

GROUNDWATER RECHARGE WITH TREATED MUNICIPAL WASTEWATER: THE LEGAL SITUATION IN SPAIN

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ABSTRACT

In Spain, the uncontrolled disposal and irrigation with untreated municipal wastewater has, in the past, been a common practice. At present, the situation is improving, with the establishment of treatment plants, fulfilling EEC guideline 91/271. However, the groundwater recharge with wastewater is a special situation, which may include elements of treatment, reuse and disposal. The legal position, in general, is relatively complex and can lead to a certain degree of confusion, both with respect to the guideline mentioned and, above all, to legislation in Spain.

In this country, groundwater recharge with reclaimed wastewater is considered to be disposal into the Common Water Domain, and not a practice of reuse. The water is a public good, and the State management of water resources is organised into catchment areas; the respective Hydrological Plans, still pending legislative development, will be responsible for setting up the basic norms for recharge with wastewater effluents. The legal model seems to be moving towards demanding a minimum quality level of the waters destined for recharge; this level would progressively rise according to the quality objectives forecast for the different water systems. Meanwhile, wastewater recharge requires a favourable hydrogeological report; furthermore, in cases of a possible effect on public health or natural ecosystems, the relevant health and environmental reports will also be necessary.

Key words: reclaimed municipal wastewater, groundwater recharge, legal requirements, Spain

RESUMEN

En España, los vertidos y riegos con aguas residuales urbanas brutas han sido una práctica muy extendida. Hoy día la situación va mejorando, con la puesta en marcha de planes de depuración, en cumplimiento de la Directiva 91/271 de la CEE. Sin embargo, la recarga de acuíferos con aguas residuales es una casuística especial, al tener algo de tratamiento, reutilización y vertido. En general, el tratamiento legal es relativamente complejo, y se presta a cierta confusión, tanto por lo que respecta a la Directiva citada, como, sobre todo, a la legislación española.

En España, la recarga de acuíferos con aguas residuales está considerada como un vertido al Dominio Público Hidráulico, y no como una práctica de reutilización. Todas las aguas son públicas, y la gestión estatal de los recursos hidráulicos está organizada por cuencas hidrográficas; los respectivos Planes Hidrológicos, pendientes aún de desarrollo legislativo, serán los encargados de establecer las directrices básicas para la recarga con aguas residuales. El modelo legal parece tender hacia la exigencia de una calidad mínima de las aguas a recargar, progresivamente mejorada según los objetivos de calidad previstos para los diferentes medios hídricos receptores. Mientras tanto, la recarga con aguas residuales urbanas necesita de un informe hidrogeológico favorable; y, en los casos de posible afección a la salud o a ecosistemas naturales, de los pertinentes informes sanitarios y medioambientales.

Palabras clave: aguas residuales urbanas depuradas, recarga de acuíferos, normas legales, España.

INTRODUCTION

In recent years great progress has been made in groundwater recharge technology. However, the legal requirements for the protection of aquifers against possible contamination by wastewater effluents are still unsatisfactory, though for different reasons in different countries. The legislative measures adopted range from the general application of strict quality control standards to the almost total absence of guidelines, and even to the encouragement of uncontrolled land disposal. Land applications of wastewater (to eliminate, recharge or irrigate) are common practice in arid regions, where the climatic and hydrogeologic peculiarities are in no way comparable to those of wetter regions.

Clearly, the quantity and complexity of the variables to be found in the practices of groundwater recharge make it very difficult to adopt an all-inclusive and general set of guidelines and quality standards. One compromise solution is to adopt certain minimum quality standards, with the guarantee of establishing, where necessary and in a case-by-case application, stricter quality requirements.

This is, broadly speaking, the model foreseen for Spain, where the situation is typical of a country initiating the regulation of practices of reuse and groundwater recharge with reclaimed municipal wastewater. There then arises the not insignificant difficulty of putting the legal dispositions into practice, in a way that is both uniform and consistent with common sense.

In Spain, State management of waters, structured into territories defined by catchment areas, together with an administrative division by Autonomous Communities (possessing various transferred competences), is a potential source of conflict over differentials and of bureaucratic complexity. This foreseeable conflict of competences might limit and frustrate the expectations created in regard to wastewater recharge, which in Spain, a country with a significant water deficit, especially in the South and East, receives considerable social and technical encouragement.

NORMS OF THE EUROPEAN ECONOMIC COMMUNITY (EEC)

The norms and guidelines on water reuse issued by the EEC (which must be complied with by all member states) do not establish the conditions to be met by groundwater recharge (not even at the level of recommendations). However, guideline 91/271 (DOCE, 1991) stipulates a series of minimum quality requirements for wastewater effluents before it is disposed of. Thus, this guideline indirectly affects the practices of wastewater recharge, which in Spain is considered to be a disposal into the Common Water Domain. In this respect, numerous assemblies have discussed the foreseeable difficulties for Spain, and other countries in the South of the European Community, in fulfilling the treatment targets. This guideline also poses certain problems of interpretation, such as the case whereby land application is considered a medium for the treatment of wastewater effluents.

Groundwater recharge is also subject to the quality standards laid down by other guidelines, which regulate the disposal into water systems of certain, particularly dangerous, substances; additional limitations are established by guideline 76/464 (DOCE, 1976, and those deriving from this), affecting a list of constituents which are specially prejudicial for public health and water ecosystems. However, it must be understood that such constituents are only found in minimal quantities in reclaimed municipal wastewater, as normally defined.

LEGAL SITUATION IN SPAIN

Introduction

The main legislative framework is provided by water legislation, both the Water Act of 29/1985 (BOE, 1985; henceforth WA), and part of the latter's development in the Royal Decree of 849/1986 (BOE, 1986; henceforth, RD 849/86).

However, the regulation of groundwater recharge with reclaimed municipal wastewater is still pending important regulatory advances. The decisive complement is due to be established by means of the corresponding Catchment Area Hydrological Plans (CAHP), as detailed in article 40 of the WA.

Groundwater recharge with wastewater effluents constitutes, as stated above, a disposal into the Common Water Domain (article 92 of the WA) and is therefore subject to the required procedure to obtain the authorization for such a disposal.

In the cases of incidental recharge arising from reuse practices (agricultural irrigation, mainly), there would first have to be the obtention of the corresponding administrative approval; in Spain all water is publicly owned, with individual rights only recognized in the concession of permission to use. For the foreseeable surpluses from water reuse, there would, secondly, have to be an application for authorization of its disposal. Apart from these administrative proceedings, wastewater reuse is intended to be regulated at national level by certain basic conditions (article 272.1 of the RD 849/86), still to be published. In any case, conditions corresponding to groundwater recharge are unlikely to be established, as this is not considered to be a water reuse practice.

Legal situation of the main cases of groundwater recharge

a) Planned recharge (direct recharge)

As commented above, in the cases of the planned groundwater recharge with wastewater effluents, the corresponding authorization for disposal must be obtained, whether the waters to be applied come from treatment plants or derive from the surpluses of reuse. As this is a case of disposal, the quality standards stipulated in the EEC guideline 91/271 must be applied.

According to the established procedure to authorize disposals, the permission will specify, in general terms and among other questions, the limits affecting the composition of the effluent, which must basically comply with the established standards, if existing, and otherwise the quality objectives set for the water systems in the corresponding CAHP.

It is also necessary for a (favourable) hydrogeological report to be issued by the relevant Administration (articles 94, WA and 110.1, RD 849/86). As additional guarantees, at the discretion of the management body, environmental and health reports may also be requested (article 236, RD 849/86). As this is an activity with the potential to affect the quality of neighbouring urban water supplies, groundwater recharge with wastewater effluents is also subject to the dispositions regarding perimeters of protection in articles 89d of the WA and 173 of the RD 849/86. The location of these perimeters will be determined at the requirement of the management body or on requirement by the competent authorities, according to what is to be protected. Such perimeters and the respective conditions attached are expected to be established in the corresponding CAHP (article 40g, WA).

Finally, before a definitive resolution, there would remain open the possibility for any person or judicial figure to request further reports, both during the preliminary phase and in that of public information.

b) Incidental recharge, after land treatment or land disposal

This is a mechanism for the indirect groundwater recharge which is greatly used in certain circumstances and places. It is well known that the land application itself constitutes an efficient system for treating wastewater effluents, either alone or as a complement to other methods. In fact, in arid and semi-arid regions, characterized by low rainfall and high insolation, it is considered to be a low cost and highly efficient system, particularly recommended for small urban communities. In this case, and as an exception, the wastewater applied could even be untreated, provided the action of the land is sufficiently effective as to constitute an "adequate" treatment. Then, the stipulations of guideline 91/271 would be fulfilled, in which article 2 (9) defines "Adequate treatment"

as that *"treatment of municipal wastewater by any process and/or system of purification such that, after entry of this reclaimed wastewater, the water systems comply with the relevant quality objectives and the dispositions of this and other EEC guidelines"*. Thus the surpluses produced, runoff and infiltration, must fulfil the quality prerequisites established by said guideline. However, this is just one possible interpretation of the extent of the application of this guideline, which, to avoid confusion, should be clarified by the competent authority.

In other respects, this is a case of disposal into the Common Water Domain and is subject to the requirements of the corresponding authorization, as well as the other regulations contained in the above section (request for hydrogeological, environmental or health reports, limitations due to perimeters of protection, etc.).

c) Incidental recharge by reuse practices

Groundwater recharge by surpluses of wastewater used for irrigation is, very possibly, the most important of all the forms of recharge by wastewater effluents, from the quantitative point of view. In this case, the corresponding permission must be obtained, together with authorization for disposal of the surpluses produced, which must comply with the quality objectives determined by guideline 91/271. As this is a case of reuse, with guidelines and quality standards established by national legislation, the waters must meet these requirements, according to the crops to be irrigated. In a complementary form, and by virtue of the transferred competences (public health and the environment, particularly), the Spanish Autonomous Communities (17 in all) are starting to determine their own guidelines and standards.

For example, at present the Balearic Islands have approved Decree 13/1992 (BOCAIB, 1992), in relation to quality standards for the wastewater effluents from treatment plants before land disposal. The Autonomous Community of Catalunya, which has issued health decrees for wastewater reuse (Direccio General de Salut Publica, 1994), intends to establish, in the near future, further sanitary criteria specific to groundwater recharge. And, finally, the Autonomous Community of Andalusia, too, has issued sanitary guidelines dealing with reuse practices (Consejería de Salud and Fundación Empresa-Universidad de Granada, 1994), but here groundwater recharge is not considered.

CONCLUSIONS

In Spain, groundwater recharge with reclaimed municipal wastewater is still in need of clear regulatory development; nevertheless, the legislative model is moving towards the demand of a minimum quality level of the waters to be recharged, increasing according to the particular circumstances of each case. To this end, a decisive criterion would be the establishing of quality objectives for the different water systems; these quality objectives would, in principle, be determined by the corresponding CAHP, which have yet to be published.

It would be very beneficial to classify the recharge practices according to the degree of sanitary and environmental risk existing, distinguishing, in principle, the recharge for nonpotable aquifers from that recharge of aquifers destined for drinking or recreational use.

For groundwater recharge for nonpotable use (taken as free from industrial compounds), use could be made of water of lower quality, or even of untreated waters. In any case, pretreatment would always be necessary, from the technical viewpoint, to favour infiltration and to avoid clogging. Many highly prestigious scientists and institutions have favoured this type of groundwater recharge with only slightly treated wastewater, particularly in cases of seawater intrusion, overexploitation, subsidence, maintenance of base flow, aquifers used for nonpotable purposes, etc. In these cases, it is particularly appropriate to consider the land as a treatment medium, and then the recharge is a consequence and not an end in itself; this consideration might satisfy the goals of guideline 91/271, in respect of "adequate" treatment.

As concerns groundwater recharge for potable use, the normative framework commented upon above, consisting of guideline 91/271, of the obtention of authorization for disposal and the subjection to the necessary perimeters of protection, comprises more than sufficient guarantee for public health and the environment.

However, this model, in Spain, might produce a certain level of bureaucratic complexity and lack of uniformity of criteria, given that the country is divided hydrologically into water catchment areas and administratively into Autonomous Communities, and that management of water is effected at the national level, while other competences, such as public health and the environment, have been transferred to many Communities.

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