

Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987.

THE GAZETTE OF INDIA: FEBRUARY 28, 1987/PHALGUNA 9, 1908 [PART II-Sec.3(i)]

DEPARTMENT OF ATOMIC ENERGY

Bombay, the 3rd February, 1987

G.S.R. 125.-In exercise of the powers conferred by the sub-section (1) read with clause (i) of the sub-section (2) of Section 30 and clause (b) of sub-section (1) of Section 17 of the Atomic Energy Act, 1962 (33 of 1962) and all other powers enabling it in this behalf, the Central Government hereby makes the following rules, namely –

1. Short title, extent and commencement – (1) These rules may be called the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987.

(2) They shall come into force on the date of their publication in the Official Gazette.
2. Definitions – In these rules, unless the context otherwise requires:-
 - (i) “accident condition ” means a substantial deviation from normal operating conditions which could lead to release of unacceptable quantities of radioactive materials if the relevant engineered safety features did not function as per design intent;
 - (ii) “Act” means the Atomic Energy Act, 1962 (33 of 1962);
 - (iii) “adequate protection” means protection against radiation so provided that the prescribed operational limits are not exceeded;
 - (iv) “applicant” means a person or an organisation that applies in form A, for granting of authorisation to perform specified activities connected with disposal of radioactive wastes;
 - (v) “authorisation” means permission for disposal of radioactive wastes, granted by the competent authority in form B;
 - (vi) “authorised person” means a person authorised by the competent authority to disposal of radioactive waste in accordance with the provisions of the se rules;
 - (vii) “competent authority” means any officer or authority appointed by the Central Government by notification under these rules;
 - (viii) “conditioning” means those operations, chemical or physical, that transform the radioactive waste into a form suitable for transport, storage or final disposal and may include converting the waste into another form, enclosing the waste in container and providing additional packaging;
 - (ix) “contamination” means the presence of radioactive substance in a material or place that may be specified as excessive by the competent authority by notification for the purpose of these rules;

- (x) “disposal” means release of any material to the environment in a manner leading to loss of control over the future disposition of the radionuclides contained therein and includes emplacement of waste material in a repository;
- (xi) “disposal limits” means the limits for disposal of radioactive waste, prescribed from time to time by the competent authority under these rules;
- (xii) “effluent” means gaseous, particulate or liquid emission which is discharged from the installation into its environment;
- (xiii) “environment” means the surroundings of an installation that will influence the life, survival and development of human beings and any organisms relevant to man;
- (xiv) “employer” means a person who employs workers or who is self-employed as a worker in an installation;
- (xv) “Form” means form attached to these rules;
- (xvi) “installation or institution” means any location wherein the processes incidental to waste generation, conditioning, storage and disposal are carried out;
- (xvii) “institutional control” means controls or actions to preclude unauthorised human contact with radioactive waste and include controlled access to the installation and to the restricted area around it, periodic inspection and surveillance of the said installation and its restricted area, controlled productive use of the said restricted area and restrictions in the form of titles and deeds for land use;
- (xviii) “operational limits” means operational limits prescribed from time to time under the Radiation Protection Rules, 1971;
- (xix) “packaging” means any container prepared for containing the conditioned waste for handling, transportation, storage or disposal and may be permanent part of the waste package or it may be a reusable cask or overpack;
- (xx) “person” includes,
 - (i) any individual, corporation, association of persons whether incorporated or not, partnership, estate, trust, private or public institution, group, government agency or any state or any political subdivision thereof or any political entity within state any foreign government or nation or any political subdivision of any such government or nation or other entity;
 - (ii) any legal successor, representative or agent of each of the foregoing;
- (xxi) “Radiological Safety Officer” means any person who is so designated by the employer and who in the opinion of the competent authority is qualified to discharge the duties and functions outlined in rule 13 of these rules;
- (xxii) “radioactive waste” means any waste material containing radionuclides in quantities or concentrations as prescribed by the competent authority by notification in the official gazette;
- (xxiii) “repository” means an underground geological formation with or without engineered barriers or an overground vault in which waste may be emplaced for disposal;

- (xxiv) “restricted area” means any area access to which is controlled by the employer and approved as such by the competent authority for purpose of protection of individuals from exposure to radiation and radioactive contamination;
- (xxv) “Schedule” means Schedule attached to these rules;
- (xxvi) “storage” as distinct from disposal means containment of the radioactive waste under controlled conditions and under radiation surveillance in accordance with the provisions of the Radiation Protection Rules, 1971;
- (xxvii) “Surveillance” includes all planned activities performed-
 - (i) to ensure that conditions at an installation remain within prescribed limits;
 - (ii) to ensure that the operational limits prescribed under Radiation Protection Rules, 1971 are not exceeded; and
 - (iii) to detect in a timely manner any unsafe condition and the degradation of structures, system and components which would at a later time result in an unsafe condition in the installation or in its environment;
- (xxviii) “waste form” means the physical and chemical form of the waste , without its packaging;
- (xxix) “waste package” means waste form duly contained in its packaging for handling, transportation, storage or disposal;
- (xxx) words and expressions used in these rules and not defined but defined in the Act, shall have the meanings respectively assigned to them in the Act.

3. Restrictions on the disposal of radioactive waste – No person shall dispose of radioactive waste –
 - (a) unless he has obtained an authorisation from the competent authority under these rules;
 - (b) in any manner other than in accordance with the terms and conditions specified in the authorisation issued under these rules;
 - (c) in any location different from those specified in the authorisation;
 - (d) in quantities exceeding those specified in the auhtorisation.

4. Application for authorisation – Each application for authorisation to dispose of or transfer radioactive waste shall be made (save as provided in rule 15) in Form I and shall include –
 - (i) brief description of –
 - (a) the process, materials and equipment generating radioactive wastes in the installation;
 - (b) the equipment and systems provided in the waste generating installation to monitor and control the radioactive wastes and to reduce environmental releases;
 - (c) the environment around the installation;
 - (d) the processes and equipment in the installation for conditioning treatment and disposal of radioactive waste and the staff employed for the purpose;

- (e) safety devices incorporated in the waste disposal installation to contain the radioactive effluents and control their release to unrestricted areas during normal operations, including anticipated operational occurrences and to keep these releases as low as reasonably achievable (ALARA);
 - (f) an estimate of the amounts of annual releases, discharges and leakages from radioactive waste repositories during normal condition and an analysis of their anticipated environmental impact;
 - (g) an analysis of potential accidents which may occur in the installation and design features and monitoring equipment incorporated in the waste disposal installation to control the release of radioactivity in the event of such accidents;
 - (h) procedures to be followed for safe collection of radioactive wastes arising from such accidents; and
 - (i) design features of surveillance equipment incorporated or otherwise provided in and around the waste disposal installation to monitor the normal releases of activity and those released in the event of an accident;
- (ii) estimates of quantities of each of the principal radionuclides expected to be released in the environment annually (in solid, liquid and gaseous form) during normal operations;
 - (iii) any other information which the competent authority may deem necessary to evaluate the safety status of the waste disposal operations.
5. Issuance of authorisation - The competent authority shall issue authorisation in Form II where it is satisfied that the applicant has complied with the requirements of rule 4.
6. Duties of the authorised person – Every authorised person shall ensure that –
- (i) disposal of radioactive waste is done in accordance with the provisions of these rules, and in accordance with the terms and conditions laid down in the authorisation;
 - (ii) records of waste disposal are maintained in Form III for period stipulated by the competent authority;
 - (iii) all the requirements of the Radiation Protection Rules, 1971 are complied with;
 - (iv) any operation likely to result in a more hazardous accident that that envisaged in the safety analysis given by the applicant under rule 4 (i) (g) are not carried out in the installation;
 - (v) personnel monitoring and environmental surveillance is carried out on a continued basis to evaluate the risks and to monitor the environmental impact of the waste disposal operations;
 - (vi) unless stipulated otherwise in the authorisation, quaterly reports are submitted to the competent authority in Form IV;
 - (vii) reports received on any hazardous situation as provided under clause (g) of Rules 13 are forthwith submitted to the competent authority;
 - (viii) that the Radiological Safety Officer discharges his duties under rule 13 of these rules;

- (ix) after the waste disposal installation is closed, institutional control is maintained for such time as stipulated by the competent authority in each specific time under rule 11;
7. Maintenance of Records of Waste Disposal – Every authorised person shall maintain records of disposal of radioactive waste giving the following particulars-
- (a) the description, quantity, physical state, chemical characteristics and the date of disposal of each consignment of radioactive waste;
 - (b) mode of disposal, concentration of radioactive material in the waste disposed of and site of disposal;
 - (c) names of the workers and the radiological safety officers associated with the disposal of the radioactive waste;
 - (d) data on periodic radiation surveillance in and around the site of the disposal of radioactive waste as specified in the authorisation;
 - (e) any other information which the competent authority deems necessary.
8. Installation for disposal of radioactive waste to be considered as radiation installation:- Any installation for disposal of radioactive waste shall be considered a radiation installation as defined under the Radiation Protection Rules, 1971.
9. Prevention of entry into restricted area:- The authorised person shall make adequate arrangements to prevent entry of unauthorised members of the public in the restricted area and shall further ensure that only the essential staff remains in the said areas to perform necessary operations.
10. Power to inspect installations:- Any person duly authorised by the competent authority under Section 17 of the Act, for purpose of inspection and enforcement of these rules, may at any time:-
- (a) inspect any installation where disposal of radioactive waste is carried out;
 - (b) inspect any equipment (permanently installed or mobile) therein;
 - (c) make such tests and or measurements as may be necessary for purposes of evaluating radiation hazards;
 - (d) order disposal of such radioactive wastes as he deems necessary in the interest of radiation protection;
 - (e) do all such things (including examination of relevant records) as he may consider for purposes of determining the adequacy or otherwise the methods employed and devices used therein for controlling and monitoring environmental releases.
11. Closure and Institutional Control:- Decommissioning or closure of a radioactive waste disposal installation and institutional control shall be under taken by the authorised person in accordance with the procedure as prescribed by the competent authority in each case.
12. Radiological Safety Officer:- The authorised person shall designate with the approval of the competent authority, either himself or a person under his employment as Radiological Safety Officer. The Radiological Safety Officer shall possess the following minimum educational qualifications, training and experience:-
- (i) A graduate in science with mathematics and physics as the subjects;

- (ii) Training in radiological safety at the Bhabha Atomic Research Centre or at any other organisation recognised as equivalent by the competent authority;
- (iii) One year experience of discharging relevant duties under a qualified Radiological Safety Officer.

13. Duties and functions of Radiological Safety Officer:- The duties and functions of the Radiological Safety Officer in the radiation installation shall be as follows:

- (a) to advise the employer regarding the safe handling and disposal of radioactive wastes and on the steps necessary to ensure that the operational limits are not exceeded;
- (b) to instruct the radiation workers engaged in waste disposal on the hazards of radiation and on suitable safety measures and work practices aimed at minimising exposures to radiation and contamination and to ensure adequate radiation surveillance is provided for all radiation workers and the environment;
- (c) to carry out such tests on conditioned radioactive wastes as specified by the competent authority;
- (d) to ensure that all buildings, laboratories and plants wherein radioactive wastes will be or are likely to be handled/produced, conditioned or stored or discharged from are designed to provide adequate safety for safe handling and disposal of radioactive wastes;
- (e) to assess radiation protection instruments required for an installation and to keep such instruments in use under proper calibration;
- (f) to help investigate and initiate prompt and suitable remedial measures in respect of any situation that could lead to radiation hazards;
- (g) to ensure that reports on all hazardous situations of the type referred in rule 14 or as laid down by the competent authority regarding operational limits along with details of any immediate remedial measures that may have been initiated are made available immediately to his employer and a copy thereof to the competent authority;
- (h) to ensure that provisions of the Radiation Protection Rules, 1971 are followed properly.

14. Accidental release of radioactive waste:- In the event of accidental release of any radioactive material resulting in personnel, surface or environmental contamination, the Radiological Safety Officer shall:-

- (a) take steps to arrange for the immediate decontamination of the affected personnel and areas and other remedial measures as required;
- (b) inform immediately the employer and the competent authority details of the incident, remedial measures initiated and programme for disposal of contaminated material, if any.

15. Special provisions for installations such as Hospitals and Tracer Research Laboratories:- (1) Persons using small amounts of radioisotopes of very short effective half life (such as in medical practice and tracer applications) may submit their application in Form V for authorisation to dispose of radioactive waste.

(2) without prejudice to the generality of these rules, a person thus authorised may dispose of wastes containing short lived radioisotopes, contaminated materials and

contaminated effluents in accordance with the procedures and conditions laid down in the Schedule.

16. Prior Approval of Modifications:- Any modification to any installation for disposal of radioactive waste or any change in the working conditions therein, shall be done only with the approval of the competent authority.
17. Power to Suspend or Cancel an Authorisation:- The competent authority may cancel an authorisation issued under these rules or suspend it for such period as it thinks fit in its opinion, the authorised person has failed to comply with any of the conditions of the authorisation or with any provisions of the Act or these Rules after giving the authorised person an opportunity to show cause and after recording the reasons therefor.
18. Power of the competent authority in the case of cancellation of authorisation:- Upon suspension or cancellation of authorisation and during the pendency of an appeal the competent authority may give directions to the persons whose authorisation is suspended or cancelled for the safe storage of radioactive wastes, and such person shall comply with such directions.
19. Authorisation for Existing Installations:- Every person presently engaged in disposing of radioactive waste shall obtain an authorisation under these rules from competent authority within six months from the date of coming into force of these rules.
20. Powers to Ask for Records:- In addition to the quarterly reports in Form IV, the authorised person shall submit such periodical reports to the competent authority as stipulated in the authorisation for ensuring safe disposal of radioactive waste.
21. Appeal:- (1) An appeal shall be made against any order of suspension or cancellation or refusal of an authorisation by competent authority to the Central Government.
(2) Every appeal shall be in writing and shall be accompanied by a copy of the order appealed against and shall be presented within thirty days of the order passed.

[No. AEA/30/3/84-ER]
H.A.D. SAWIAN, Jt. Secy.

SCHEDULE [See rule 15(2)]

Conditions and procedures for disposal of Radioactive Wastes by Institutions handling small quantities of Radioisotopes.

Institutions such as hospitals and tracer research laboratories handling small quantities of radioisotopes of short effective half life may, after obtaining authorisation under rule 3 undertake disposal of radioactive waste in accordance with the following procedures:-

1. Disposal of Radioactive Waste by Release to Sanitary Sewerage System:- An authorised person may discharge radioactive waste into a sanitary sewerage system provided:-

- (a) the waste is readily soluble or dispersible in water;
 - (b) the maximum quantity of radioactive material released in the sanitary sewerage system is less than the quantity prescribed in Table 1 of this Schedule and not in excess of the quantity which if diluted by the average daily quantity of sewerage released into the sewerage system by the authorised institution will result in an average monthly concentration equal to the limits:-
 - (i) as specified in Table 1; or
 - (ii) as specified by the competent authority on a case by case basis for radionuclides not listed in Table 1;
 - (c) the gross quantity of radioactive material released into the sewerage system by the institution does not exceed 37 GBq per year;
 - (d) when more than one radionuclide is present in the liquid waste, the sum of the ratios of the individual quantities of each of the radionuclides present and their respective maximum quantities allowed as per Table 1 does not exceed unity;
 - (e) periodic maintenance and monitoring of the pathways of the liquid effluents till the effluents reach the sewerage system is done by the radiological safety officer to ensure that the appropriate disposal limits and operational limits are not exceeded in and outside the drainage system;
 - (f) a log book is maintained in Form III recording the identity and quantity of each radionuclide disposed, its time of disposal, the name of the person who has supervised the waste disposal and the data on radiation surveillance.
2. Disposal of solid radioactive wastes:- An authorised person may dispose of solid radioactive waste by burial into pits prepared in an exclusive burial ground provided:
- (a) the burial ground is located in an isolated site owned by the said person;
 - (b) the site is duly fenced off to prevent unauthorised entry;
 - (c) the site is duly approved by the competent authority for burial of radioactive wastes; the approval being governed by factors such as the nature of environment including topographical and geological characteristics of the burial site, usage of ground and surface waters in the general area around the site with a view to minimise the assessed anticipated risk of accidental dispersal of the waste to potentially affected locations or back to the environment;
 - (d) the total activity in the wastes buried in any one pit of the burial ground does not exceed –
 - (1) the limits specified in Table 2 of this Schedule; or
 - (2) the limits specified by the competent authority on a case by case basis for radionuclides not listed in Table 2 of this Schedule;
 - (e) when more than one radionuclide is present in the solid waste, the sum of the ratios of the individual quantities of each of the radioisotopes present and their respective maximum quantities allowed as per Table 2 does not exceed;
 - (f) the depth of the burial pit is so chosen that the waste have a top layer of compact earth of minimum 120 cm thickness when the pit head is closed;
 - (g) successive burial pits are separated by a distance of atleast 180 cm;
 - (h) not more than 12 burials are made in any one year;
 - (i) a closed pit is not opened for reuse till ten half lives of the longest lived radioisotopes buried in that pit have elapsed;

- (j) the burial area is treated as restricted area and subjected to provide environmental surveillance by the radiological safety officer to ensure that the appropriate disposal limits and operational limits are not exceeded;
 - (k) the material excavated from a closed pit is released for normal disposal under the supervision of the radiological safety officer before reusing the pit as laid down in (i);
 - (l) periodic monitoring of the burial ground and its environment is done by the radiological safety officer to ensure that the operational limits on radioactive contamination are not exceeded;
 - (m) a log book is maintained in Form III recording identity and quantity of each radioisotope buried, description of waste, time of burial name of the person who has supervised the burial operations and the data on radiation surveillance.
3. Incineration of Radioactive Waste:- An authorised person may undertake incineration of radioactive wastes, including incineration of animal carcasses, provided competent authority is duly satisfied that-
- (a) the design of the incinerator is suitable for the intended operations and provides for retention of solid and liquid combustion/scrubbing by products and for controlled discharge of liquid and gaseous effluents;
 - (b) the incineration operations will not result in air borne radioactive contamination in excess of the operational limits prescribed under Radiation Protection Rules, 1971 for unrestricted areas;
 - (c) the solid and liquid radioactive wastes arising from incineration operation will be duly collected and disposed of in accordance with these rules;
 - (d) adequate environmental surveillance including air monitoring where necessary will be provided to ensure that operational limits are not exceeded;
 - (e) the incineration operations are undertaken under direct supervision of the radiological safety officer;
 - (f) up-to-date records are maintained in Form III of the incineration operations indicating the names of radionuclides and their amounts finally disposed of in gaseous, liquid and solid form, the details of such disposals the names of the persons involved in these operations and the data on radiation surveillance.
4. Records etc.:- Quarterly records in respect of the disposal operations shall be submitted to the competent authority in Form IV.
5. Other conditions:- The authorised person shall abide by-
- (I) such orders as may be issued by notifications by the competent authority modifying the concentrations prescribed in Table 1 or the quantities prescribed in Tables 1 and 2.
 - (II) Any other safety measures stipulated by the competent authority in accordance with these rules.

Table 1
Disposal limits for sanitary sewerage systems

Radionuclide	Maximum limit on total discharge per day (MBq)	Average monthly concentration of radioactivity in the discharge (MBq/m ³)
H-3	92.50	3700
C-14	18.50	740
Na-24	3.70	222
P-32	3.70	18.5
S-35	18.50	74
Cl-36	0.37	74
Ca-45	3.70	10.1
Co-60	0.37	37
Sr-89	0.37	11.1
Zr-95 + Nb-95	3.70	74
Mo-99 + Tc-99m	3.70	185
Mo-99	---	---
Ru-106 + Rh-106	0.37	14.8
Sn-124	0.37	25.9
I-125	3.70	22.2
I-131	3.70	22.2
Cs-137 + Ba-137m	0.37	14.8
Ba-140 + La-140	0.37	29.6
Ce-144 + Pr-144	0.37	11.1
Tm-189	3.7	37.0
Ir-192	3.70	37
Po-210	0.037	0.74

Table 2
Disposal Limits for Ground Burial

Radionuclides	Maximum activity in the pit (MBq)
H-3	9250
C-14	1850
Na-24	370
P-32	370
S-35	1850
Cl-36	37
Ca-45	370
Co-60	37
Kr-85	37
Fe-59	3700
Sr-89	37
Sr-89 + Y-90	3.7
Zr-95 + Nb-95	370
Mo-99	370
Ru-106 + Rh-106	37
Sn-124	37
I-125	37
I-131	37
Xe-1333	37
Cs-137 + Ba-137m	37
Ba-140 + La-140	37
Ce-144 + Pr-144	37
Tm-189	37
Ir-192	370
Po-210	3.7

