the manufacturing process and quality assurance program, including:

- Review of design and quality requirements with Nuttall Gear personnel
- Inspection of component and quality documentation prior to assembly
- Witness of performance testing
- Final quality release



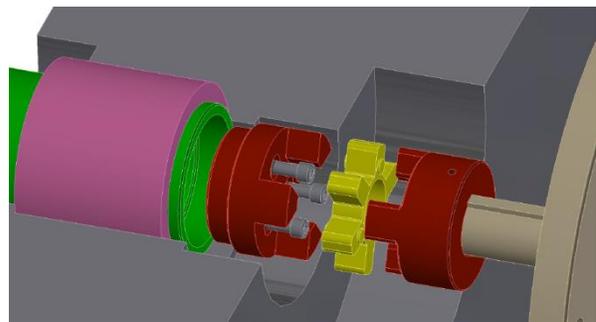
*Final assembly and inspection of a high-speed gear drive*

If refurbishment of a gear unit is an option, Westinghouse and Nuttall Gear engineering personnel perform a detailed examination of the housing to verify proper bore alignment and determine if replacement is required. In addition, the gear set is inspected for damage or excessive wear to determine if replacement is needed.

Finally, new gear components are manufactured to high-quality AGMA Class 13+ standards using today's improved materials.

### Benefits

Westinghouse and Nuttall Gear also now offer a permanent solution to wear and loss of lubrication issues on the two-pin type lubrication pump coupling.



*Lubrication pump coupling upgrade*

This new upgrade eliminates the two-pin type coupling and replaces it with a custom-designed, three jaw type coupling with a buna N insert.

Westinghouse and Nuttall Gear also modify existing gear shafts to accept the new style coupling, even if the gear shafts have years of wear from the two-pin type design. This design is proven with decades of safe operation and is currently in use at several nuclear plants.

## Experience

Westinghouse maintains the original design and qualification baseline documentation for high-speed gear drives. All replacement components supplied are evaluated through Westinghouse's rigorous 10CFR50 Appendix B quality assurance program.

Utilizing the original design basis documentation, Westinghouse certifies to the original qualification reports so that costly reengineering is not necessary.

- Replacement and refurbishment of gear drives includes enhancements and upgrades developed over more than 40 years of manufacturing experience.
- Westinghouse engineers and technicians have more than 50 years of experience in providing equipment for safety-related applications in the nuclear industry.
- Westinghouse has furnished more than 200 original Nuttall high-speed gear drives and thousands of replacement parts for the gear drives.



*Westinghouse and Nuttall partner to offer state-of-the-art manufacturing capabilities; pictured is a gear grinder with a typical high-speed gear mounted.*

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