


## Supplying Complex Replacement Items

Mike Dunkelberger

March 11, 2015




---

---

---

---

---

---

---

---

---

---

### About MPR

Founded in 1964 by lead engineers from Admiral Hyman Rickover's Navy nuclear power organization



They instilled in MPR a culture of:

- Technical Rigor
- Process Discipline
- Business Integrity

Consists of about 250 highly talented professionals covering all major engineering disciplines

A supplier of complex replacement items and performing commercial grade dedication since 2000

The MPR Nuclear QA Program satisfies 10 CFR 50 Appendix B and the NRC endorsed versions of ASME NQA-1

MPR Associates 320 King Street Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---



---

---

---

---

### Project Experience

*Timing Module / Load Sequencer*

MPR Associates 320 King Street Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Project Experience



*Service Water Strainer*



MPR Associates 320 King Street Alexandria VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Project Experience



*EDG (emergency diesel generator) Excitation Systems*



MPR Associates 320 King Street Alexandria VA 22314 | mpr.com

---

---

---

---

---

---

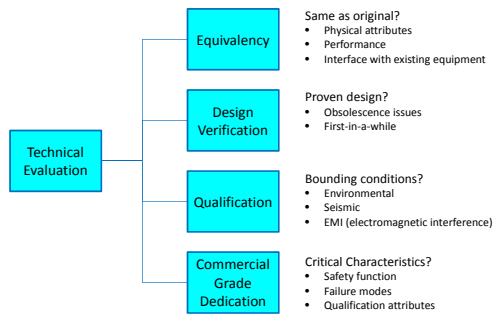
---

---

---

---

### Don't underestimate the engineering effort



MPR Associates 320 King Street Alexandria VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Become experts on the application / engage client SMEs

#### Perform plant walkdowns

- Obtain design information
- Confirm interface points



#### Get the client's SMEs (subject matter experts) involved

- Obtain operating experience for existing equipment
- Align expectations for qualification and CGD activities
- Discuss installation concerns (e.g., existing electrical connections)

*Take advantage of existing information and expertise*



MPR Associates 320 King Street Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Partner with key suppliers

#### Provides access and input to design information

- Design changes
- Failure history
- Proprietary concerns

#### Provides access to the manufacturing facility

- Surveillance activities
- Manufacturing process changes

#### Improves communication

- Discuss limitations (e.g., manufacturing and testing)
- Work together to resolve issues as they occur



*An environment of collaboration increases the potential for success*



MPR Associates 320 King Street Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Perform bounding tests for verification and acceptance

#### Design verification

- For complex equipment, small design changes can produce unexpected results
- If first-in-a-while:
  - Confirm no loss of manufacturing expertise
  - Ensure compliance with applicable standards and requirements



#### Component and system level testing

- Critical characteristics selected from a top down and bottom up perspective
- Verify the response to anticipated system transients
- Verify components interact as expected

*Testing should simulate the client's application to the extent practical.*



MPR Associates 320 King Street Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### Ensure QA oversight personnel are engaged throughout

#### Review project documents

- Confirm key decision points are documented sufficiently
- Minimize repeat documentation errors
- Ensure nonconforming conditions are resolved



#### Monitor project activities

- Assist with pre-job briefs
- Ensure inspectors are prepared
- Participate in design reviews

*Timely reviews can minimize the need for costly rework at the end.*



MPR Associates, 320 King Street, Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---

### MPR lessons learned

**Don't underestimate the engineering effort**

**Become experts on the application**

**Engage the client's SMEs** *(take advantage of their expertise)*

**Partner with key suppliers** *(collaboration leads to success)*

**Perform bounding tests for verification and acceptance**

**Ensure QA oversight personnel are engaged throughout**



MPR Associates, 320 King Street, Alexandria, VA 22314 | mpr.com

---

---

---

---

---

---

---

---

---

---