Pharmaceuticals in Surface Waters: Use of NEPA

Shawna Bligh

The regulation of pharmaceuticals in surface waters has evaded substantive regulatory review. Emerging scientific data arguably suggests that pollution of rivers, lakes, and streams by active drug residues presents a significant, adverse impact on the aquatic environment. The agency charged with the regulation of pharmaceuticals, the Food and Drug Administration (FDA), provides a blanket categorical exclusion to substantive environmental review when drug residues, at their point of entry into the environment, fall below concentrations of 1 part per billion (ppb). 21 C.F.R. § 5.31. However, drug residues entering surface waters in concentrations as low as 1 part per trillion (ppt) result in adverse impacts to the aquatic environment.

Some drug residues entering surface waters are subject to existing federal effluent limitations for discharges from pharmaceutical manufacturing facilities. This article will not discuss those; rather, it will discuss drug residues that are discharged as a result of human consumption or injection of a drug into the body for a desired therapeutic result. These drug residues signal that the time is coming for a rule change or a finding of "extraordinary" circumstances with respect to the FDA's compliance with the National Environmental Policy Act (NEPA).

Even after metabolism, active drug compounds often leave the body unchanged. *See* Klause Haberer, Roman Hirsch, Karl-Ludwig Kratz & Thomas Ternes, *Occurrence of Antibiotics in the Aquatic Environment*, 225 The Sci. of the Total Environ. 109, 110, Table 1 (1999). These excreted active drug compounds make their way to local wastewater treatment facilities, where the wastewater typically undergoes three different treatment stages: physical, biological, and chemical. However, these treatment processes do not completely eliminate active drug residue. In fact, the efficiency of wastewater treatment processes to eliminate active drug compounds is as low as 7 percent. *See* Thomas A. Ternes, *Occurrence of Drugs in German Sewage Treatment Plants and Rivers*, 32 Water Res. 3245 (1998). This means that wastewater treatment facilities often discharge significant amounts of excreted, still-active drug compounds. Effluent from wastewater treatment plants mix with surface waters, which are the primary source of the U.S. drinking water supply. The solid waste generated during wastewater treatment (i.e., sludge) is either landfilled or applied to agricultural fields. Runoff from agricultural fields also finds its way to surface waters.

Significant amounts of these compounds, including oral contraceptives, heart medications, and painkillers, are making their way through the wastewater treatment process and into the aquatic environment. *See* F. Ingerslev, S.E. Jorgensen, H.C. Holten Lutzhoft, S. Nors Nielsen & B. Halling-Sorensen, *Occurrence, Fate and Effects of Pharmaceutical Substances in the Environment—A Review*, 36 Chemosphere 357, 365 & 372 (1998).

In 2002, scientists from the U.S. Geological Survey performed a comprehensive study of the low-level contamination of streams by pharmaceuticals, hormones, and other organic chemicals. *See* Larry B. Barber, Herbert T. Buxton, Dana W. Kolpin, Edward T. Furlong, Michael T. Meyer, E. Michael Thurman & Steven D. Zaugg, *Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance*, 36 Envt'l Sci. & Technol. 1202–11 (2002). The study focused on ninety-five organic compounds, several of which are used in antibiotics, steroids, hormones, and other prescription and nonprescription drugs. *Id.* at 1203. The study indicated that pharmaceutical drugs account for some of the most pervasive wastewater contamination. *Id.* at 1207.

Certain pharmaceuticals, such as hormone-regulating drugs, can take effect at concentrations as low as a few nanograms per liter, which is a level that is 1000 times less concentrated than the range at which many of these compounds have been found in the environment. F. Ingerslev, *et al.* at 357, 365 & 372 (also citing G.W. Aherne, J. English & V. Marks, *The Role of Immunoassay in the Analysis of Microcontaminants in River Samples*, 9 Ecotoxicology & Envt'l Safety 79–83 (1985), at 357). These compounds alter sex characteristics of certain fish at concentrations as low as 20 parts per trillion (ppt). Janet Raloff, *Drugged Waters*, 32 Science News 187–89 (1998). Levels detected in rivers have been up to ten times this concentration. *See* L. Barber *et al.* at 1202–11. Even at lower concentrations, some male fish exhibit both male and female reproductive tissues. *Id.* At higher concentrations (i.e., 1 ppb), hormones can transform all males into females. *Id.* These intersex fish have been found in several U.S. waters, including the Great Lakes, and their locations have been connected to proximity to outfall locations for wastewater treatment facilities. *Id.*

The New Drug Application (NDA) process has become the principal regulatory device for controlling pharmaceutical companies in the United States. James Robert Nielson, Handbook of Federal Drug Law (1992) (stating that FDA's "most formidable" power lies in its regulatory authority to approve new drugs); *see also* 21 C.F.R. § 314.50. An NDA is an extensive document, including detailed safety and effectiveness data and statistical analyses. Pursuant to NEPA, all NDAs must contain either a claim for categorical exclusion or an environmental assessment, including submission of data providing the concentration of the active ingredient at its point of entry (i.e., concentration of the influent to the wastewater treatment facility) into the aquatic environment. Jeffrey N. Gibbs, *Food & Drug Administration Regulation & Products Liability: Strong Sword, Weak Shield*, 22 Tort & Ins. L.J. 205 (1987); *see also* Ranga Velagaleti, Philip K. Burns, Michael Gill, and James Prothro, *Impact of Current Good Manufacturing Practices and Emission Regulations and Guidance on the Discharge of Pharmaceutical Chemicals into the Environ-*

Published in ‚Natural Resources & Environment Volume 24, Number 2, Fall 2009. © 2009 by the American Bar Association. Reproduced with permission. All rights reserved. This information or any portion thereof may not be copied or disseminated in any form or by any means or stored in an electronic database or retrieval system without the express written consent of the American Bar Association.

ment from Manufacturing, Use and Disposal, Envt'l Health Perspectives, 110:3 (Mar. 2002). Upon submitting an NDA, a drug manufacturer includes a risk assessment. If the risk assessment indicates that upon entry into the aquatic environment, the drug will be at a concentration below 1 ppb, then the applicant submits a claim of categorical exclusion. The claim permits the applicant to forego preparation of an environmental assessment.

However, the residual pharmaceuticals, particularly hormone-regulating drugs, can produce adverse effects on fish and other aquatic species in concentrations below 1 ppb. In light of this emerging scientific data, one could make a colorable claim that the time for a rule change with respect to FDA's mandated environmental review has come. Alternatively, the FDA could require new drug applicants to prepare an environmental assessment on the basis that the presence of these drug residues in surface waters and their adverse impacts to the aquatic environment constitute an "extraordinary" circumstance justifying performance of an environmental assessment. For any specific action otherwise categorically excluded from environmental review, the FDA will require an environmental assessment if "extraordinary" circumstances indicate that the specific proposed action could significantly affect the quality of the human environment. 21 C.F.R. § 25.21; 40 C.F.R. § 1508.4. The "human environment" is defined to include the "natural and physical environment and the relationship of people with that environment." 40 C.F.R. § 1508.14.

Extraordinary circumstances can be shown by data available to the agency or the applicant and can be based on the production, use, or disposal from use of the FDA-regulated substance. FDA, Center for Drug Evaluation and Research, Guidance for Industry: Environmental Assessment of Human Drug and Biologics Applications (July 1998). For example, actions for which available data establish that there is a potential for serious harm to the environment at the expected level of exposure constitute an extraordinary circumstance warranting preparation of an environmental assessment. *Id.* FDA considers harm to the environment to not only include toxicity to environmental organisms but also environmental effects other than toxicity, such as lasting effects on the dynamics of ecological communities. *Id.*

Compelling FDA to apply the extraordinary circumstances exception granted within its categorical exclusion regulation begins by filing a citizen petition to the Commissioner of Food and Drugs for the FDA with the Division of Dockets Management. 21 C.F.R. §§ 10.20, 10.30. Such a petition, would, of course, need to be filed by interested persons with sufficient statutory standing to bring such an action. This is essential, particularly in the event that a citizen petition is denied and these interested persons choose to seek judicial review of the agency's denial. In order to seek judicial review of an anticipated denial of such a petition, the interested persons must have standing to sue the agency. Standing has proved much more difficult in the wake of *Summers v. Earth Island Institute*, 129 S. Ct. 1142 (2009). In order to have standing, interested persons must show that they will be explicitly harmed by specific actions or inactions taken by an agency. Without such a showing, interested persons will be restricted from challenging agency actions in court.

Therefore, it is essential that any group looking to petition FDA for a rule change or finding of "extraordinary" circumstances possess the requisite standing. The wastewater industry may be one group with sufficient standing to file such a petition. However, this would be predicated on promulgation of water-quality standards and effluent limitations, which may require POTWs to implement technology capable of treating active drug compounds prior to discharge in the environment. Implementation of such technologies comes with significant cost to an industry already "strapped for cash." The wastewater industry could use NEPA to shift the cost of compliance to new drug applicants by petitioning FDA to more thoroughly assess the adverse environmental impacts of pharmaceuticals released into the environment after therapeutic use.

Ms. Bligh is an associate with The Session Law Firm office in Kansas City, Missouri, and a member of the editorial board of* Natural Resources & Environment. *She may be reached at sbligh@session.com.

Published in ‚Natural Resources & Environment Volume 24, Number 2, Fall 2009. © 2009 by the American Bar Association. Reproduced with permission. All rights reserved. This information or any portion thereof may not be copied or disseminated in any form or by any means or stored in an electronic database or retrieval system without the express written consent of the American Bar Association.