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# NSD BULLETIN NO. \_\_\_\_\_\_\_\_\_

# Series of 2018

# GUIDELINES FOR THE ACCEPTANCE OF LOW LEVEL RADIOACTIVE WASTES BY THE

# PHILIPPINE NUCLEAR RESEARCH INSTITUTE-RADIOACTIVE WASTE MANAGEMENT FACILITY

# (PNRI-RWMF) FROM WASTE GENERATORS

1. **PURPOSE**

The guidelines for the acceptance of low-level radioactive wastes as set forth in this bulletin apply to on-site (PNRI) and off-site (non-PNRI) waste generators who are authorized to collect and transport unconditioned low-level radioactive wastes for treatment, conditioning and storage at the PNRI-Radioactive Waste Management Facility.

An authorized waste generator is an agency, firm or institution possessing a valid Facility License or Radioactive Material License and therefore authorized to collect generated radioactive wastes and transport them to PNRI for further treatment, conditioning and storage. Radioactive wastes generated may be in the form of solid, liquid, contained gas and spent/disused sealed radioactive sources (DSRS).

The segregation, collection, packaging and transport requirements established in these criteria guarantees the effective treatment and conditioning procedures at the PNRI-RWMF. The facility requires that the size and configuration of the waste packages for transport should be standardized. Proper segregation of low-level wastes at the place of origin will permit efficient processing of wastes with the appropriate method and procedure.

The waste acceptance criteria contained in this document is based on the current practices optimized to the extent possible and in no way supersedes the Code of PNRI Regulations.

1. **GUIDELINES**

### REQUEST FOR RADWASTE MANAGEMENT SERVICES

The waste generator shall submit a letter of request for radioactive waste management addressed to: (1) for **off-site waste generator** – *Director of PNRI* and attention to the *Head of the RPSS* and (2) for **on-site waste generators** – *Head of the RPSS*.

The request shall contain the following information:

* + - 1. Waste Coordinator – Provide the name, position, address and contact number of the person responsible for the segregation, collection, packaging and transport of the radioactive waste generated.
      2. Proposed Schedule – Provide the proposed date of shipment and the expected date and time of arrival at PNRI-RWMFF
      3. Waste Material – Provide the information corresponding to the type of radioactive material, as follows:
* ***For Disused Sealed Radioactive Sources*** – provide the following information for each package containing a specific type of radionuclide:
  1. Operating manual of equipment if source is still attached to the equipment as needed
  2. Photocopy of Facility License / Radioactive Material License
  3. Type of casing (specify the type of device where the source is encased e.g. Al, Pb, steel)
  4. Number of units
  5. List of radionuclides present (indicating the elements and the corresponding mass number)
  6. The marked activity, the reference date and the corresponding name of manufacturer and serial number of each unit of spent sealed source
  7. Dimension of waste package
  8. Weight of completed transport package to include type and description of package
  9. Handling device (rigging, tie-down, forklift, etc.) as needed
  10. Maximum radiation dose rate reading at contact and at one (1) meter distance from surface of package in mSv/hr
* ***For Other Solid Waste Materials*** – provide the following information for each package of solid waste:
  1. Volume of waste material in m3
  2. Waste category (See Table 1)
  3. List of radionuclides present
  4. Beta-gamma/alpha contamination level per cm2 in the waste materials
  5. List of non-radioactive waste components (e.g. glass, metal sheets, paper and destroyed biological components)
  6. Radiation dose rate reading at surface of package and at one (1) meter distance from surface
  7. Total weight of completed package
  8. Type and description of package
  9. Type of transport container
* ***For Liquid Waste*** – provide the following information for each container of liquid waste:
  1. Waste Category (see Table 1)
  2. List of radionuclides present
  3. Approximate activity per unit volume of waste
  4. Type of solvent/chemicals present (indicate the specific type of solvent or state if organic, acidic or aqueous)
  5. Other non-radioactive component (include destroyed biological or pathogenic components)
  6. Waste volume in liters
  7. Type of waste container (glass, plastic carboy, etc.)

The PNRI-RWMF will evaluate the request upon receipt and respond within 10 working days. If the request is found to meet the requirements, the PNRI-RWMF will send a “***Letter of Approval”*** for the Radioactive Waste Management service and informs the waste generator to fill-up and submit two (2) copies of the following:

* ***Service Request for Radioactive Waste Management***
* ***Radioactive Waste Collection Form***

Off-site waste generators are required to comply with *CPR Part 4 “Regulations for the Safe Transport of Radioactive Materials in the Philippines”* for the transporting the radioactive waste to the PNRI-RWMF.

The waste package will be verified upon receipt and the waste generator will be issued with a **“*Certificate of Radioactive Waste Disposal”.***Request is only valid for one shipment, which may contain several packages of waste materials.

For radioactive waste that cannot be verified visually, a “***Radioactive Waste Receipt Form***” will be issued and once verified a *Certificate of Radioactive Waste Disposal* will be given to the waste generator.

### WASTE CHARACTERIZATION, SEGREGATION AND PACKAGING

Materials that are identified as waste must be properly characterized and segregated by the waste generators according to waste categorization system provided in Table 1. This will enable PNRI to treat and conditioned waste in the most efficient manner and to optimize the interim storage capacity at the PNRI site. The above-mentioned waste materials must be collected and packaged as follows:

### Contaminated Solid Materials:

Waste materials belonging to the same waste category must be collected in a 100-liter drum lined with polyethylene plastic bag. Compactible wastes containing C-14 or H-3 however should be segregated from the non-compactible materials contaminated with the same type of radionuclide. When the container is full the plastic bag must be tightly closed by wrapping a tape around the empty side near the open end of the plastic bag.

### Liquid Waste

All liquid waste, organic or aqueous, including waste in vials belonging to the same waste category should be collected in 2-liter glass containers (for organic liquid) or in 20-liter plastic carboy (for aqueous waste) with dependable screw cap or whichever will be appropriate for the type and the amount of substance to be contained.

### Spent/Disused Sealed Radioactive Sources (DSRS)

Sources belonging to the same type of radionuclide can be packaged in the same transport container, provided it is in compliance with CPR Part 4, e.g. Transport Index, package classification, placarding etc. .

**Table 1. RADIOACTIVE WASTE CATEGORIZATION**

|  |  |
| --- | --- |
| Category | **Radionuclide with Half-life** |
| A – 1 | Radionuclides with half-lives ≤ one month (i.e. I-131) |
| A – 2 | Radionuclides with half-lives > one month but ≤ one-year (i.e. Ir-192, I-125) |
| B – 1 | Radionuclides with half-lives > one year but ≤ five years (i.e. Cs-134, Co-60) |
| B – 2 | Radionuclides with half-lives > five years but ≤ 20 years (i.e. H-3, Kr-85) |
| B – 3 | Radionuclides with half-lives > 20 years but ≤ 100 years (i.e. Cs-137, Sr-90) |
| C – 1 | Radionuclides with half-lives > 100 years but ≤ 500 years (i.e. Am-241) |
| C – 2 | Radionuclides with half-lives > 500 years (i.e. C-14, U-238, Pu-239, Th-230) |

### UNACCEPTABLE WASTE

All radioactive waste meeting the requirements set forth are acceptable for conditioning and interim storage except the following:

### Waste materials with activity within or below the clearance level as set in CPR Part 3 “Standards for Protection Against Radiation” Appendix D.

### Contaminated pressurized containers such as aerosol cans, unless when pressure is released by punching holes on the container.

### Materials containing explosive chemicals, unless the explosive chemicals are chemically converted to a stable state by the waste generator before they are sent to PNRI for disposal. The procedure for the conversion/chemical destruction done should be attached to the waste generator’s request for evaluation.

### Waste materials containing biological or pathogenic components, unless treatment such as autoclave method or addition of disinfectant is done by the waste generator to destroy these components prior to packaging. A certification that such procedures were done and that the wastes no longer contain active pathogenic components should be attached to the accomplished request forms upon submission.

### Unsegregated waste especially those in vials (i.e. scintillant in vials, pathogenic samples in vials - Bactec)

### TRANSPORT CONTAINERS

The waste generator shall ensure that the volume loading of the container is optimized. Optimum loading is necessary to reduce the number of shipments or delivery and will enhance space utilization at the PNRI-RWMF.

Transport containers must be properly painted and lined with plastic bags. The suggested container types are described below:

1. Standard 200-liter steel drum with removable head is prescribed for packages of solid waste and liquid waste contained in glass or plastic containers. The drum must be provided with head gasket, bolt ring and bolt lock. It can also be used for DSRS.
2. Steel box which can withstand 73.30 g/cm2 (150 lbs/ft2) is the minimum prescribed for packaging spent/disused sealed sources whose original casings cannot fit the 200-liter (55 gal) drums. Installed or permanent handle must be provided for safe and convenient handling and transport. The maximum weight allowed per package is 1000 kg.
3. For DSRS: Original casing or transport container of the device containing the radioactive source.

### TRANSPORT REQUIREMENTS

All radioactive waste shipment shall be accompanied by all the required documents. It shall be packaged and contained in a transport container as provided for in Section 4 Transport Container. Radiation levels from the waste container must conform to the CPR Part 4.

Radiation and waste package contamination levels declared by the waste generator shall be verified upon arrival at the PNRI-RWMF. If the dose rate and/or contamination level reading obtained by the waste generator at the time of transport and the PNRI reading at the time of receipt vary by a **factor of 20%**, the waste generator will be asked to provide the explanation.

The exterior of all packages sent to PNRI should be reasonably free of dirt, moisture and rust. DSRS waste packages should have a handle or a lifting device. Bulky and heavy metal casings shall be blocked and braced inside the waste package to prevent a shift of the waste item material during transport and handling.

### TRANSPORT EXPENSES

The waste generator shall shoulder all the costs necessary to deliver radioactive waste to PNRI. Any radioactive waste package received at the PNRI for treatment, conditioning and storage found to be in violation of the requirement stated herein may be refused by PNRI in the interest of public health and safety of its workers. The material may be returned to the waste generator or PNRI may perform the corrective action. The cost of either of the two actions will be charged against the account of the waste generator.

### REFERENCES

* Code of PNRI Regulation Part 3 *“Standards for Protection Against Radiation”*
* Code of PNRI Regulation Part 4 *“Regulations for the Safe Transport of Radioactive Material in the Philippines”*
* Code of PNRI Regulation Part 26 *“Security of Radioactive Sources”*

### CONTACT PERSON

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