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FOR ENGINEERING AND SCIENCE

Beyond Expertise: One Person's Science, Another Person's Policy

Year

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Description

This case focuses on a scientist's results on the oxidation and reduction reactions of the heavy metal jekylhydium in water and soil which have been published in a series of papers in reputable, peer-reviewed journals and who has been asked to draft regulations by The Environmental Protection Agency (EPA) who is concerned about the toxicity and potential for human exposure.

Body

Part 1

Dr. Debra Reams works in the field of environmental chemistry and focuses on the oxidation and reduction reactions of the heavy metal jekylhydium in water and soil. Jekylhydium is used in many industrial processes and is known to exist in nature primarily in two oxidation states. The oxidized form is extremely toxic; the reduced form is harmless. Reams was the first person to clearly demonstrate that interconversion between the oxidized and reduced forms can occur in the presence of certain compounds found naturally in some soils and sediments. Reams loves basic research and has been successful in obtaining support, often prefacing her proposed laboratory research with a discussion of the industrial significance of jekylhydium and how knowledge about the environmental behavior of jekylhydium

potentially may be used in determining exposure risk and setting regulatory limits. Reams's results have been published in a series of papers in reputable, peer-reviewed journals.

The Environmental Protection Agency (EPA) is concerned about the toxicity and potential for human exposure to jekylhydium, which has been detected in many Superfund sites. The Agency is alarmed by news of the possibility of transformation from the less toxic to the more toxic form and asks Reams to help rewrite the regulatory limits for jekylhydium in soils and water based on her findings. She declines the opportunity. She explains that drafting regulations is beyond the scope of her data and her expertise and that she could not predict with confidence the extent of the oxidation reaction in diverse environmental conditions.

The EPA amends the current regulatory limits in soils and water and lowers the allowable limits for the total concentration of jekylhydium, justifying the change by reference to Reams's findings. This move raises the concern of representatives from industries that produce and discharge the nontoxic, reduced form of jekylhydium in their waste products. It also disturbs Reams, who feels that her research results were over-simplified and over-generalized when applied to policy/regulatory limits for jekylhydium.

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Discussion Questions

1. Was Reams wise to refuse to move beyond her expertise as a provider of new knowledge?
2. If a scientist is conducting basic research in an applied field, does that change how the results should be presented?
3. Is scientific discovery accompanied by the responsibility to contribute to the use and application of that discovery?
4. Does a scientist have the right or capacity to determine how scientific knowledge is applied?
5. Would it matter if Reams were a senior scientist? a beginning researcher whose discovery was based on her dissertation work?

6. What difference does the source of funding make to what is expected of Reams?

Part 2

Consider a scenario in which Reams agrees to participate in the regulatory decision-making process. Her input is well received, but the final regulatory decision appears to ignore the complexity of the chemistry for the sake of expedient regulations -- a situation that could result in over-regulation and unnecessary clean-up expense.

Discussion Question

7. What recourse does Reams have? Should she follow up with the EPA and impress upon the regulators that they are distorting and oversimplifying complex issues?

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Notes

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