TRUPACT-II LESSONS LEARNED
AN ENGINEERING PERSPECTIVE

PHIL GREGORY, PRINCIPAL ENGINEER
WESTINGHOUSE ELECTRIC CORPORATION
TRUPACT-II LESSONS LEARNED
AN ENGINEERING PERSPECTIVE

- Design
- Test
- Certification
- Fabrication
- Safety
- Operations and maintenance
TRUPACT-II LESSONS LEARNED

DESIGN

- Use codes and standards when possible
- Accepted materials and processes will reduce certification review time
- Conservative design is easier to review
- New concepts are possible, but they may take longer to certify
TRUPACT-II LESSONS LEARNED

TEST

- Testing may be required for:
  - Nonstandard materials
  - Unconventional design
  - Liberal design

- Full-scale testing may be required by:
  - Inability to analyze both normal and hypothetical accident conditions
  - Soft (deformable) packaging design
  - Public perception

- Listen to the regulators
TRUPACT-II LESSONS LEARNED

CERTIFICATION BY TEST

- Analysis is preferred to test because:
  - Analysis predicts a safety factor based on material properties
  - Design changes may be analyzed for a new safety factor

- Safety factor for a test is one

- Regulator's comfort level is important
TRUPACT-II LESSONS LEARNED

CERTIFICATION BY TEST
(cont.)

- Consider initial conditions which will cause maximum damage
- Multiple test sequence may be required; comfort level
- Test conditions may induce failure not related to the design
- Listen to the regulators
TRUPACT-II LESSONS LEARNED

FABRICATION

- Utilize experts to review the process from beginning to end
- Don’t assume that anything is easy
- Understand and follow procedures
- Make the QA program part of the team
- Identify tolerances on the design drawings and fabricate within them
TRUPACT-II LESSONS LEARNED

SAFETY

- NRC safety concerns are primarily sub-criticality, shielding and containment
- NRC considers both normal and hypothetical accident conditions
- NRC is also concerned about flammable gas/shipping time
- Use the NRC regulatory guides
TRUPACT-II LESSONS LEARNED

OPERATIONS AND MAINTENANCE

- Design safety into the operation:
  - Minimize administrative controls
  - Use the ALARA concept

- Examples of human engineering:
  - Leak test prior to each shipment
  - One fixture for lids and payload
  - Tiedown u-bolt go/no-go gauge

- Maintenance requirements must:
  - Be reasonable and achievable
  - Have defined acceptance criteria
TRUPACT-II

PROTECTIVE STAINLESS STEEL SKIN 3/8" THICK

HONEYCOMB IMPACT LIMITER

LYTHERM INSULATION 1/4" THICK

INNER CONTAINMENT VESSEL 72.63" I.D. 1/4" THICK

OUTER CONTAINMENT VESSEL 73.60" O.D. 1/4" THICK

FOAM 10" THICK

HONEYCOMB IMPACT LIMITER

FORKLIFT POCKETS

LYTHERM INSULATION

PROTECTIVE OUTER SKIN

INNER CONTAINMENT VESSEL

OUTER CONTAINMENT VESSEL

WEIGHT: 11,600 LBS. EMPTY 18,600 LBS. LOADED

MATERIAL: ASTM - A240 TYPE 304 (STAINLESS STEEL)