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The Federal Scientist: Multiple Roles and Moral Issues

Year

2000

Description

This scenario highlights potential dilemmas encountered by postdoctoral fellows in a research setting. This scenario looks at the multiple roles a scientist must play and how it can affect decision making.

Body

Alice Campbell is an environmental geologist employed by the Toxic Waste Disposal Administration, a federal agency. She is responsible for making recommendations on funding research and directing geologic investigations to determine the safety of sites for toxic waste disposal. Because these materials remain toxic for extremely long periods of time, geologic conditions at potential disposal sites must be known with sufficient certainty to allow decisions to be made regarding siting and construction of disposal facilities. However, because of the long time periods and the nature of the hazardous materials involved, many decisions are made in spite of uncertainty about the performance of the sites and the application of new, unproven technology.

Decisions to site waste facilities are extremely litigious and controversial. These decisions are made in a politically sensitive environment and are scrutinized by the public and the media. Scientists who work in this area are often called to testify in

court proceedings and must be able to defend their data collection methods, notes, methods, processes, and decisions in an open court of law.

A Day in the Life of a Federal Scientist

10 a.m. - Funding Research. One of Alice's responsibilities is to review technical reports and recommend further agency action based on the results of the reports. Due to the nature of the questions regarding the safety of the disposal site, traditional geologic methods do not always provide decision makers with adequate information nor provide sufficient demonstrations of compliance with regulations governing public health and safety. A new method for determining the stability of geologic formations has been developed by Dr. von Wegner, a world-renowned senior geochemist at a national laboratory. The method, Thermal Oxygenation Xenolith (TOX) uses heat sensors suspended from helicopters to determine the presence of active faults based on residual thermal characteristics from fault friction.

Von Wegner is an articulate and convincing salesman for his new method, and the national laboratory where he works has an excellent reputation; he is able to convince the management board of Toxic Waste Disposal Administration to use the new method. Federal funding is provided to the geochemist for a report on the use of TOX at the proposed disposal site to determine whether any faults exist that would make the site unsafe for waste disposal. Von Wegner's TOX report shows that no significant faults exist on or near the site that could impact waste isolation.

During her review of the report, Alice discovers that TOX is not only new, but the validity of its application to environmental problems is contested within the geochemical community, due to calibration problems from biological contributions to the thermal signature of rocks. After further investigation and discussion with her professional colleagues, Alice learns that a professional rivalry exists between von Wegner and other experts in this area, who are proponents of an alternative method for locating faults.

Discussion Questions

1. What are the moral issues raised by this scenario?

2. Did von Wegner misrepresent his method? Did he deceive Alice and the federal

agency? Should Dr. von Wegner have indicated the drawbacks of his new method?

3. Should the agency have researched the method more thoroughly before granting funding?

4. Is the report adequate as a basis for demonstrating compliance with regulations regarding public health and safety? Should the information be trusted, or should it be compared with the findings of another method? Would it make a difference if the report showed the site to be unsafe?

5. How should Alice proceed?

6. How does scientific conflict impact decision making?

Noon - Public Perceptions of Risk. At lunch, Alice reads an article in the local newspaper about the latest in a series of minor tremors at the site. She recalls that reports on the potential for seismic activity at the site determined a probability greater than 1 in 10,000 that an earthquake of 7.0 or greater on the Richter scale would occur in the next 1000 years. Therefore, the site met the established regulatory requirements for designation as a suitable site for waste disposal. However, the newspaper quotes a "knowledgeable source" from an environmental group, who asserts that the most recent tremor is evidence that the potential for earthquakes in the vicinity of the waste disposal site make it unsafe. This group has been a vocal opponent to the disposal program Alice is working on. As a geologist, Alice knows that earthquakes occur almost everywhere, including the waste site, and that seismic investigations have shown that the site is safe.

Discussion Questions

7. Does Alice have a responsibility to act in this situation?

8. Are there moral issues in the use of science for advocacy or political purposes?

9. How safe is safe? Does the federal agency have a responsibility to explain the potential hazards of this site in terms the public can understand?

6 p.m. - Conflict of Interest. In addition to her federal job, Alice has begun to take graduate classes at Western Gambling State University, but she has not chosen a research topic or an academic adviser. Early in the semester, the professor teaching Alice's class, Dr. Sharpo, discusses a research proposal he has developed to use the

microbe *Toxiconsumus*, which may have the ability to chemically neutralize toxic waste. Alice is excited by the topic and considers approaching Dr. Sharpo to discuss this topic as the subject of her dissertation research.

8 a.m. The Next Day. Alice is surprised to learn that Dr. Sharpo has submitted a proposal to the federal agency where Alice works. He is applying for funding to assess the utility of using the microbe on the toxic waste disposal program. Alice's supervisor asks her to serve on a five-person team to review the university's proposal and provide a recommendation on whether the research should be funded. If use of the microbe proves feasible, Alice could use this topic for her dissertation.

Discussion Questions

10. What ethical issues does this scenario raise? Should Alice review the proposal?

11. Under what conditions would conflicts of interest or issues of independence arise in relation to government-sponsored scientific research?

Notes

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