



Irradiator Technology H-315



Session 09 Maintenance

Control Room Organization

Record Book

- Irradiator entry log book
- Visitor log book
- Downtime log book
- Operator manuals

Radiation Detectors

- Bertold Rato/F or Ludlum or ?
- Digital dosimeter
- Direct reading dosimeter
- Thermoluminescent dosimeter
- Warning labels for broken radiation survey meters

Control Room Organization

Maintenance

- Plc logic listings
- Set of drawings
- Hand control box

Postings

- License, license amendments, violations, etc.
- NRC-3
- Emergency procedures
- Where to find regulations

Maintenance Room Organization (typical)

Tools

- All necessary tools for mechanical and electrical maintenance

Spare Parts

- One complete set of spare parts (as recommended by Nordion)
- One set of source pass cylinders
- One set of timers (Eagle Signal or equivalent) (Older machine)
- One set of radiation monitors (L-118 boards, DL-2..) or equivalent

Equipment Room Organization (typical)

Equipment

- Pool vacuum pump and accessories
- Source handling tools
- Underwater lights
- Work table (for source replenishment)
- Compressor
- Chiller
- Deionizer with radiation monitors
- Air filters

Equipment Maintenance

- **Air Compressor(s) (weekly)**
 - Inspect oil level in crankcase
 - Clean air filter
 - Check for air leaks
 - Check V belt for wear and tension
- **Water treatment plant (de-ionizer)**
 - Check water circulation pump
 - Check water level float switch
 - Check for water leaks
 - Record water conductivity
 - Record make up pool water meter reading

Equipment Maintenance

- **Chiller:**

- Check low & high pressure
- Check inlet/outlet water temperature
- Check oil pressure
- Check coolant temperature
- General maintenance as per owner's manual

Note: Chiller must have S.S. heat exchanger

No copper pipes in the system

Irradiator Maintenance General

- Internal conveyors
 - **Air cylinder will need new packing (if too slow)**
- Pool water float check all positions
- Pool skimmer, does it work?, Needs cleaning?
- Micro switches will need replacing
- Source hoist:
 - **check pressure, lubricator, pressure switch, air interlock, check cable and sheave wear.**

Irradiator Maintenance Weekly

- **Air Line & Filters**

- Check air pressure on gauges
- Check for air leaks
- Check filters for blockage
- Check cylinder speeds

- **Product Conveyors**

- Check cylinder speed + air/oil consumption

Irradiator Maintenance Weekly

- **Storage conveyors**
 - Check puller latches for freedom of movement
- **Wheel Bearings**
 - Every 2 weeks inspect & spray all bearings with heavy duty lubricant

Irradiator Maintenance Monthly

- **Radiation Levels**

- Maximum reading at filter bank
- Maximum reading at deionizer and pumps

- **Irradiator stop controls**

- Check emergency stop button on control console
- Check safety pull cable source pass & interim

Irradiator Maintenance Monthly

- **Air pressure switch**
 - Lower air pressure to check
- **Temperature Switch**
 - Raise temperature to check

Irradiator Maintenance Monthly

- **Other Irradiator shut down controls**
 - Check roof plug switch, personnel access door open
- **Source Hoist and Guide Cables**
 - On older machine check “Rotowink” pressure indicator between the two solenoid valves,
 - On new machine source valve fault is self checking
 - Inspect cables for broken strands and signs of wear
 - Check guide cable for stretch (Belleville washers)
 - N.B. Nordion notice:
Every 5 years or 20,000 source movements (up+down) replace hoist cable & hoist sheaves

Irradiator Maintenance Monthly

- **Monitors and Personnel Access Door Interlock**
 - Expose L-118, Ludlum 396, Ludlum 385 or DL/2 radiation monitor probe to test source and adjust if necessary
 - With monitor alarming check personnel door stays locked + water circulation stop for DL/2 or Ludlum 396 at deionizer
 - Check L-118 or Ludlum 385 for saturation with the monitor test button on control console while the source is moving up + 30 seconds

Irradiator Maintenance Monthly

- **Ventilation system**
 - Check fan motor V-belt for tension and wear
 - Lubricate pulley, bearings and motor
 - Check pulley alignment
 - Replace roughing filter, measure pressure drop across filters
 - Check operation of air flow switch
- **Overdose control**
 - Check overdose timer
- **Storage conveyor cylinders**
 - Check for cylinder speed, air leaks
 - Jogger wheels for wear + lubricate

Irradiator Maintenance Monthly

- **Storage load & unload hydraulic elevators**
 - Operate elevator load & unload
 - Verify clearances between elevator rail and overhead rail
 - Visually inspect all hydraulic pipes and coupling for leaks
 - Check oil level for hydraulic cylinders

Irradiator Maintenance Quarterly

- **Power interruption**
 - Cause short power interruption check proper operation after restoring power
- **Storage conveyors**
 - Check wear on rollers + latches

Irradiator Maintenance Annually

- **Source pass cylinder packing**
 - Replace as needed + micro switches
- **Product carriers/totes**
 - Inspect for structural fitness
 - Check trolley heads for secure ness
 - Check that doors function properly (Hinge wear??)
 - Check for tote corner splitting

Irradiator Maintenance Every 2 Years

- **Clean trolley heads**
 - Lubricate as required

Irradiator Maintenance

- Anything organic inside the irradiator is subject to radiation damage.
- The irradiator will stop automatically if microswitches or cylinder gaskets fail.
- The operator must keep an eye on s.s. cables for wear or fraying.

Irradiator Maintenance

- **Internal Records of Planned Maintenance:**
 - Every Irradiator comes with an Operators manual that includes weekly, monthly, Semi-annual, annual.. maintenance schedule + forms.

Sample set in your manual