Technical Safety

- Workpack risk assessments
  - Stage 1 & 2
  - Design review prior to Rev R1
  - Constructability review prior to Rev C1
- Temporary refuge impact assessment
  - Fire
    - Lomond jet fire
  - Blast
  - Smoke
  - Gas
  - Model fly through
    - Key features
    - Lomond/ETAP
- Fire & gas detection
  - Fire & gas philosophy
    - Process plant
    - Accommodation and temporary refuge
  - Specifications and layouts
    - Examples
      - Line of sight
      - Point
    - Interface with instruments discipline
- Zone plots
  - Zone 0
    - Explosive atmosphere is present continuously or for long periods
  - Zone1
    - Explosive atmosphere is likely to occur in normal operation occasionally
  - Zone 2
    - Explosive atmosphere is not likely to occur in normal operation or for a short period only
  - Non Haz
    - Explosive atmosphere is not expected to be present.
  - Driven by
    - Flanged joints
    - Vessels
    - Vents
  - Inputs
    - Piping routing/ISOs
    - Haz area classification schedule
  - Output
    - Haz area hatched drawings
    - Coverage review
      - AFP
      - F&G detection
    - Elect and inst equip ratings checks
- Non-process modifications
  - Construction HAZID
    - Feed
    - Detail design
  - Dropped object studies
    - Topsides/subsea
    - Escalation mitigation
      - Protection
      - Shutdown
      - Hydrocarbon Free
  - ENVIDS
    - Releases
    - Process waste
    - Construction waste
  - Best available technique
  - MAH assessments
  - Safety case impact assessments
  - Human factors
    - Specialist
    - I.e. CCR screens layout
    - Looks at learnings from incidents
  - ALARP report
    - Summarises all issues
    - Identifies risk increase/decrease
    - If not ALARP must mitigate
- Technical safety engineers
  - Various 1st degrees
  - Majority MSc safety eng, reliability and risk management
- Safety screening report
  - Identifies required studies
- Process modifications (minor)
  - P&ID review
- Process modifications (major)
  - Formal HAZOP
  - C&E review
  - Safety instrument function
    - SIL assessed
      - LOPA
      - Riskcraft
      - Risk graph method
    - Trips
      - HHL
      - LLL
  - Fire and explosion analysis
    - Jet fire/pool fire/bleve etc
    - Initiated at study phase
    - Gas dispersion analysis
    - AFP &PFP philosophy
      - Specification
      - Hydraulic modelling
    - Blast overpressure studies
    - Vent location
      - Dispersion modelling
    - Flare radiation modelling
    - Piping/equipment drag loads
      - strengthening
  - Quantatitative risk assessment
    - Normally 3rd party (examples)
      - DNV
      - GL Noble Denton
  - EER Analysis
    - Impact to escape routes
    - Impact to safety critical systems
      - i.e. TEMPSC, liferafts, knotted ropes, decent-to-sea devices,
    - Equipment change
    - Safety signage
    - Life saving equipment
      - Portable fire extinguishers
      - Smoke hoods
      - Fire hoses
      - etc
  - HAZID
  - ENVID
  - Major accident hazards
  - Safety case impact assessment
  - Human factors
  - Process ALARP report
- Mechanical package evaluations
  - Ignition sources
    - Spark/heat
  - Shutdown requirements
  - Noise/vibration assessment
  - PUWER assessment
    - Examples
      - Maintenance
      - Access
    - Complete list in PUWER regs