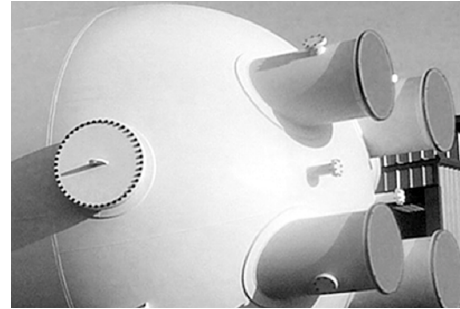
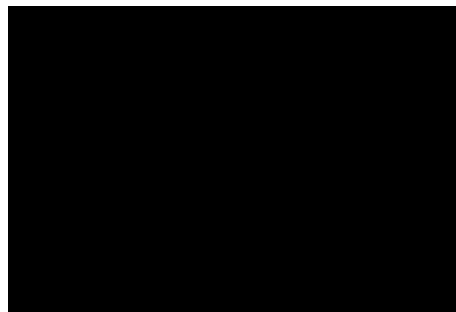


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Nuclear Division



# Mechanical Reverse Engineering Curtiss-Wright Nuclear Division - Nova





# Reverse Engineering

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## WHAT IS REVERSE ENGINEERING?

“The process of developing technical information sufficient to duplicate an item accomplished by physically examining, measuring or testing existing items; reviewing technical data; or performing engineering analysis.”

*EPRI TR-107372 – Guideline for Reverse Engineering at Nuclear Power Plants*

# Reverse Engineering

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## LEVELS OF COMPLEXITY

### Piece Parts (Simple)

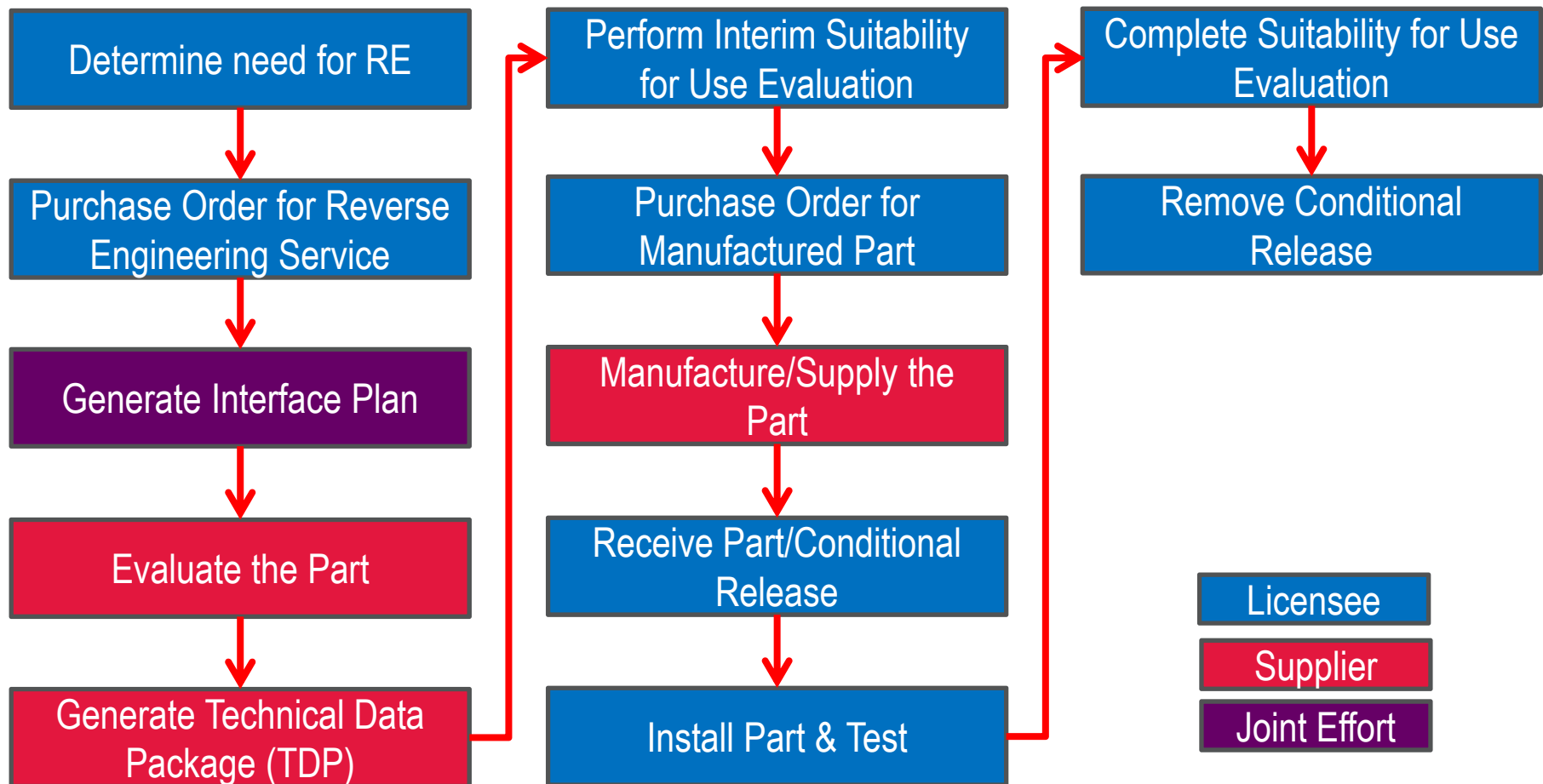
- Specialty Fasteners
  - Nut, Bolt, Screw, Stud, Washer...etc.
- Valve Applications
  - Stem, Bushing, Disc, Guide, Retainer, Spindle, Gland, Pin, Cage, Spacer, Follower....etc.
- Pump Applications
  - Shaft, Sleeve, Ring, Coupling.....etc.

### Components (Complex)

- Pumps
- Valves/Actuators
- Snubbers/Accumulators/Hydraulic Cylinders

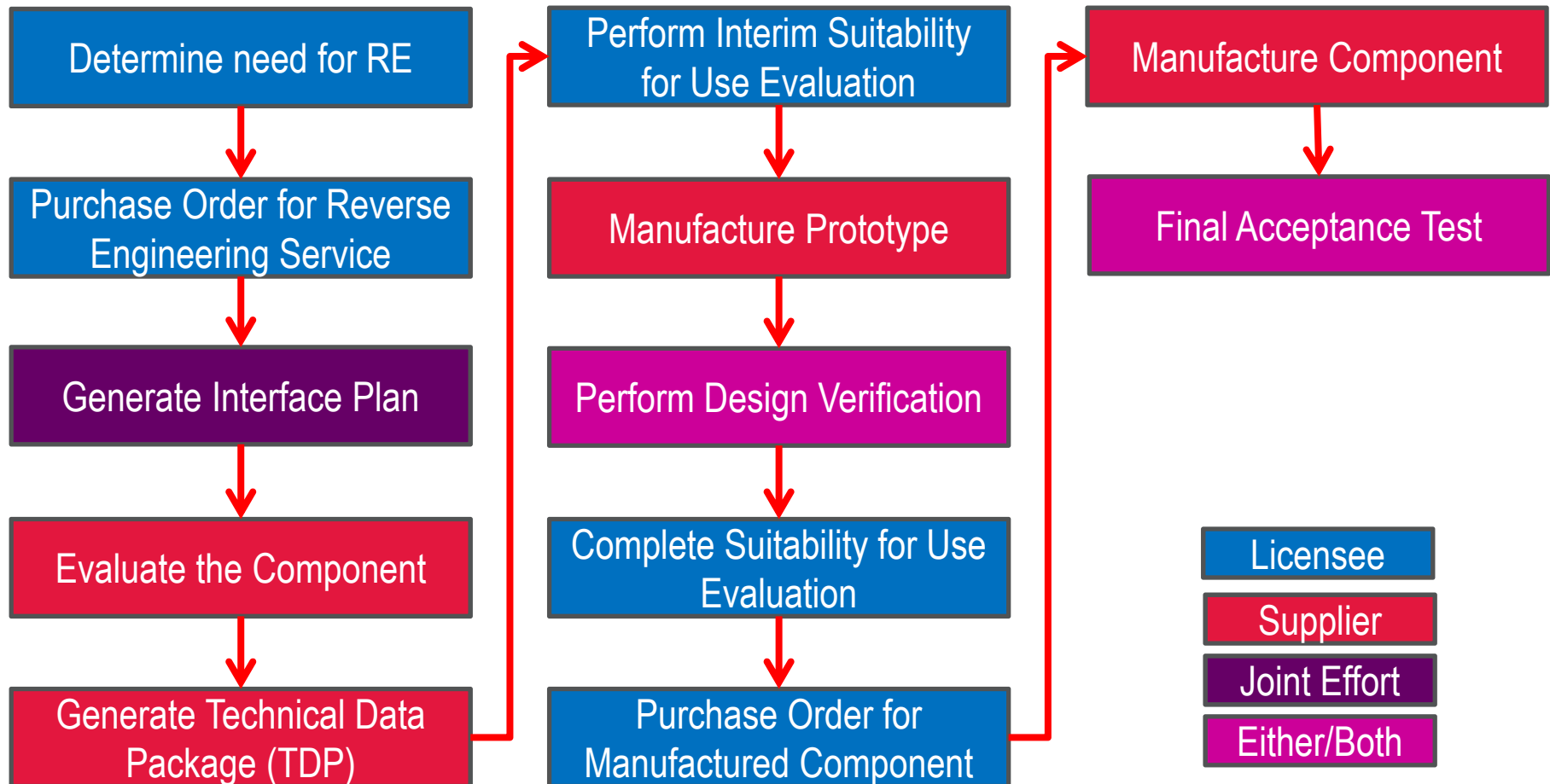
# Reverse Engineering – Typical Process

## GENERIC REVERSE ENGINEERING PROCESS – PIECE PARTS (SIMPLE)



# Reverse Engineering – Typical Process

## GENERIC REVERSE ENGINEERING PROCESS – COMPONENTS (COMPLEX)



# Considerations

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## COLLABORATIVE PARTNERSHIP

- **Multi-disciplined team**
  - Procurement Engineering
  - Component Engineering
  - Design Engineering
  - Supply Chain
  - Quality Assurance
  - Systems Engineering
  - QC/Inspections
  - Supplier



# Considerations

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## DESIGN CONTROL

- **Responsibility must be clearly defined**
  - Piece parts – typically lies with the Licensee
  - Components
    - Supplier Responsible – component supplied safety related
      - Supplier performs design verification through analysis, testing or qualification
    - Licensee Responsible – component supplied non-safety related
      - Licensee performs design verification





# Reverse Engineering

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## SUMMARY

- Understand the complexity of the item being reverse engineered and how suitability of use will be determined.
- Licensee and Supplier must work in concert to ensure success.
- Evaluation of effectiveness may require review of the entire process including activities performed by both the Licensee and the Supplier.

# Questions

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The Curtiss-Wright logo, featuring the words "CURTISS - WRIGHT" in a bold, white, sans-serif font, stacked vertically, set against a red rectangular background.

Tad K. Gray  
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