



SCIENTIFIC EVIDENCE IN ENVIRONMENTAL CASES

Workshop on Environmental Adjudication
For the Green Bench Judges of Bhutan

Ammie Roseman-Orr
U.S. EPA Environmental Appeals Board
Thimphu, Bhutan
July 2018

ORDER OF PRESENTATION

I. TYPES OF EVIDENCE

What types of technical evidence are seen in environmental cases?

II. ADMISSIBILITY:

What types of Evidence is Allowed?

III. MANAGING EVIDENCE:

How Can We Make It Less Complicated?

IV. WEIGHING EVIDENCE

How does a judge evaluate and weigh evidence?

EVIDENCE IN ENVIRONMENTAL CASES IS HIGHLY TECHNICAL

- Courts must be able to understand the technical evidence
- Courts often need to rely on experts to help them establish and understand the facts of the case





A Typical Case Example: Chem-Solv

- ▶ Chemical Blending Facility was handling and storing hazardous waste without a permit and in an unlawful manner
- ▶ EPA filed an administrative complaint
- ▶ Following an administrative hearing, the Administrative Law Judge found Chem-Solv liable and assessed a penalty of around \$612,000, which was upheld by the Agency's Appeal Board

A dark grey arrow points to the right from the left edge of the slide. Below it, several thin, curved lines in shades of blue and grey sweep across the left side of the slide.

Part I: Types of Technical Evidence in Environmental Cases

Two Basic Types:

- ▶ **FACTUAL EVIDENCE**, such as inspector reports and sampling
- ▶ **OPINION EVIDENCE** from technical and scientific experts

Another Typical Case Example: Duke Energy



- Largest Utility in the U.S.
- Massive Coal Ash Spill into the Dan River in North Carolina
- Coal ash contains contaminants like mercury, cadmium and arsenic
- Those Responsible Pled Guilty to 9 Criminal Violations of the Clean Water Act
- Sentenced to pay \$68 Million in Criminal Fines, \$34 Million on Environmental Projects, and 5-year term of probation
- Also Must Develop and Implement Environmental Compliance Programs to be regularly and independently audited by a court monitor
- Results of Compliance Programs Will Be Made Available to Public

EXAMPLES OF WATER POLLUTION EVIDENCE



- Field Agent Testimony
- Photographic Evidence
 - ≡ Discharge pipes
 - ≡ Pollutants in the water
 - ≡ Dead fish
- Chemical analysis
- Medical evidence



A dark grey arrow points to the right from the left edge of the slide. Below it, several thin, curved lines in shades of blue and grey sweep across the left side of the slide, creating a dynamic, abstract background element.

Examples of Situations in Which We Need Experts

- ▶ Causation
- ▶ Harm or risk of harm to human health or the environment
- ▶ Damages from past polluting activities
- ▶ Remedy needed to prevent future pollution
- ▶ Remedy needed to restore damaged property or natural resources



Expert Subject Areas



- ▶ **HYDROLOGY:** The study of the movement, distribution and quality of water
 - ▶ Where did the contamination come from? Where did it go? How will it affect the existing quality of the water?
- ▶ **TOXICOLOGY--**The study of the adverse effects chemicals have on living organisms - symptoms, mechanisms, treatments and detection of poisoning
 - ▶ What effect might water contamination have on human health and the environment? How big is the risk?

ECONOMIC LOSS/DAMAGES

The difference between the value after an event that causes damage and what the value would have been if that event had not occurred.



An Ounce of Prevention is Worth a Pound of Cure
~ Benjamin Franklin



NATURAL RESOURCE DAMAGE (NRD)

- Compensation to the public for the loss, or lost use, of natural resources or the services they provide
- Underlying goal is to reverse loss to the “public trust” (the nation’s natural heritage)
- Question is how to restore, replace, rehabilitate, and/or acquire equivalent natural resources.



STATISTICS



- Statistical evidence is used in many kinds of cases
- For example toxicologists, hydrogeologists, and economists may use statistics to support their opinions
- Judges must be prepared to learn the terminology of statistics and to discern the strengths and weaknesses of a given statistical approach.

Part II: What Technical Evidence is Admissible?

- ❖ Courts must ensure that only reliable evidence comes into the case



GENERAL RULE OF EVIDENCE AS APPLIED IN ENVIRONMENTAL CASES

- Must be Relevant
- Witnesses Must Testify to Facts, Not Opinions
(Experts Provide Opinion Testimony)
- Facts Must Be Based on Direct Observation



A dark grey arrow points to the right from the left edge of the slide. Below it, several thin, curved lines in shades of blue and grey sweep across the left side of the slide.

AUTHENTICATION – WHY IS IT IMPORTANT?

- Many environmental cases hinge on sampling and analysis of various environmental media
- The integrity of samples and laboratory practices are of great importance to ensuring credible evidence.

AUTHENTICATING SAMPLING DATA

- Samples properly captured
- Transport of the sample followed a “chain of custody”
- Transportation and storage of samples preserved integrity
- Analysis conducted pursuant to good laboratory practices, including properly calibrated and clean equipment





Threshold Questions for Allowing Expert Opinion Evidence to Come In

- ▶ Is the evidence relevant to proceedings?
- ▶ Is specialized knowledge needed to understand the case?
- ▶ Is the witness qualified in the relevant area of expertise?
- ▶ Is the evidence offered by the expert reliable enough to be considered by the court?



How Do You Determine If The Expert's Opinion is Reliable?

- ❖ Has the expert relied on sufficient facts or data?
- ❖ Are the scientific principles and methods applied by the expert widely accepted by scientists in the field?
- ❖ Can the expert's methods be reliably tested or verified?
- ❖ Has the expert reliably applied the principles and methods to the facts of the case?



USE OF EXPERT REPORTS



- Compels parties to focus on the strengths and weaknesses of their own case
- Reports help the court learn and help the parties narrow issues
- Identifies areas of agreement
- Compels improved preparation for trial
- Disclosure may encourage early settlement

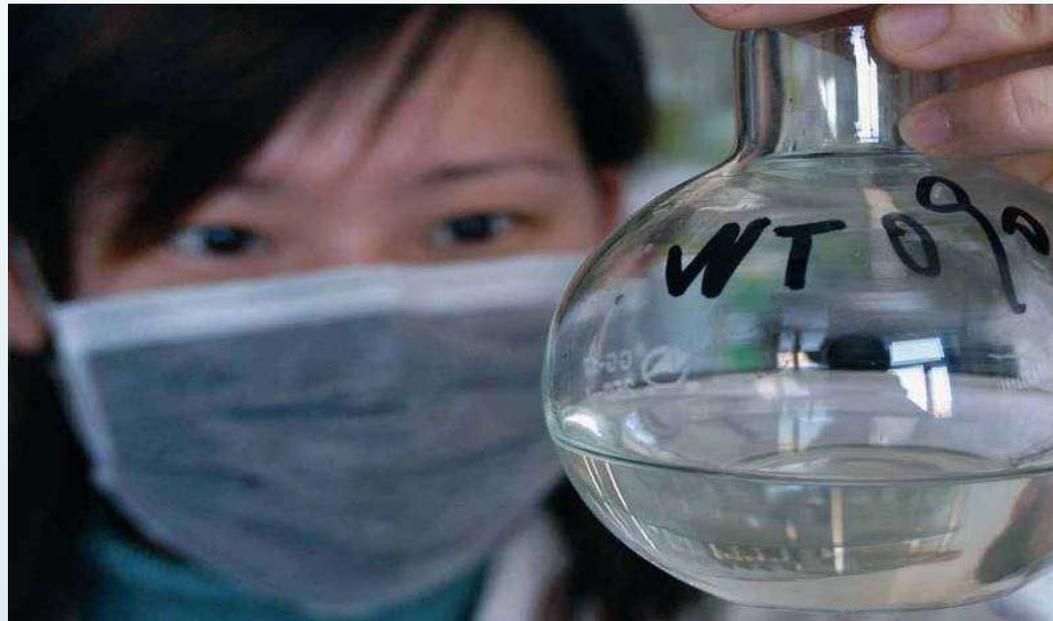


Part III: Managing Scientific Evidence

How can we make it less complicated?

- Stipulations of fact or authenticity before trial
- Restrict areas of expert testimony before trial
- Consider grouping issues and requiring scientific evidence on similar issues to be presented back-to-back
- Set time limits on presentation of evidence, or limit the number of witnesses
- Generally avoid cumulative evidence

Part IV: Evaluating and Weighing Technical Evidence



- Courts must evaluate and weigh technical evidence and expert opinions to make findings of fact and conclusions of law



PRINCIPLES FOR ASSESSING SCIENTIFIC EVIDENCE

- ❖ Can the results be tested or verified?
- ❖ Has it been peer reviewed? Published?
- ❖ Is it widely accepted?
- ❖ Is there an identified error rate?



DUELING EXPERTS: HOW DO YOU DETERMINE WHO TO BELIEVE?

- Compare:
 - Relative degree of training, education and experience of the experts
- Examine:
 - Reliability of the scientific data that underlies the opinion
 - Reliability of the analytic method used by each expert
 - Level of each expert's familiarity with the facts of the case
 - Is there any reason to discredit the expert's opinion, e.g., bias?

SCIENTIFIC UNCERTAINTY AND DECISIONMAKING



Regardless of scientific certainty,
Judges must make decisions by
applying the legal standard of proof.

In the US (in civil cases) we ask:
Based on a preponderance of the evidence,
Is a fact more likely than not to be true?



SUMMARY



- ❖ Environmental cases involve many different kinds of technical and scientific evidence
- ❖ The parties must present the evidence that supports their case in a manner that the court can understand
- ❖ Judges must assure that only reliable evidence comes into the case
- ❖ Special rules for handling evidence are needed for technical and expert evidence

Evidence Exercise

- 1) What evidence could the NEC introduce to demonstrate that the Gypsum mine violated the law (or the conditions of operation)? What evidence of harm could the NEC introduce? How could NEC demonstrate that the Gypsum mine was responsible for the harm caused? What evidence could The Gypsum Mine introduce in its defense?
- 2) What must the NEC show to establish the proper “chain of custody” for the water and sediment samples? What if the NEC has full chain of custody documentation for the first water samples, but has incomplete records for the samples taken from kitchen gardens in Shongdung? What can the NEC do to be able to use the samples from the kitchen gardens even though the records are incomplete?
- 3) What factual foundation must NEC demonstrate before the court allows into evidence the photographs of erosion and the dead birds in the orange orchards?
- 4) Should the court allow Dr. Phachung to testify about his opinions regarding the human health effects of drinking water contaminated with nitrogen compounds and high turbidity? Why or why not?
- 5) Should the court allow Dr. Phachung to testify about his opinions regarding the effects of the contaminants on fruit eating birds? Why or why not?
- 6) Is the Farmer’s testimony about his lost earnings from inability to sell milk from his cows admissible? Why or why not?