Characterization Plan

Reactor Bay
Reactor Grounds
East Wing

PNRI

7 December 2007

Components of the plans

- Survey requirements
- Methods chosen
  - Data gathering methods
  - Quality assurance
  - Waste management program
  - Safety program
  - Emergency program
  - Preparation of survey report
- Personnel & equipment
- Work schedule

Survey requirements

- Produce reliable and sufficient data to support decommissioning plan
- Radiological & non-radiological safety

Data gathering methods

- Information gathering
  - Drawings and photos
  - Operational history and records
    - inventory of radionuclides
    - previous monitoring data
    - incident reports
  - Personal recollections

Data gathering methods

- Survey preparations
  - Preliminary categorization of areas
  - Control room / sample room / instruments room
  - Pre-survey inspections
  - Clearing and cleaning
    - removal of fuel in the reactor bay
    - design of container
    - storage area
    - planning of transport
    - removal of other sources present
    - removal of other non-radioactive material
  - Making reference drawings
  - Establishing grid system

Data gathering methods

- Measurements
  - Reference background measurements
  - Field surveys
    - surface contamination scanning
    - air sampling
    - dose rate monitoring
    - in situ gamma spec
  - Sampling
    - concrete (core) sampling
    - soil sampling
    - paint sampling (for radiological & non-radiological)
    - swipe sampling
    - Metal/wood samples
    - water sampling
    - sludge/septic tank sampling
    - resin sampling
    - samples in pipes, ducts
    - sample preparations
  - Laboratory analysis
    - gamma spectroscopy
    - liquid scintillation
    - gross gamma/beta counting
    - alpha counting
    - xrf for non-radiological analysis
  - Ergonomics?

Data gathering methods

- Data analysis / decision making
  - Category reclassification if required
  - Comparison to clearance levels

Quality Assurance

- Identification of measurements
- Equipment calibration
- Validated procedures
- Personnel qualifications/training
- Record keeping
- Security
  - Area
  - Source
  - Data

Waste Management Program

- Radioactive wastes
- Non-radioactive wastes
- Storage / disposal area

Safety program

Radiation protection

- Dose constraints
- Protective clothing
- Personnel monitoring
- Shielding
- Contamination controls

Non-radiological safety

- Industrial safety
- Ventilation system
- Health

Emergency program

- First aid
- Incidents (fire, earthquake, power interruptions,etc.)
- Accidents

Preparation of survey report

- Radionuclide/radioactivity maps
- Databases

Personnel

- Number of personnel
- Level of expertise and training requirements
- Team responsibilities (team leader, surveyor, health physicist, map maker..)
- 2 teams of 5 for field survey
- 2 teams of 3 for sampling
- 1 team, 6 members for laboratory
- 1 team, 6 members for clearing and cleaning
- 2 for data management

Instrumentation & equipment

- Survey meter (3)
- Contamination meters (3 for alpha, 3 beta/gamma)
- Teletectors (2)
- Portable gamma spec (2)
- Air sampler
- Diamond core drill
- Reference sources
- HPGe Well detector
- LSC
- XRF
- Gross Gamma/beta/alpha counters
- Alpha spectrometers
- Assorted common tools

Work schedule

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Data gathering (essentially completed)									
Survey preparations									
insturment setup	<								
pre-survey									
clearing and cleaning									
making of reference drawings and grid system									
Measurements									
field surveys									
sampling									
sampling preparations									
laboratory analysis		<							
Preparation of survey report									