



Ethical and environmental principles of radioactive waste management

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1. Introduction

Governments and national and international organizations have adopted, over the last decades, charters of principles as guidelines to guide their decisions. The main purpose of this action is to demonstrate to society the institution's commitment to an ethical and updated agenda, applied to all aspects of the organization. Customers and other people involved have increasingly valued this commitment to complying with so-called ethical principles.

Initially, it seems that the institutions involved with radioactive waste management in Brazil must formally recognize and adopt ethical and environmental principles. Radioactive waste management requires that decisions are made in due course and in the best possible way, so that they can contribute to an acceptable level of safety for all, today and in the distant future. If the laws and regulations on radioactive waste management are well constructed and complied with, they should lead to this result and will also be a reflection of these principles.

One more reason for adopting these principles is to reduce the negative perception that the public has about nuclear safety and security, and also to settle society's doubts about the need and validity of this activity. Although radioactive waste has been managed in a way that respects the limits imposed by law, adopting a charter of principles is like attaching a quality seal to the product. Consequently, a charter of principles will serve as a guide for a thorough assessment of the quality of work carried out in radioactive waste management.

However, there are other reasons as well. Radioactive waste management involves many aspects

beyond physics or engineering. Several of them are outside these areas of knowledge and are necessary to reasonably ensure that radioactive waste is isolated from the biosphere and that the radiation emitted does not cause unacceptable effects on individuals of present and future generations, while radioactivity has not fully decayed to harmless levels for the health of man and Earth's environment.

These other aspects may be associated, for example, with how much risk can future generations be subjected to, compared to the risk admitted today for the present generation, which benefits from the application of nuclear technology that originated radioactive waste. This ethical issue is called justice between generations or intergenerational justice. Another example is the distribution of costs and benefits resulting from nuclear applications that generate radioactive waste, among individuals of the present generation. In this example, it is even reasonable to think that fair distribution of benefits can be achieved, but equitable distribution of associated risks may be difficult or even impossible to achieve. This ethical issue is called justice within generations or intragenerational justice.

These two examples belong to the category of problems studied in other areas of human knowledge, such as Social Sciences, Philosophy and Law.

Radioactive waste management, even depending on these contributions from different areas of knowledge, cannot stop while waiting for solutions to the problems. On a daily basis, decisions must be taken to treat, store or release into the environment the radioactive waste that is generated in a large number of industrial, medical and research activities. Likewise, other decisions are also taken today to establish public policies and strategies, and to create the laws and regulations that rule these same activities.

In the nuclear industry, it is already well established that one way of dealing with these issues and seeking the right decision-making in due course is the preliminary establishment of a series of ethical principles that serve as a guide for all aspects of radioactive waste management, whether technical, administrative, political or other principles.

In several economic activities today, adopting ethical principles has become practically mandatory, in order to guide decisions to protect rights and avoid legal actions, and to publicly commit to the interested community, the company's customers, for the good of our planet, for example. In many of these activities, this decision identified a set of principles underlying life in current society and called them environmental principles, designed to properly protect the Earth's environment, including present and future human beings, in a sustainable way.

When it comes to radioactive waste management, at the international level, the work of identifying these principles has gone on for decades and the result of this work is manifested in the form of laws, regulations, public policies, recommendations and standards that have been adopted by countries, governments, national and international organizations.

In this matter, the objective of this work is to identify principles that may be relevant in radioactive waste management, even if they are present in other areas of knowledge or human activities. These

principles may have legal, infra-legal or merely recommendatory status, adopted or proposed by various institutions around the world.

From this identification, a comparative table will be presented focusing on its application in the area of radioactive waste management, offering to open a discussion on which principles should be considered in the Brazilian legal and regulatory framework. Therefore, the paper aims to provide a space for clarification and reflection with those interested in the nuclear industry, in particular, those interested in the controversy surrounding the radioactive waste generated by nuclear activity.

2. Methodology

Through bibliographical and documentary research, examples of organizations that publicly declared the environmental and ethical principles that guide their activities were collected. The emphasis of the paper was based on the expressiveness of institutions and the correlation of their activities with core activities. Based on these data, a table will be presented highlighting the presence of these principles related to radioactive waste management, both nationally and internationally, through the regulations of the Brazilian Nuclear Energy Commission (CNEN), and through the standards of the International Atomic Energy Agency (IAEA), respectively.

3. Discussion

Taking good decisions requires a decision-making method and sensitivity to ethical issues. Only through careful examination of the problem, by evaluating different perspectives, dialoguing with other people and identifying alternative courses of action, can we make ethical choices in specific situations, in particular regarding to radioactive waste management.

As suggested by the referenced author [1], the options can be evaluated by asking the following questions:

- Which option will produce the most benefit and cause the least harm? (Utilitarian approach)
- Which option best respects the rights of all who participate? (Rights approach)
- Which option treats different groups of people equally? (Justice approach)
- Which option best serves the entire community, not just a few groups? (Public welfare approach)
- Which option would be chosen by the virtuous person? (Virtue approach)

Nevertheless, using this method and answering these questions in the best possible way is not easy. How do you know for sure if a decision could be harmful to someone or a group of people? Does the decision involve a choice between a good alternative and a bad one, or perhaps between two good alternatives or between two bad ones? Are all facts and factors involved known? It is an extensive list of questions that may not have answers.

One way out of these obstacles is to identify moral values underlying decision-making process in a specific field of human activity and transform them into a set of 'ethical principles' through analysis. In activities that may negatively impact the environment, ethical principles are translated into their operational

equivalents, the 'environmental principles', as they are currently understood.

Thus, the paper will analyze the aspects currently indicated by the International Agency on radioactive waste and compare them with charters of principles from public and private institutions that have similar activities to the nuclear industry, including possible implicit principles in the national regulation of radioactive waste by CNEN.

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References

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