§ 9:18. —Testimony of county health officer

In the Hoerner Waldorf litigation the defendant sought to examine the representative of the local health agency charged with air pollution control. If the opportunity arises, counsel for the plaintiff should conduct such an examination if the defendant does not call the witness, but it is preferable to have the local health or air pollution control authority called in on behalf of, or as a witness for, the defendant. This can later become a key element in demonstrating that the plaintiffs have no effective administrative remedy to exhaust:

Direct Examination

BY DEFENDANT'S COUNSEL:

Q. Would you state your name and present occupation, please?

A. Kenneth J. Lampert, M.D.; present occupation is city-county health officer for Missoula.

Q. And how long have you had that position?

A. Since September of 1961.

Q. Will you just describe briefly the scope of your duties and authority as that officer?

A. My position is basically administration of the Health Department of Missoula City and County, direction and overseeing of all public health programs that are in operation to the prevention of disease and protect the public health and promotion of general welfare.

Q. And what activity does your office carry out with respect to air pollution in this area?

A. Beginning in 1961, in cooperation with the United States Public Health Service and the State Board of Health, there was a study conducted comparing six other Montana cities with Missoula relative to certain air pollution problems that were existent in this community. Between the years 1962 and 1965, our air pollution data is not good because it's full of holes due to the lack of personnel. I was on the sabbatical leave to the University of Pittsburgh. Beginning the year of 1965 through the present, we have acquired considerable air pollution measurement and

surveillance data with the help of the federal grant in terms of developing equipment for surveillance work.

Q. Would you describe briefly, your relations with the State Board of Health and air pollution authorities as they are at the present time?

A. At the present time, I have been designated by Dr. John Anderson, Executive Officer of the State Board of Health, as director of local air pollution control within this jurisdiction which is Missoula County . . . This is a cooperative type venture in terms of working with the state air pollution control officer, Mr. Ben Wait. We are currently in the process of handling the problem of open burning in Missoula. Again, which is an emission standard set forth by the State Board of Health, and we are working with Mr. Wait's office in this regard. The remainder of the emission standards, in terms of the industrial emissions, have been pretty much Mr. Wait's category. He prefers it this way. However, we will be working with him in this regard as well as when it will be possible for him to be on site.

Q. Well, would you describe for us what research and investigation programs as to local air pollution conditions have been conducted in the past here by your office?

A. Initially, our program was one of sampling the air for total suspended particulate. This goes back again to 1961 and 1962. These were the essential things that we did at that time with the establishment of only one high volume sampler on top of the Federal Building. This was later changed to the roof of the Central School. We were measuring at this time, particulate drawn through a vacuum cleaner type arrangement, which is the standard high volume sampler as is approved by the United States Public Health Service for sampling purposes, drawing a given quantity of air through a standard glass fiber filter for a twenty-four hour period; removing this filter at the end of that time; weighing it as to the total particulate on the filter; then extracting benzene soluble fractions from the filter. By benzene soluble, we mean the different organic constituents that will dissolve in benzene for the purpose of determining what percentage of the total particulate was organic. This was the initial work, and this has been expanded, in which I can elaborate on later.

At the present time and for the past several years, we have done in addition to what I have previously described, which again is total suspended particulate, we have obtained samplings on dust fall sites which represent really a gravimetric situation of natural fallout of dust in the air, soot, impurities that exist and

we have fifteen samplings, twelve or fifteen sampling sites that we are currently operating. In addition, we are doing work and have done work for the past four years in the measurement of soluble sulfates. Soluble sulfates are measured from our standard filter that we run our total suspended particulate matter on, and these sulfates are combined with other compounds. These are not representative of sulfur dioxides, but they are a chemically combined substance. I might add that we have ambient air standards for soluble sulfates; we have ambient air standards for total suspended particulate, and in addition—and we have ambient air standards for dust fall and in these areas we are involved. In addition to this, for the past, oh, eight months, we have done reactive sulfur by a lead peroxide candle method, which again, I would want to say first that I am not a chemist and I would also say that reactive sulfur is not distinctly a measure of SO_2, but it is a measure, I think, of sulfur compounds of a broad category such as H_2S, mercaptans, organic sulfides, and so forth. Reactive sulfur values are also available in our ambient air standards or reactive sulfur standards. Last, but not least, we have done some gas sampling for oxides of nitrogen and the oxidants and aldehydes, those three areas.

Q. Well, have these all been done as a result of just the initiative of your office or are these in cooperation with the state and federal authorities?

A. With the inception of our first air pollution grant in December of 1966, we were able to expand our activities and do these basically, I would say, on our own initiative. At that time we had no ambient air quality standards. At that time we had no emission standards for the state of Montana. We were doing this for our own interest to ascertain what our problem was.

Q. Well, do you feel that the information you have acquired through the methods you have described give an accurate present day picture of the conditions in the area?

A. I think it is a reasonably accurate picture at this time.

Q. Are any further testing and investigations programs planned?

A. Not for the moment. Perhaps—we have thought about corrosion of materials in terms of standard corrosion type materials for the purposes of testing. We have not thought of any other situations to do for the moment in regard to air pollution situation, air pollution problems. . . .

Currently, we are operating four stations in terms of reactive sulfur or lead peroxide candle methods, and this has been done since August of last year. . . .

Basically, it is a one hundred centimeter piece of gauze that is wrapped around a tube impregnated with lead peroxide and gum tragacanth to trap sulfur compound. This is then placed in an ordinary type Mason jar (pint Mason jar) and sheltered from the weather with a standard metal shelter and vented. It is left in place for a one month period and at the end of this month is analyzed for reactive sulfur or sulfation.

Q. What does it show now? What can you learn from this result?

A. I think that all we can say at this time—well, first of all, I suppose I should go specifically to some of our values as it relates to the ambient air standards that exist in Montana. Last fall these candles were showing levels that were exceeding ambient air standards in terms of reactive sulfur. Our ambient air standard for the state is .50 milligrams of sulfur trioxide per one hundred centimeters per day for any one month period. Last fall we were getting levels of—I will just pick some at random here, .61, .68, .84, .43, .72, which were in excess of the ambient air standards for a one-month period for reactive sulfation. Our recent work is showing that these figures have dropped considerably, for whatever the cause, to the range of .12, .11, .077 milligrams of sulfur trioxide per one hundred square centimeters. The excessive levels that we experienced in the fall months we cannot relate to any specific instance; I think, neither can I relate the sulfur candle to sulfur dioxide per se. It's as I said before, probably a combination of factors H_2S, organic sulfides, mercaptans, etc.

Q. Well, you speak of reactive sulfur and organic sulfur, for the record, would you tell us what all is included in reactive sulfur as the term?

A. Again, I don't pretend to be a chemist, but I think anything that would, in fact, react with the lead peroxide to give us a value, would be in this category. . . . And any compound that is not completely stable and has not come out as, for instance, sodium sulfate has a very stable substance, would in my opinion be reactive sulfur and include a whole host of oxides and sulfur, H_2S, and so forth. . . .

Q. In any event, does the term reactive sulfur include all of those substances?

A. I would say it included all the first group, mercaptan certainly, sulfur trioxide, yes, I don't think I can answer for sodium carbonate, sodium sulfate, sodium hydroxide as reactive substances.

Q. You mean you think they are not?

A. Yes.

Q. And would not be revealed by the lead peroxide method?

A. That's right.

Q. In the way the lead peroxide candle method produces a result, are you able to distinguish between the various kinds of sulfur, sulfide to mercaptan dioxide et cetera.

A. We are not at this time able to distinguish.

Q. And the net of it is that out of the whole group of sulphur compounds, you just get a composite finding that there is a total of so much?

A. This is correct.

Comment:

Defendant's counsel has successfully established that the monitoring program of the local municipality is less than scientifically adequate or complete. For all practical purposes the defendant has successfully prevented the plaintiff from using such data in support of its case, at least as far as reliance upon the local ambient air quality standards are concerned.

Q. Will you tell us how you do a study for SO_2 in a different manner than the lead peroxide candle method?

A. This is done by a gas analysis method of bubbling the air to a certain liquid that would trap SO_2 and then this is measured colormetrically to determine the presence or absence of this gas.

Q. Well, what does this indicate to you then as to the sulfur compounds that are in the air from the plant?

A. Well, it would indicate a dilution factor of considerable magnitude before anything can be detected here. We can't detect anything at this point. This is all I can say.

Q. I see. What have you to say as to the accuracy and the effectiveness of the lead peroxide candle method compared to other methods such as used on the court house here?

A. I think there has been a lot written both pro and con with reference to the lead peroxide method and the SO_2 gas method. But I believe in the literature today anyway, there is considerable doubt, at least in the literature that I have perused about the accuracy of the lead peroxide candle method; and if anything, the SO_2 gas method would with colormetric determination be probably more finite and accurate.... Yes, I am reading from the Ambient Air Quality Standards adopted May 27, 1967, by the Montana State Board of Health . . . contains the current Ambient Air Quality Standards which are in present force and effect in the State of Montana. . . . with respect to hydrogen sulfide, it has a footnote indicating that it is to be measured by the

methylene blue method-lead acetate for screening and monitoring.

Q. My question is: whether your office has had that kind of measuring device?

A. We have attempted some lead acetate monitoring but it has been unsuccessful due to technical reasons.

Q. Well, up to now at least, you do not have any information with respect to extent of hydrogen sulfide in the area?

A. Only as it effects the lead peroxide candle.

Q. Now, in any of these listed pollutants here is there a reference to the mercaptan or in which would they be included, doctor?

A. I think most generally they would again be included in the reactive sulfur or sulfation of the lead peroxide candle, or possibly—no, this would be the category.

Q. This is the one, the second category here termed Reactive Sulfur or Sulfation?

A. Yes, yes.

Q. Now, how do you interpret these quantities? Here is a standard for hydrogen sulfide, and here is a standard for reactive sulfur and yet I thought I understood you to indicate that the hydrogen sulfide is included within the term reactive sulfur. Now, in measuring the standards, would you add the reactive sulfur one to the hydrogen sulfide one, or, I mean, do they combine and are they handled separately or how is that interpreted?

A. Well, in terms of the ambient air standard, I believe the interpretation is a measurement of each situation per se. This reactive sulfur standard is an aggregate of many compounds as far as we are concerned. If we are measuring for hydrogen sulfide with a tape, that is another situation because you pick up only H_2S and the rest of the sulfur compounds would not be a part of the values obtained. . . .

Q. Now, if hydrogen sulfide would show up on the lead candle under reactive sulfur, how would you be able to combine the two and reach a conclusion as to whether this was permissible under the standards or not?

A. I think there is no way. I think that you couldn't separate relative to sulfur compounds, and this is suspended sulfates which we have the standard of four micrograms per cubic meter of air maximum allowable annual average.

Suspended sulfate which basically is measuring water soluble sulfate in compound form as we collect them on our standard

filter of particulate. Our values for suspended sulfate in the Missoula area are showing quite consistently to be above the four microgram ambient air standard. This chart for 1968, although those have holes in terms of months, does show this of the suspended sulfate fraction, and as compared to the ambient air standards. And I think this also shows in past years as well.

Q. Yesterday we were dealing with what were termed sulfur gases and I want to ask you whether this suspended sulfate that you are speaking of falls in the description of sulfur gas?

A. It does not.

Q. Is there a different kind of compound?

A. It is a stable compound usually combined with sodium, potassium, calcium.

Q. Then it wouldn't be included in the term hydrogen sulfide or sulfur dioxide or mercaptan?

A. It is not a reactive compound like these others.

Q. Well now, by reactive, do you mean harmful?

A. I mean by reactive, unstable or more unstable than the sulfate form in terms of sodium sulfate.

Q. Is there any difference between organic and inorganic?

A. Suspended sulfates are inorganic for all practical purposes.

Q. And are they toxic? Are they harmful?

A. They are stable and they are not harmful but they do exceed the standard as set forth by the State Board of Health.

Q. And they wouldn't hurt a plant or they wouldn't hurt a mouse or hurt a man as far as you know?

A. As far as I know—well, I am sure they can be toxic if a certain level is reached but—

Q. That is true also with table salt?

A. Yes, true. With relation to ambient air standards and what we are seeing in terms of suspended sulfate in this area, I could not justify them as being toxic. I might say a word about the sulfate fraction again for the record. It is a soluble fraction stable compound obtaining the SO_4 radical that is measured really on the basis of our total suspended particulate filters, and we arrived at it chemically from the filters, not from the sulfate candle. . . .

Q. Doctor, is there any scientific basis for determining the point

at which some sulfur compounds can be said to be harmful to human health?

A. (No response)

Comment:

Counsel has succeeded in establishing the essentially arbitrary basis for current ambient air quality standards and again is pointing out the futility of trying to establish fixed numerical standards before there is sufficient scientific evidence to support them. The authors contention has been that the only standard possible at this time is that of "state-of-the-art."

Q. **Is there a holding value or toxic level or however it might be termed?**

PLAINTIFF'S COUNSEL: I must object, unless we specify which sulfur compound. Sulfur exists in various forms.

A. Well, quoting Stern's Air Pollution Bible, pardon the expression. He states that anything in excess of five parts per million of SO_2 is at least potentially harmful to health.

Q. **And what about hydrogen sulfide?**

A. Hydrogen sulfide is detectable to the nose in extremely small quantities. I am not sure of my figures in terms of toxic level, but it's probably considerably less than that . . . It is probably considerably less than five parts per million of SO_2

Q. **That is the toxic level for hydrogen sulfide would be lower than for sulfur dioxide?**

A. I would believe so.

Q. **Is there any group or organization standard, standard pattern with respect to these threshold lines of demarcation between harmful and nonharmful sulfur compounds?**

PLAINTIFF'S COUNSEL: I am going to object unless we specify harmful to whom or for whom or what.

Comment:

Never let the defendant begin to talk about harmful or damaging effects without specifying to whom and for whom or what.

DEFENDANT'S COUNSEL: We had better rephrase that question.

Q. **Referring to Exhibit "A", the Ambient Air Quality Standards, does the standard here .02 parts per million maximum annual average for sulfur dioxide indicate that as far as the Montana Board of Health is concerned it is decided that a sulfur dioxide emission in a lesser quantity than it is, is not harmful or toxic to the environment?**

A. In the broad sense, I would suppose this is correct.

PLAINTIFF'S COUNSEL: I am going to object to any speculation on the part of this witness unless he has been shown to be the Montana Board of Health and that it has been shown that the Montana Board of Health is even vaguely qualified to determine the levels of toxicity.

Comment:

Issue should be joined as to the competence of any local Board or even the U.S. Department of Health, Education and Welfare when the issue is "state of the art" versus some arbitrary ambient air level of a particular contaminant.

A. I suppose in the broad sense this is correct since these are maximum permissible concentrations that are allowed by the State Board of Ambient Quality Standards.

Q. **From your work in relation with the Montana Board of Health and the air pollution director and your own studies, do you know from what source these maximum permissible concentration standards were taken?**

A. Generally, this is the composite of standards across the country, both statewide standards and citywide standards—

PLAINTIFF'S COUNSEL: I am going to object unless it's spelled out—the degree of bias on the part of the organizations that promulgated or testified to the standard-setting agencies.

Q. **Do you know from your study of the scientific literature, what the scientists say in the way of recording their findings as to the level of toxicity?**

PLAINTIFF'S COUNSEL: I am going to object unless it spells out which kind of scientist we are talking about. I think the record should show that there are scientists of all types and of all kinds, some that are wholly in the employ of the industry seeking to apologize for the emission level of that industry and some that are employed by the government seeking to account for the deficiency that exists in the air pollution control legislation, and some employed by no direct agency involved who are simply promulgating the results of their independent scientific research. Any answer that doesn't differentiate between any of the three, I submit, is irrelevant, incompetent and immaterial.

Comment:

Clarify for the record at every available opportunity the differences among scientists. The most common opportunity is during the body of an objection to a question or motion to strike an answer.

A. If I understand the question correctly, toxicity is often measured in terms of lethal toxicity to animals and then interpolated to man. In certain instances I think certain substances anyway, that we have a good information for toxic levels to man—but specifically I wouldn't be able to state what compounds. . . . Interms of substances, the measurements in the sulfation candle, again, is a composite of reactive sulfur substances. These substances are potentially harmful to animal and man. The organic fraction of total suspended particulate in Missoula's ambient air has been shown to be potentially harmful to animal primarily through repeated experiments of production of tumors and cancer on laboratory animals. These are the two areas that I think at this point, would in my opinion, be most potentially harmful.

We are considering another study of a more sophisticated method of looking at health and air pollution in Missoula.

Q. Would you outline for us how you think a proper investigation of that subject really ought to be made from the viewpoint of public health administration procedures?

A. In the first place, I think it should be a long term situation. I think it should be a study that goes on for years and not for months to ascertain a relationship of any air pollution and respiratory diseases. I think we would have to certainly have the cooperation of many agencies, all physicians in the community and try to define the disease processes themselves more clearly than we did in the study of 1961 and 1962; and try to define more conclusively the relationship of air pollution to these diseases. It would have to be set up, very frankly, as a very complex epidemiologic study which entails considerable work and staff which we have not had in the past, nor do we currently have, but hope to have some day. . . . Examinations, data collection, note collection, but—well, collection from doctors' offices and tabulations through hospital records, libraries, individual physician's records.

Q. I see. The thing that you are speaking of doing, can that be accomplished in a relatively short period of time?

A. No.

Q. You are referring to a long period of study in connection with that, also?

A. This is what I felt was wrong with the last study, that it was too short and not meaningful. This proposed study, if we go with it, would be a prolonged study. I would think two years, at least two years, to give us some accurate data.

Comment:

The defendant has successfully established that any work done by the local health agency is incomplete. This is the fate of most cases which rely on the local municipal air pollution control or health authorities to establish some direct evidence of danger within the meaning of any statute that is based on ambient air quality standards for enforcement of pollution control regulations.

Cross examination should be gentle and circumscribed when dealing with a municipal witness who has been limited by the mission restraints of his particular job title. The testimony should be directed toward further establishing that there are no adequate remedies at law for the damage that the Plaintiff alleged on behalf of the community.

Cross Examination by Plaintiff's Counsel

Q. Now, in 1961, I think, you indicated there was an epidemiological survey of chest diseases and admissions in local hospitals, is that right?

A. Yes.

Q. Now, were these studies reported to any government agency?

A. To my knowledge, they were not.

Q. And did these include a survey of admissions prior to 1960 or 1961?

A. No.

Q. Now, doctor, I think you talked about levels that were established by the State Board here in Montana.... Now, these standards were set by whom?

A. The Montana State Board of Health.

Q. And they were adopted pursuant to section six, sub-section twelve, of the Clean Air Act of Montana, is that correct?

A. Yes.

Q. And who promulgated the Clean Air Act in Montana, the Montana State Legislature?

A. That is correct.

Q. And the method under which maximum admissible concentrations were to be determined were set forth in that act, weren't they?

A. Yes.

Q. And those methods were determined by the legislature in accordance with its powers under the Montana State Constitution, right?

A. Yes.

Q. Now, these maximum permissible concentrations after—were determined after due notice and public hearing, weren't they?

A. This is right, ambient air standards.

Q. And can you tell us who is on the Montana State Board of Health?

A. Yes.

Q. All right, let's go over them. You have got a G. P., a layman, a dentist, a pharmacist who died and another layman, five.

A. That is it. . . . Dr. Anderson acts as ex-officio member.

Q. Who is Dr. Anderson?

A. He is executive director of the State Department of Health.

Q. And he is a medical doctor?

A. That is right.

Q. Now, in the promulgation of these maximum admissible concentrations, were these promulgated in accordance with any scientific investigative criteria?

A. Investigative in this state?

Q. Yes.

A. Not to my knowledge.

Q. Is the usual method of setting a maximum permissible concentration to make an initial determination of the LD-50 for a given substance on the given conditions and then allow a safety factor and say that is the maximum permissible, is that the usual method, doctor?

A. I think that is correct.

Comment:

Plaintiff's counsel has established that the basis for determining toxic levels is from data dealing with lethality of the substance and that there is little opportunity within the accepted methods now available to the municipal or state agency or even the federal government to consider factors other than direct mortality and lethality.

Q. And that is the method of the Food and Drug Administration in determining tolerance and by the U.S. Department of Agriculture in determining pesticides levels, is that correct, doctor?

A. Yes.

Q. All right, now to the best of your knowledge, do these maximum permissible concentration levels comprehend or—strike that—

do these maximum concentration levels purport to be the "no effect" level in biological systems for these substances?

A. The no effect level for what, now?

Q. **For biological systems. Are these maximum allowable concentrations or maximum permissible concentrations set forth in your ambient air quality standards, do they purport to be the "no-effect" level for these substances in biological systems?**

A. As they are set forth, I would presume they would be.

Q. **In other words, doctor, below these concentrations, you can reasonably expect, as a medical doctor, no physiological effect on any living organisms?**

A. No.

Comment:

Plaintiff is establishing that concentrations below the permitted levels can produce some biological effects, and the levels promulgated by the federal, state and local agencies are not indications of the "no effect" or "zero effect" level of the substance under investigation.

Q. **Let's back up a minute, doctor. You are aware that the Food and Drug Administration and the U.S. Department of Agriculture and a number of state health agencies have established what are called a number of definitions and what were set forth as a number of definitions, and among those definitions with respect to drug and foreign substance activity is what is called the "no effect level", the level below which no measurable or demonstrable biological, physiological effects can be noticed; now, did these maximum permissible concentrations in your state ambient air quality standards purport to be the no effect level for the individual substances named?**

A. Probably not as it relates to the entire biological system, not just limiting this to man, necessarily, but very possibly animals and plants might be affected by this.

Q. **And in the effect with respect to humans, below the standards set forth here, no consideration, scientific consideration, was given to sub-lethal effects such as: microsomal liver enzyme induction effect, or things like that, was there, doctor?**

A. No, I'm sure that is true.

Q. **Thank you, doctor. I have no further questions of Dr. Lampert.**