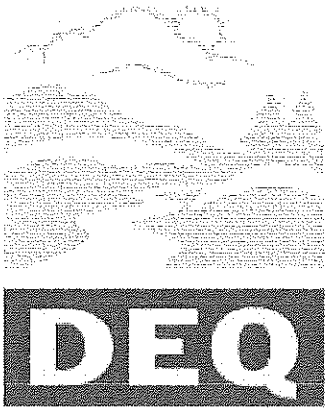
SSAMeetingDOC19670113

1/13/1967

OREGON STATE SANITARY AUTHORITY MEETING MATERIALS



State of Oregon
Department of Environmental Quality

This file is digitized in ***black and white*** using Optical Character Recognition (OCR) in a standard PDF format.

Standard PDF creates PDF files to be printed to desktop printers or digital copiers, published on a CD, or sent to client as publishing proof. This set of options uses compression and downsampling to keep the file size down. However, it also embeds subsets of all (allowed) fonts used in the file, converts all colors to sRGB, and prints to a medium resolution. Window font subsets are not embedded by default. PDF files created with this settings file can be opened in Acrobat and Reader versions 6.0 and later.

OREGON STATE SANITARY AUTHORITY

Special Meeting

January 13, 1967 - Room 72, State Office Building, Portland, Oregon

This special meeting of the Oregon State Sanitary Authority was called to order by Harold F. Wendel, Chairman, at 10:10 a.m., January 13, 1967, in Room 72 of the State Office Building, Portland, Oregon. The members and staff present were: Harold F. Wendel, Chairman; Chris L. Wheeler, Richard H. Wilcox, M.D., Herman P. Meierjurgen, B. A. McPhillips and Edward C. Harms, Jr., Members; Kenneth H. Spies, Secretary; John Denman, Legal Advisor; E. J. Weathersbee, Deputy State Sanitary Engineer; H. M. Patterson and H. E. Milliken, Assistant Chief Engineers; Dr. Warren C. Westgarth, Laboratory Director; H. W. McKenzie, P. D. Curran, Leo G. Farr, A. D. Smythe, Associate Sanitary Engineers; H. W. Merryman, District Engineer; R. B. Percy, Chief Chemist; Bruce Snyder, Meteorologist; and Clint Ayer, E. A. Schmidt, Don McHarness, James R. Sheetz and Lloyd O. Cox, Assistant Sanitary Engineers.

Mr. Wendel: This meeting has been called to hear what the Weyerhaeuser Company has to report to us in the matter of the operation of their Springfield plant. Mr. Spies, will you please open the discussion.

Mr. Spies: Mr. Chairman and members of the Authority: Prior to the last meeting of the Sanitary Authority, Mrs. John Jaqua, Route 2, Box 328A, Eugene, called our district engineer Mr. Harold Merryman, and reported that certain residents of the Eugene-Springfield area desired to appear and be heard in the matter of air pollution caused by the operations of the Weyerhaeuser Company pulp and paper mill located at Springfield. Accordingly, the following

persons appeared and were heard at the Sanitary Authority meeting on Tuesday, December 20, 1966: Mr. William O. Carey, 1150 N. 37th, Springfield; Pastor Orville C. Johnson of Route 2, Box 142A, Springfield; Mr. Leo F. Sytsma, 1850 I Street, Springfield; Mr. Robert L. Atkinson, 1110 Custom Place, Springfield; and Mr. Vern Adkison, Lane County Air Quality Control Officer of Eugene. Mr. Carey presented an undated statement signed by 84 persons which read as follows: "Weyerhaeuser Paper Company gives off odors and gases that make a person sick with a headache and breathing trouble, also it eats up our cars and trailer houses." Mr. Sytsma presented copies of a statement or a petition dated December 10, 1966, and signed by 271 persons which read as follows: "We, the undersigned, believe the vast odor emitted by Weyerhaeuser Company originating from the pulp and paper plant and the oxidation pond is an infringement on our rights as private property owners and citizens. We feel that this is a nuisance condition that must be immediately abated. We further agree to the utmost with Mr. Boekelheide's views as expressed in the December 1, 1966, edition of the Springfield News." Mr. Adkison showed a motion picture film that he had made recently in the Springfield area. Following an extended discussion of this matter by members of the staff a motion was adopted that a special meeting of the Sanitary Authority be called as soon as practical for members of the Authority and officials of the Weyerhaeuser Company to get together and try to do something definite about this problem. So gentlemen, that is the background for this meeting. Your staff has prepared some information covering its observations during recent weeks which they will bring to your attention today and there are officials of the Weyerhaeuser Company here whom I am sure will have something to offer.

Mr. Wendel: Whom should we hear from first, the staff or the officials of the company?

Mr. Wheeler: I would appreciate hearing from the staff.

Mr. Spies: Mr. Patterson will present a staff report.

Mr. Patterson: I will read a staff report dated January 10, 1967. (Read pages 1 and 2 of report) At this time I would like to have Dr. Westgarth show some pictures that were taken in the Springfield area because I think this is more demonstrative of conditions. Visibility effects are very difficult to describe on paper.

Dr. Westgarth: I have put a few pictures together on a sheet that I will initially describe so that you will have a picture of some of the things that we have observed the last few days. Let's pass this around the table so that you can look at it. We have a few slides and a few movie scenes that will be presented. They will be on this screen back here. (The slides and movie scenes were then shown.) (Mr. Patterson then resumed the reading of his report.)

Mr. Patterson (After he finished reading the report): With your permission, the staff did do some extensive survey work the past week. Dr. Warren Westgarth will explain some of the locations of the sampling equipment and some of the work that was done.

Dr. Westgarth: We prepared this map so that everyone could be oriented to the same particular problem. We set up the Weyerhaeuser plant as a focus and since this is what we are talking about, put line ratings so we could locate ourselves in the various octants around the plant. We have shown the various sampling stations. Each one of these circles is a station that is used for one or the other types of samples that we have collected.

The ones that have a green half-circle are the high volume samples; the ones with the red half-circle are the locations of AISI machines which measure hydrogen sulfide, and the ones with the numbers are simple fallout stations. These have been put in what were believed to be strategically located stations to collect the information that was desired. Our last meeting indicated that we didn't have enough data to pinpoint this problem down tight enough but we did run an intensive survey for the past week, a little over a week in fact. This survey was made from two standpoints, one was complaints of various types and the other was our own odor survey. I made an overlay showing all of the complaints that were received up until about a week ago. These complaints shown in green are of odor. The ones in red are the ones that the people complained of corrosion, and the little black dots that are scattered sporadically through here are complaints of fallout. So we put these on the overlay to see if there was a pattern suggested, and it does appear from these corrosion points that there is significant pattern of complaint. So with that in mind we took our next step using our odor survey that we performed in the field and made envelopes of the area that was covered by these odor complaints. These envelopes are not an exactly true picture of everything that is or of every place that you might get complaints. But this is what we saw from our picture of what we studied when we made our intensive survey. We found odors of a detectable intensity in here. We found odors of pronounced intensity in this general area, and we found a few other pockets of pronounced intensity. In general there was perceptible odor in this area. Up through the Mohawk-Camp Creek area we did find some odor.

This pattern down here occurs in the summer months that is not prevalent during this particular period. This has given a picture of where the odors occur.

It seems significant to us that this corrosion envelope that we found looks pretty well over the mass of complaints. This is true in general. We also wanted to check this with any meteorological data that we could find so we looked at the wind patterns. We have a wind station at this point which is in the Mohawk Shopping Center in Springfield. Weyerhaeuser Company has pinpointed the wind in their operations and we have a wind pattern at the municipal airport. We put this just in quadrants and didn't try to show it in detail. The pattern in this direction is for the general winds. This one is within about 87% of the time in this particular quadrant. On the one we have here it is in this quadrant about 78% of the time and here it is about 85% of the time. So, in general, the wind for that particular period of time was in this quadrant, this quadrant out here and here, so that you can see that the wind patterns could cause the flow of air crossing this direction, it could cause it up in this direction. We did not find significant odor around in here the past week but during the past summer odors were highly significant out in that area.

Mr. Patterson: That essentially concludes what we have to present.

Mr. Meierjurgen: Mr. Chairman, may I ask Mr. Patterson some questions?

Mr. Wendel: Yes, indeed.

Mr. Meierjurgen: On page 3, Item No. 2, I don't know as I thoroughly understand that. In speaking of light weight material to what do you refer?

Mr. Patterson: Well, we refer to the complaints relative to the saltcake which we feel over a given spot is very fine material that comes down. We feel that this material coming down on a given area in a short period of time would be of very small weight compared to what we might collect in that fallout jar over a month's period from natural dust in the area, sawdust fallout in the area or any other natural fallout. What we are saying is that a chemical analysis does not show up the minor amounts of constituents that get into a fallout jar over a long period. It might be better if we sampled at the time of the fallout and made the chemical analysis then and measured the total weight.

Mr. Meierjurgen: What particles would be characteristic of the Weyerhaeuser fallout or have you been able to determine that? What I mean is, it wouldn't be sawdust or half burned things that you would expect from a waste burner, would it, or would you be looking for saltcake?

Mr. Patterson: Sodium sulfate. So we analyzed in our chemical analysis for both sodium and for sulfate.

Mr. Meierjurgen: I see, and those are sporadic as to volume. That is, I mean they don't all fall out; it is not a continuous thing that you can tie to; in some days there is more than other days.

Mr. Patterson: Well, in the past that has been our staff's observation and also I refer to the letter of Weyerhaeuser Company where they indicated on at least one occasion the precipitator was down and this caused an excessive discharge in the area.

Mr. Meierjurgen: Would that be the one shown here as received on January 6 that we have in our notebooks?

Mr. Patterson: Yes, January 5 and at the bottom of the second page the Koppers precipitator No. 3 recovery.

Mr. Meierjurgen: Now on the second page of this letter again, as I roughly add these things up (some of them look like they overlap) they had about 90 days of trouble between July 29 through the 30th of December of 1966.

Mr. Patterson: Yes, I think Weyerhaeuser will speak to this question, but essentially they had difficulty through that period and particularly with the oxidation unit which they got back in operation on December 10.

Mr. Meierjurgen: Now has the staff been able to go back and assess this increase, sporadic increase, now and then of particulate fallout in the light of these shutdowns, have you had time to do that?

Mr. Patterson: No, not in detail. We think we can explain some of it, we have not checked it in detail.

Mr. Meierjurgen: What was the range between a, shall we say a normal fallout, and a high fallout? I don't think I got that for some reason or another.

Mr. Patterson: Well, take one sampling station, No. 14, for total fallout. In 1964 it was 18.5 tons,the first part of 1965 it was 15.8 and the second half of 1965 it was 23. The first half of 1966 it was 20 and from July 1 to October 10, 1966, it was down to 19. This variation in total fallout is not unusual anywhere in the state.

Mr. Meierjurgen: I was talking about the fallout that was characteristic with the Weyerhaeuser operations.

Mr. Patterson: I am talking about total fallout in an area in close proximity to Weyerhaeuser Company, where one of our sampling stations is. Are you referring to sodium and sulfates?

Mr. Meierjurgen: Yes, yes.

Mr. Patterson: At the same station I mentioned before, No. 14, the amount of sodium varied from .44 to 1.1 tons per square mile per month. The amounts of sulfate varied from 2.2 to 4.2 tons per square mile per month.

Mr. Meierjurgen: You haven't gone back and checked to see whether these large fallouts were characteristic of the days when they were having trouble?

Mr. Patterson: These are the long-term sampling periods which run generally over a month.

Mr. Meierjurgen: Had you known about the time that the trouble was going on at the plant as reported by this letter, would you have been able to go out and make short term samples to see what was happening when that equipment was shut off or broken down or out of order?

Mr. Patterson: We certainly would have been able to go out and make some observations.

Mr. Meierjurgen: Did you know about it?

Mr. Patterson: I don't believe I knew when the precipitator went down.

Mr. Meierjurgen: This April 14, 1966, report, I don't remember the details on that. When you state that particulate fallout or suspended particulate data collected since April 14, 1966, appear to support the

conclusions of the April 14, 1966, report, what conclusions were you referring to there? I guess I don't remember.

Mr. Patterson: Essentially in that report we concluded that up to that period of time since our studies started, from 1964 to April 14, 1966, the total fallout was not a problem attributable to Weyerhaeuser.

Mr. Meierjurgen: Now on page 4 under item 3 and I will read the little area I have marked, "White fallout material in high concentrations was observed during several investigations of corrosion complaints." These complaints were on the part of people about corrosion and someone went out and investigated them on the spot. "The laboratory analysis of samples of this material showed sodium concentrations in excess of 10% by weight. The high sodium concentrations are significant evidence that the fallout material is definitely from an unnatural source in the area." By that you mean that normally where you would take factory sources or plant sources that you would not expect that much fallout from sodium.

Mr. Patterson: That is right.

Mr. Meierjurgen: (Continuing to read) "We do not as yet, however, have sufficient information to conclusively link the fallout material or the observed corrosion with any particular source or effect." I take it by that that it can't be traced back. This abnormal amount has not been traced back to any particular plant, the Weyerhaeuser plant or anyone else?

Mr. Patterson: No, we have our opinion on the matter. The difficulty in analyzing this material is getting enough quantity of this particular sample.

Mr. Meierjurgen: With a little more time to work on this do you think we can pinpoint this?

Mr. Patterson: I think there actually would have to be some corrosion studies made in the area, we probably should put out some corrosion plates of our own, and compare them with background areas and with other areas of the state to get the accelerated corrosion as soon as it occurred.

Mr. Meierjurgen: What I mean is you feel that it is within our capabilities of isolating or pinpointing this, finding the area where it is coming from?

Mr. Patterson: Yes. We can determine if accelerated corrosion is occurring in the area. There is difficulty in determining when one person complains of having damage to an automobile. It is difficult to assess it to a certain source or attribute it to a particular condition because you do not know all the details of the prior condition of and care of the car or whether the car has been on the coast or somewhere else in a prior period.

Mr. Meierjurgen: If we put out a sampling device of our own do you think it would be too difficult to pinpoint. It would not be difficult?

Mr. Patterson: That is right.

Mr. Meierjurgen: On page 5, near the bottom, "The maximum hydrogen sulfide concentration measured was less than 10 ppb." Relatively speaking, is that high or low?

Mr. Patterson: It is low but it is high for odor.

Mr. Meierjurgen: It is low for possible chemical effects, for toxicity, but high for odor?

Mr. Patterson: Yes.

Mr. Meierjurgen: What is the nature of this white precipitate?

Mr. Patterson: The white precipitate is the saltcake or sodium sulfate, it is very light and it is generally called saltcake.

Mr. Meierjurgen: Is it a salt or an ash or both?

Mr. Patterson: It is usually salt I would say, it is very difficult to describe. There might be other white fallout in the area.

Mr. Meierjurgen: I might be asking some stupid questions but is this stuff soluble.

Mr. Patterson: Yes.

Mr. Meierjurgen: Would you say it is soluble enough that some of these pictures we have seen of cars and leaves and one thing and another that this might be the source of it.

Mr. Patterson: We think so.

Mr. Meierjurgen: And again do you feel we should have a place out there where we can pick this up for samples? No. 4 on page 8, "that construction of a conventional primary clarifier with continuous sludge removal be considered as a substitute for the existing primary sedimentation pond", I don't know that I completely understand that. Does that have anything to do with air pollution or is that water?

Mr. Patterson: Well, this is part of the water treatment facility. I don't think these waste ponds were considered a problem during the early part of their operation but they appeared in a recent survey to be a local area problem, from the standpoint of odor.

Mr. Meierjurgen: What you are talking about here, is the continuous sludge removal some sort of an arrangement to take solids out of it?

Mr. Patterson: Yes, they take the solids out of it so that it will be aerobic.

Mr. Meierjurgen: Is that comparable to some sort of a primary treatment?

Mr. Patterson: It would be essentially the same thing.

Mr. Meierjurgen: That's all the questions I have Mr. Chairman.

Mr. Wendel: Thank you for clearing up some of these points for us. Does anyone else have any questions to ask Mr. Patterson?

Dr. Wilcox: Just one. Do you feel that the sodium sulfide is soluble enough to be carried out in the stack emissions?

Mr. Patterson: Yes.

Dr. Wilcox: Is there any way of capturing stack emissions, that is, in measuring the amount of sulfides emitted?

Mr. Patterson: Yes, the Weyerhaeuser Company has done this and has submitted their analyses to us.

Mr. Wendel: Does anyone else have any questions? I think it is now time to hear from the company, if they wish to be heard.

Mr. McEwen: As I make this presentation, if any of you would like to break in or ask questions, I want you to feel perfectly free to do so. My name is John M. McEwen (reads from report). We thought we would make specific reference to December 10 since at least according to the newspaper report this was discussed at the last Sanitary Authority meeting. Also, it brings out one of the things which we believe is a major factor in whether the mill smells or not and that is the wind and weather conditions.

You have, I believe, our report on the major failures that we have had. Included in that is the fact that the oxidation system went back into operation on the 10th. Although it was actually operating on the 10th, it had been off for some substantial time before and it takes some time after the oxidation system goes into operation to clear the system of the partially oxidized liquor which was in the system during the day of December 10. (Again reads from report.)

(Page 10 of the report - departed from text.) We have tested many, many types of scrubbers in our research pilot plants and in various operations. We have some of them installed in our operation - the best ones. We have investigated the distribution and the effectiveness of the pond and came up with improved distribution which should make our aeration pond even better. We have investigated various systems of combustion, some of which have been put into successful operation and some of which were not successful and we have not put them in operation. We have others that we are still studying. One of the big problems that we have in trying to evaluate odors emission and particulate fallout is good testing methods so that we can determine the source so that we can better solve the problems. We have worked very hard on improved testing methods in order to better identify the problem. When improvements are found or better systems are made, we have put them in. At some times we have put them in coincidentally with various meetings and hearings, and at other times they didn't happen to coincide with meetings and hearings and we put them in also. We are as seriously involved, if not more seriously involved, with this problem than you are. Certainly it is to our great advantage, if there is a better way to do it, to do it. We would like as much as you would to have this 96% recovery changed to 100%.

The problem is how do you get from 96% to 100%. It is those last small quantities that are the most difficult. (Finished reading report.)

One of our strongest weapons, we believe, in the control of both air and water is the concern and ability of our workmen. I would be very happy to discuss my statement with you and answer what questions you would like, but we have a representative of our air and water protection committee here who would like to make a statement if it would please the Authority and then I could come back or you could have his statement after you have finished questioning me, whichever you would like.

Mr. Wendel: Let's have his statement.

Al Buell: (Read report)

Mr. McEwen: I assume you have some questions.

Mr. Meierjurgen: Mr. McEwen, do you have any technical staff down here today? What I want to ask here is this white flyash you spoke of on page 9 that built up in ledges on the bottom of the precipitators and eventually shorted out the unit, what is that, what is the chemistry of that?

Mr. McEwen: Primarily sodium sulfate, saltcake.

Mr. Meierjurgen: Is that something that is significant in your recovery program?

Mr. McEwen: We do recover this. We recover it in the furnace and we also have the special electrostatic precipitators which clean the air from the furnace and recover the sodium sulfate for reuse. This is reused.

Mr. Meierjurgen: It was the plant breakdown that caused this stuff to accumulate. Would you say that it might have been discharged from the stack during that time?

Mr. McEwen: It was discharged from the stack until we found it. In other words, we shut down when we found it.

Mr. Meierjurgen: On page 11 in summary here, "We have been working on the problem for a long time and have increased our control of the odor from about 90% retained before construction of the expansion in 1965 to about 96% retained at the present time." Is it proper to inquire what these percentages are related to?

Mr. McEwen: This computation was made by taking the total sulfides in the system during the day as the total that might be released, and comparing them with measured sulfides that went out of these various sources which were listed earlier in the report, the various stacks. Now, there may be some unmeasured, but this would be insignificant. We are emitting about 4% now.

Mr. Meierjurgen: These sulfides that are discharged, are they all of one nature, or are they a mixture?

Mr. McEwen: They are a mixture, but they are primarily hydrogen sulfide and methyl mercaptan. There are certain other minor quantities of sulfur compounds, but these are total sulfur compounds that we are talking about. But they are primarily hydrogen sulfide and methyl mercaptan.

Mr. Meierjurgen: This work that you have done on this, you may or may not be able to detail all of it. I understand it is highly technical - can you detail the nature of your efforts that you put in there; how are you attacking this problem? Hydrogen sulfide, for instance, let's take that - that is the one that causes most of the stink, isn't it? Is that a very difficult problem and what have you done to solve it?

Mr. McEwen: It is an extremely difficult problem, because hydrogen sulfide - the human nose is so sensitive to it. In other words, it is objectionable at odor levels that are far below that at which it becomes a health problem or anything like this - in fact, it is objectionable in areas

that are very difficult to measure chemically or quantitatively. The way we have attacked the hydrogen sulfide problem is the black liquor, which comes from the digester, is oxidized. This changes the sulfide, which is the chemical form that sulfur is in when it is in as hydrogen sulfide, to a higher form such as sulfate - thio sulfate - which is not as volatile or as odorous as is hydrogen sulfide. Unfortunately, in the later part of the process more sulfides are generated. We need sulfide for cooking and this sulfide is made in the recovery furnace. So that the design of the recovery furnace is such that we must smelt with carbon to reduce the higher sulfur compounds to sulfides to form sodium sulfide for cooking chemicals. A small amount of the sulfide which was oxidized earlier in the system is regenerated as hydrogen sulfide. Actually our quantities are low as you can see from our percentages that only 4% is getting away, but that is where it is generated in the recovery furnace.

Mr. Wendel: If your production has increased 3-fold, in other words you are producing three times as much as you did before, and your efficiency is 96%, would that not mean that the volume of the odorous materials being emitted is 20% greater than it was before your expansion?

Mr. McEwen: It would be in this order of magnitude. In other words, if we were producing 400 tons before, times 10% getting out - that is a factor of 40 say, and if you take 1,000 tons times 4% now, that is a factor of 40, so we are in the order of magnitude now of where we were before. Now this is subsequent to December 10, because up until December 10, as you know from this report which we gave you, we were in and out with our oxidation system. Normally the difference between 90% which we had after the expansion the same as before the expansion, was due to the fact that we did not have an

adequate oxidation system. There have been some other minor things, but one of the big differences between the 90% that we had on the start up and prior to the new installation was this new oxidation system which we have on the big unit.

Mr. Wendel: What is the complaint situation since you have had the new equipment in operation?

Mr. McEwen: Complaints really reflect three things I would assume: (1) Being the weather conditions are substantial; (2) the amount of emission of course is a major factor and (3) is the publicity climate that exists at the time. Due to recent public utterances and to circulation of petitions and things like this, certainly this area has been accelerated, I mean there has been a lot more public interest, not only in air pollution here, but all over the country. I would say that since December 10 it would not - I couldn't say that there has been a substantial change in the complaints. Whether some of these other factors might well overcome the emission factor, you see.

Mr. Wendel: In general it has appeared to us that the complaints as the report states, that the emissions were much greater than the 20% that we have calculated and I wonder if that has been true since December 10, also.

Mr. McEwen: In our discussions with the staff they indicated that their studies were generally taken prior to December 10, I believe this is correct. In other words, I don't believe that your investigations reflect the new oxidation system, although there were times in October when the new oxidation system was working effectively before it broke down again. So there was a period when we were up around our 96% efficiency.

Mr. Wendel: Is it your policy whenever you have a breakdown to shut down?

Mr. McEwen: We have to shut down in order to fix it.

Mr. Wendel: You say, when you discover the breakdown. How quickly does that occur?

Mr. McEwen: We like to discover it as soon as it happens, but we don't always. In this particular case we know there was some period of time when this shorted out which we didn't know until the thing built up, that there was abnormal emissions that we didn't know about. I might say that we are concentrating in this area. I indicated in the paper itself that we are concentrating on measuring and we are certainly giving considerable emphasis toward trying to find out as soon as practicable when these things happen so that we can correct them that much sooner. We feel that this is a big part of the problem.

Mr. Meierjurgen: When did you install these systems there at Springfield?

Mr. McEwen: There are many systems. Some of the earlier systems were installed around 1950 or 1951. We have been adding constantly since that time. The last major item to go on stream was the oxidation system on the new part and we will be installing more improvements as the new aerator comes in. This has not arrived yet; it has been ordered, but it hasn't arrived. We still have the four aerators, so we have ample oxygen in the pond, but our standby aerator has not come yet.

Mr. Meierjurgen: This is on the pond you are talking about?

Mr. McEwen: That is right. I mean all of these things - you see, there is not one source. There are many sources and we have to work on all the sources.

Mr. Meierjurgen: I took your letter here outlining these breakdowns and troubles that you have had, and tried to run up a total of days in which you experienced trouble. Would - is 90 days pessimistic - is that wrong?

Mr. McEwen: I would think that that would - I haven't run through it that way, but I certainly wouldn't offhand say that this is not right. There are many, many items here - in other words the same - we didn't have the same problem necessarily all that time, but we had one problem or another.

Mr. Meierjurgen: Now in July - from July through December of 1966, what machinery gave you the most problems and when I asked a little while ago when was it installed, is that some new machinery you were talking about or was that some old stuff.

Mr. McEwen: No, this - the enlarged oxidation system was probably the one that gave us the most problem and has the most impact on the community at large.

Mr. Meierjurgen: Is it something - just normal bugs that can be ironed out, like motors?

Mr. McEwen: Partly, and we think we have it. I can go back into history if you want the detail as to what our problems were.

Mr. Meierjurgen: No.

Mr. McEwen: We did have some major problems, chemical as well as mechanical, but it has been running well since the 10th of December. We couldn't say that it is running now, but it was running when we left.

Mr. Meierjurgen: In connection with these breakdowns, insofar as I am personally concerned, you don't have to answer this, but do you have any comments or thoughts on this corrosion problem?

Mr. McEwen: I don't think there is any question but what we have reported certain breakdowns which would lead toward some saltcake emissions over short

periods of time, and as Mr. Patterson stated, there would be considerable doubt of any direct connection between a breakdown and substantial corrosion on an automobile for example.

Mr. Meierjurgen: Regarding our staff's recommendations, have you any comments that you would like to make?

Mr. McEwen: I don't believe that I could make any particular comments at this time - to make a meaningful comment you have to really think about it for a while. I don't know that there is any comment.

Mr. Meierjurgen: I only had one here on this second item - that a program of production curtailment or shutdown be followed if necessary to prevent - wait a minute am I on the right one? It is on the one that had to do with reporting of breakdown and then following that the second one. Let's take the first one first. How do you feel about that?

Mr. McEwen: We have done this in times past and we see no reason to be concerned.

Mr. Meierjurgen: You would be amenable to that?

Mr. McEwen: I am not able to make any official statement at this time, but certainly we have worked with the staff in times past and I can see no reason why we shouldn't continue to work with the staff. You may do it on an expanded scale if this is going to be helpful to solve the problem. We are trying to solve the problem. Actually I see no problem at all in item one.

Mr. Meierjurgen: Do you see any problem in item 2?

Mr. McEwen: I see no problem overall. There is no question about agreement in principle. There may be some problems as to when you get down to any specific decision as to whether this is logical or that is logical. In other words, there is always a matter of degree in these things, principle - no problem. This is what we have done many times, of course.

Dr. Wilcox: Mr. Chairman, I wasn't quite clear on our staff report recommendations whether this curtailment or shutdown related to the entire production of pulp and paper by the plant or whether it related to the specific piece of machinery.

Mr. Patterson: We meant that part of it which is necessary to reduce emissions - any or all.

Mr. Wendel: Do you agree with items 3, 4 and 5?

Mr. McEwen: When you first see these things you are really not able to make a complete judgment on them. In other words, so far as 3, 4 and 5 are concerned, we see no particular problems involved at this time, but there may be some if we have a chance to study them. The same thing applies on all of this, I mean it is really - the words are reasonable words - really it is how you interpret the words.

Dr. Wilcox: Do you have any plans at all for future construction of a primary clarifier?

Mr. McEwen: We have been studying the problem which in our opinion is certainly one part of our odor control problem, but a minor part of our odor control problem of anaerobic conditions in the sedimentation pond which is our primary treatment system. We have several alternative methods, one of which is this as a solution and we would like to solve it in the most efficient and effective manner possible. This is certainly one of the methods we have been considering to solve this problem.

Dr. Wilcox: This is completely anaerobic - this primary sedimentation pond?

Mr. McEwen: Right.

Dr. Wilcox: And does emit considerable odor?

Mr. McEwen: Well, we have had - let's say that I don't know any complainant could identify necessarily the source; however, we do recognize from our own studies that this anaerobic pond has some effect in the immediate area - it certainly is of concern to us and we feel this is something that will be amendable to solution. Our problem right now is to get the best and most logical solution. There are other alternatives to putting in this type of a system which would do the same thing of eliminating the odor from the pond.

Dr. Wilcox: Aeration?

Mr. McEwen: This is possible, but we haven't considered that too seriously. We have considered some other alternative pretty seriously though, as well as the possibility of putting in a conventional clarifier. You remember the reason we installed this type of thing was conventional equipment was not available in time to meet the low river runoff this last summer.

Mr. Wendel: One thing that concerns me is this number 5. It will take time probably to find qualified outside consultants, take time for them to become familiar with the problem and for them to find solutions, I suppose. In the meantime, what concerns me, you can't declare a moratorium on your efforts, you would continue the same ----

Mr. McEwen: We would propose to stay ahead of any consultant. That is what we would like to do. In other words, we feel that we have been in the forefront in fighting these problems for many years and that is exactly where we want to stay until we get to the final answers.

Mr. Spies: In our staff report we pointed out very clearly that we recognize down at Springfield that you are using essentially all known and proven techniques and facilities to control and minimize air pollution and you are doing as good a job, if not better, than any other kraft mill in

the country. So that in effect says that if we are going to do any better, we have got to have some new answers. Answers are found by research. You have referred to some of the research that you were doing locally. Could you or do you have anyone here who could tell us what the industry as a whole is doing in this field?

Mr. McEwen: Yes, I think that we do have - Russ Blosser who represents the National Council for Stream Improvement is here and I think he is knowledgeable of what is being done there and knowledgeable of the industry. If you would like to hear from him.

Mr. McPhillips: I have a question Mr. Chairman. One of the noticeable effects aside from the odor which we have been talking about principally is stack emission. Is there anything on the drawing board or what is your personal opinion as to the possibility of that being licked in the sometime determinate future?

Mr. McEwen: By stack emission - there are lots of emission from the stack - are you talking about the white steam coming out the stack?

Mr. McPhillips: Partially, and I wonder how much this has been referred to before. I noticed in the movies that were shown that one stack had considerable black smoke coming out and I also wonder as to the purely steam content of the rest because it would seem that steam would be dissipated in the atmosphere, but this seems to stay - it gets up there in the cloud and rolls back and forth with the prevailing wind, so that I would assume that a good share of that white stack emission must be something other than steam. Because it is noticeable and because it does have an effect on people living there, people driving there, you can't see the sun, it does cloud up the atmosphere, and I think it very important that that, as well

as the actual odor, be - something be done about it. I just wondered what your opinion was as to the possibility of improvement in that line.

Mr. McEwen: There - we are doing things to improve the black stack. The white stacks or the steam stacks - almost everything you see in that stack is steam. There is a small amount of organic material - the same as you might find out of a conventional fuel burning operation - but it is very minor compared to the amount of steam, way less than 1%. I don't know what percent it would be, but we do have the black stack which was observable in this group which is the stack from our power house which burns hogfuel. In this case we are working on this also; we have completed a rebuild of our number one boiler. We are in the process of rebuilding our number two boiler. We have three boilers that are similar. When we complete that if things go well and it works as we expect it to, we will go ahead and rebuild our number three boiler which are three similar hogfuel boilers to minimize the amount of black smoke coming out. So this is being done now - in other words, we are attempting to control the emissions from the power house which burns hogfuel. Insofar as the steam, it would be nice to say that we could solve that - we have considered various possibilities - none of them have looked promising to date. There are many inherent problems. No. 1. If you try to condense that quantity of steam it is going to take a vast amount of water and that amount of temperature going into the McKenzie River, I don't think you would find desirable. If you do condense the steam, then you lose the effect of dispersion of a high heat material that goes up rapidly, so then the things that were left - the non-condensible which are the odorous compounds - instead of being dispersed in the air would stay right around the area. At present we haven't looked with too much favor on condensing the steam. Those are some of the reasons.

Mr. McPhillips: Now to go back to the odor - it would appear from the complaints that we have received that most of them and the fact that probably what precipitated in the last discussion at this meeting was the extremely high odor which was involved around the fore-part of December. It would appear that that has happened more or less spasmodically - it isn't anything that was continuous at least in that range. It would appear that that has been due to some mechanical failures at your plant. Do you feel that you have those licked?

Mr. McEwen: We - you can never say you have solved your mechanical problems. Many of the things that we think are the best will fail us. We have certainly gone a long ways towards the solution of the particular problem that caused us trouble during this period that you allude to before December 10 at this time. These were mechanical problems with the design of the system which we had, but again this was a pioneering effort in an attempt to make a more effective system. It has to do with motor sizes, shaft sizes, things like this which I think that type of thing we can solve. If it is a question of mechanics, if it's not big enough when you build it, you put in a bigger one. The problems of that time were a combination of both weather and the fact that we were not up to our 96% efficiency, but were only down around 90% efficiency at that time. Certainly the occurrence of those things should be greatly reduced, but I certainly couldn't say here that it would never happen again.

Mr. Wendel: Wouldn't it be relatively easy to get rid of the emissions caused by your burning through the use of supplemental fuel to raise the temperature?

Mr. McEwen: We have made some studies in this line. They haven't looked particularly promising.

Mr. Wheeler: You indicated that you were doing everything you could in order to determine when equipment failures occurred so as to shut it off as

quickly as possible. Despite this, breakdowns had occurred that were not detected immediately. How far have you gone into the use of continuous gas analyzers or other continuous devices that would measure the amount of pollutant and thereby when it rose you knew something broke down immediately?

Mr. McEwen: We have made some inquiries. Now I may get slightly off base on here. I'll ask some of my technical experts to take me back if I do get off base on this. We have made inquiries on continuous gas emission analyzers, for example, which are covered in point three of your recommendation, and in order to get meaningful tests we are already low in quantities of these things. When we have asked for equipment that will measure the small quantities that we would deal with, the manufacturers have not been able to come up with it. In other words, they haven't been able to meet the specifications required for this small quantity in equipment. Now this doesn't mean that it may not be possible, and certainly we will investigate and we will concern ourselves with it, of having something floating on the line that isn't measuring anything but may give us a telltale when and if we do approach a substantial problem. We can have problems in the order of magnitude in which we are now operating and we cannot get continuous analyzers to get down to that level.

Mr. Wheeler: I notice a couple of the breakdowns you mention referred to the precipitators. It would seem there is a device ----

Mr. McEwen: This is something we have under consideration right now. A continuous monitoring system so far as the precipitators are concerned. I thought you had reference to point three. At the present time it looks more hopeful to have a continuous monitoring system before the precipitators will be available.

Dr. Wilcox: Isn't there a relatively simple device that would show when it is shorted out?

Mr. McEwen: This might solve one thing if you had it put on the particular part that fails. There are so many different parts that to try to put a tell-tale on each one is not too practical. The thing we have in mind is a continuous monitoring system on the output so that no matter what goes wrong, you pick it up.

Mr. McPhillips: When might we expect a reply from Weyerhaeuser as to an acceptance of the recommendations of our staff?

Mr. McEwen: Since this is Friday, the 13th, suppose we propose Monday, February 13, one month from today for a reply.

Mr. Wendel: You know there are those who are going to say the Sanitary Authority is soft if we don't refer this to the courts right away, upon any further violations. It seems to me that would be the only alternative left; that is, upon any further violation and investigation of complaints that are found to be valid, to seek an injunction against the operation. Is there any other alternative besides that which we have considered today and that which I have just stated?

Mr. Meierjurgen: I doubt, and I am speaking strictly for myself, that throwing this thing into court would necessarily solve the smell down there, unless they shut the whole plant down. Very frankly I don't think that is going to come about without a lot more pain and agony. I don't think it is anything that anybody here wants. I would like to have some more commitments on just how hard we are going about this business, not only from Weyerhaeuser itself, but if the industry as a whole is actually entering into this thing or are we trying to temporize with it. I would like to get in to some of that and I don't set myself up as an expert to know what they are talking about

in these areas, but I would like to know for instance, how far have you gone in the plant area down there with trying to solve this. You spoke of a pilot research plant, have you got a research program going right there on your grounds?

Mr. McEwen: Our research is conducted at Longview. The primary research in this area is done at Longview, although we do a certain amount of research and their people come down and work in our plant, but the primary people in research are at our Longview plant where we have our centralized research department.

Mr. Meierjurgen: Does your technical staff apply itself to this problem or do you have a technical staff.

Mr. McEwen: We have five people full time on problems of air and water protection.

Mr. Meierjurgen: The monitoring of these devices. You had a previous gentlemen here, I've got his name here somewhere, I believe he works in the monitoring - the instrumentation, have you got good qualified people watching that?

Mr. McEwen: We feel we have.

Mr. Meierjurgen: Don't misunderstand me Mr. McEwen, I am not impuning the efforts of the Weyerhaeuser people - I am sure they would like to start the plant up tomorrow morning and have it smell like Chanel #5.

Mr. McEwen: I am afraid any smell at all would offend someone.

Mr. Meierjurgen: It would be comforting I am sure to know that Weyerhaeuser was really doing everything they felt was possible to solve this - Weyerhaeuser and/or the industry. I've talked to some of our staff and other people who are qualified in the business and they seem to think that given sufficient amount of time and a good healthy effort, that these things could be solved. Do you feel they can?

Mr. McEwen: I think they can eventually be solved.

Mr. Meierjurgen: Do you have any technical staff here that would differ with that or would like to comment?

Mr. McEwen: I see nothing but agreement as I look around. I was just advised that when you talk about trying to have technical people that I would be happy to try and answer whatever technical questions you may have because it happens that I happen to have a Ph.D. and am specialized in pulp and paper affairs and there is a technical association of the pulp and paper industry which has some 12,000 members all over the world, and currently I am president of that organization.

Mr. Wendel: Mr. McEwen I would not want to go through a situation where solution is left to an industry-wide group such as we went through with the paper mills in relation to water pollution. Every time we would bring that up they would say, "That is in the hands of the National Council." In other words, that provided the industry with a beautiful out because it was up to the entire industry to find a solution.

Mr. McEwen: We are looking for all the help that we can get. We appreciate it is our problem - our problem may be similar to others, but it is still our problem. I have been advised to outline somewhat the fact that the Weyerhaeuser organization has a technical staff at each of the mills and I indicated that we have five people full time, plus many people who spend a substantial amount of their time on the problem, but these people are assigned only to this area. In addition to that we have a research department which includes and it has been some time since I could talk about the numbers of people, but there are a substantial number of people in the research department. I would suppose maybe 75 to 100 that are located at Longview, Washington, under direction of Dr. Jack Reagh and one division of this department under Mr. DeHaas. He is particularly

knowledgeable in this field and they do work in the air area. Now another department they have is under Gene Haydu, under the water area, so they have one area for water and one area for air. In addition to that, we have a research department which is a subsidiary of the main department in Longview under Dr. Walseth at Everett, Washington, and they also have a staff of perhaps 25 people who work on these various problems. So it isn't that we don't have qualified people working on them. The problems are extremely difficult. We are working down towards this last 4% and that may be much more difficult than the first 96%.

Mr. Spies: Can you enumerate specific research projects that are being conducted by the industry, aimed specifically at kraft odor?

Mr. McEwen: I think it would probably be best to have the National Council people talk about this, rather than for me to talk about industry in general.

Mr. Wendel: The people of Oregon are very, very impatient. Undoubtedly, there will be those who will feel that this has accomplished nothing today - that we are not getting any further along. As I say, the only alternative is to seek an injunction against their operation, which certainly doesn't seem indicated.

Mr. Wheeler: You didn't respond that the Council should give a list of the research projects; I assume partly you may not feel that you could identify them all as you sat right here today. Could we expect a list of these projects, both by industry in general and by Weyerhaeuser Company in particular?

Mr. McEwen: We can certainly give you a list of the projects. There might be some that may be being worked on that we might not be able to put on the list. But there will be a substantial number of available projects.

Mr. Wheeler: I have kind of gotten the idea that basically much of the Weyerhaeuser work during this period of breakdowns and problems you have talked about has been in in-plant control.

Mr. McEwen: In this area. In Springfield, yes, because this is our primary mission. Where the more fundamental work is being done is at Longview by the research group there.

Mr. Wendel: Mr. Harms, has the condition in Springfield seemed better to you in January since they have gotten this new equipment working, than it did before?

Mr. Harms: As a personal observation, yes. That is why I would be most concerned and most interested in Weyerhaeuser's reply to the staff recommendations, particularly concerning point No. 2 regarding production curtailment in the event of breakdowns or malfunction, because it has been my own observation, and this is only a lay observation, but I live within the area marked by one of those red bands up there, so I think that it has some validity, that certainly it is not a uniform situation, but the conditions that existed during these periods of breakdown actually did approach the intolerable, particularly around the latter part of November and that is why I would be most interested in this. It has been as I say a personal observation and certainly not a scientific fact that for the past - since the first of the year there has been an improvement, a noticeable improvement from the standpoint of odor which is the only thing that I have personal experience with. I did take the opportunity to go out to the aeration lagoon about a week or 10 days ago, and I did not notice really any kraft odor at all. There was an odor and I would not say it was a pleasant odor. It was something that has been better than it was in the past when I

have been out in the area. I am hopeful the breakdowns do give some logical explanation of why it was so bad during this period since the latter part of this summer really to more or less varying degrees up until the middle of December.

Dr. Wilcox: Would it be - even though they have appealed for a month to reply to the entire recommendation of the staff - the 5 points - would it be unreasonable to invoke one and two at this time and apply it to all the kraft industry in the state and let the rest of the action follow and the report come in in a month's time? I think both of these points could be met at the present time if the management would agree.

Mr. McEwen: I see no particular problem for the interim, at least until we get a reply to you.

Mr. Wendel: Numbers 1 and 2 you agree upon now?

Mr. McEwen: Not completely. I say we will temporarily until we give you a reply. I mean this is what I think was requested.

Mr. Wendel: In other words, you agree to these until we hear from you further?

Mr. McEwen: That is right. In other words, what we are really saying is we will give you a reply on all of them. If you have particular concern for one and two, we will agree to them on a temporary basis, until you get a reply. In other words, I don't want to prejudge the reply at this time.

Dr. Wilcox: It seems to me that it would be entirely logical for all the kraft industry to adhere to those two points and if they are going to actually accomplish this during the interim and give us an opportunity to react one way or another after a month's period of time, this would accomplish a lot.

Mr. Carey: Before you adjourn this meeting I want to be heard. I brought a petition containing 256 signatures. This concerns the news of the situation in hand. The situation in hand is the pollution by the Weyerhaeuser paper mill and we do hope that this committee has not been blinded by the high taxes of the corporation involved. We hope to get just treatment for this trouble in the area. We don't intend on waiting forever for a solution. This has been the past thing that has been carried out waiting and waiting. We have got a lot of lip service, we want some action. We have problems down there that are worse than this fellow McEwen states. I have lived there for some 12 years. Just passing through the area may not be so bad, but you live there for a period of time and I grant you you will have trouble and you don't have to go down to the coast to get your car eat up - you bring it over to my house and leave it for a month and I will show you. There will be spots of rust appear on that car. Weyerhaeuser themselves have employed the use of a car wash. They realize this problem exists and it is not something that someone alleges. This thing is a fact. If we have to go to a higher level to seek action, we are going to do this, because we are satisfied that this problem is a health hazard. I have a respiratory problem and I neither smoke nor drink to cause the problem. I am not the only person down there with this problem.

Dr. Wilcox: Mr. Chairman, I might respond to a portion of this by stating at the present time we are attempting to enlist the assistance of the Medical Association members in and around the Eugene-Springfield area in giving us their opinion of the number of conditions that they feel might be caused by air pollution, and with that statement I would MOVE at this time that this Sanitary Authority request Weyerhaeuser Company to proceed with a reply to the five recommendations made by the staff and by February 13, and particularly

that in the interim that they adhere to points 1 and 2 and put them into practice immediately.

Mr. Harms: I second the motion.

Mr. Wendel: Is it your intention to have another meeting on February 13?

Mr. Harms: It would depend upon the nature of the reply.

Dr. Wilcox: If they agree to all five points, there wouldn't be much point in holding a meeting.

John Lucky: I am just a layman, but this is a national problem, state problem and a local problem. I feel that it is the responsibility of one of our biggest industries who are not only suffering the same as we are, but will suffer more if it isn't stopped, to set the lead in it. Not make excuses, but to take the lead.

Mr. Harms: Mr. Chairman, we might point out that that is exactly one of the things that we are requesting, that they give us a reply on which is this business of employment of qualified independent consultants or groups of consultants to study the problem in depth, suggesting possible improvements. Of course, the gentleman doesn't have the benefit of the staff recommendations in writing, but I think it should be of interest to him to know that that is exactly one of the five points that is being requested.

Mr. Wendel: Any further discussion on the motion? (The motion was approved.) Any further business to come before this meeting?

Mr. Wheeler: I would like to MOVE that as a policy of this body that the staff be instructed to request the other kraft industries in the state to comply with items one and two also.

Mr. Harms: I second the motion. (Motion carried)

Meeting adjourned at 12:20 p.m.

Respectfully submitted,

Kenneth H. Spies

Kenneth H. Spies
Secretary

MOTIONS MADE AT SPECIAL SANITARY AUTHORITY MEETING--JANUARY 13, 1967

It was MOVED by Dr. Wilcox, seconded by Mr. Harms and carried that at this time the Sanitary Authority request Weyerhaeuser Company to proceed with a reply to the five recommendations made by the staff and by February 13, and particularly that in the interim that they adhere to points No. 1 and 2 and put them in practice immediately.

It was MOVED by Mr. Wheeler, seconded by Mr. Harms and carried that as a policy the staff be instructed to request other kraft industry in the state to comply with Items No. 1 and 2 also.

/ms

STAFF REPORT

Weyerhaeuser Company, Springfield

Status Report on Air Pollution Investigations

January 10, 1967

In September 1964 the Sanitary Authority granted conditional approval to air and water pollution control procedures and facilities proposed by Weyerhaeuser Co. in connection with expansion of its kraft pulp and paper mill at Springfield from 400 ADT/day to 1150 ADT/day of Kraft pulp and paperboard.

The Weyerhaeuser Co. proposal incorporated all known techniques and equipment to keep air polluting emissions to the lowest possible levels. Sanitary Authority staff opinion was that some increase in area air pollution would occur as a result of the expansion but the extent of the increased air pollution and the resultant effects on the community could not be accurately predicted.

Sanitary Authority approval was finally given subject to the condition that if proposed methods for controlling air and water pollution were not entirely successful as represented by the company, such further control, disposal or treatment of air and water polluting wastes would be provided as required to prevent or eliminate validly objectionable air or water pollution.

It was further clearly stated in the letter of conditional approval that it was the intention of the Sanitary Authority that no increases in air or water pollution shall occur, after a reasonable period of adjustment, as a result of the company's expanded operation.

Weyerhaeuser Company had experience some air pollution problems at the time production was initiated at its Springfield plant in 1949 at a production capacity of 150 ADT/day. Through company efforts, these problems were

brought under satisfactory control. Between 1949 and 1964 production was gradually increased to and operated at a nominal capacity of 400 ADT/day with very few complaints of air pollution. After Weyerhaeuser announced its proposed expansion to 1150 ADT/day, complaints of air pollution received by the Sanitary Authority increased markedly and have continued on an intermittent basis with the numbers of complaints being generally related to adverse weather conditions and possibly aggravated by start-up problems and breakdowns of air pollution control equipment at the mill. Weyco has submitted

Complaints of alleged air pollution resulting from the Weyerhaeuser, Springfield Kraft mill have included: reduced visibility, malodors, excessive particle fallout, accelerated corrosion, and impairment of health and well being.

STAFF INVESTIGATIONS

The Sanitary Authority staff has attempted, within the limits of its resources, to evaluate the nature and extent of the air pollution problem associated with the Weyerhaeuser, Springfield mill. These efforts have included: odor surveys, reduced visibility surveys, collections of particle fallout and suspended particulates, sampling for hydrogen sulfide and mercaptans, corrosion surveys, meteorological studies, and complaint follow-up.

SURVEY RESULTS

Staff findings are summarized as follows:

1. Reduced Visibility

   Visibility effects have been evaluated by visual inspections and recorded by pictures. Staff observations indicate that stack emissions generally exceed Sanitary Authority opacity regulations and that these emissions contribute significantly, along with numerous other sources, to reduced visibility in the area during periods of inversion and low wind speeds.

2. Particle Fallout

Particle fallout stations have been operated continuously at selected locations around the Weyerhaeuser Mill since July 1964, prior to start-up of the expanded production facilities in July 1965. Suspended particulate matter has been collected periodically by means of high volume air samplers. Visual observations of apparent saltcake fallout have been noted. It was concluded in the Sanitary Staff Report of April 14, 1966, based upon particle fallout data collected up to that time, that a significant area fallout problem attributed to Weyerhaeuser Company could not be demonstrated.

Particle fallout and suspended particulate data collected since April 14, 1966, appear to support the conclusion of the April 14, 1966 report.

However, since the fallout and suspended particulate data do not correlate well with abnormal fallout of light-weight material actually observed for short periods, it now appears that long-term particulate sampling and reporting on a weight basis may not be an accurate and meaningful measure of the actual fallout situation.

Additionally, chemical analyses of particle fallout samples collected in the area show concentrations of sodium and sulfate which are significantly higher than background levels. Sodium and sulfate concentrations also are higher at stations located near the Weyerhaeuser Mill and west of the mill in the directions of generally lower wind velocities. Most of the complaints of excessive corrosion have been received from an area near the fallout stations (#14 & #29) where high concentrations of sodium and sulfates have been found.

Stack emission data submitted by Weyerhaeuser Company show that total solids currently being emitted are within the range of total solid emissions reported prior to start-up of the expanded facilities.

Current hydrogen sulfide and mercaptan emissions are reported to be lower than levels submitted for the period prior to the mill expansion.

3. Accelerated Corrosion

Several complaints of accelerated corrosion alleged to have been caused by fallout from the Weyerhaeuser mill have been investigated by the Sanitary Authority staff. Automobile finishes, exposed metals and particularly trailer houses examined showed signs of excessive corrosion. These observed conditions, in general, appear to be related circumstantially, by virtue of their locations, to the Weyerhaeuser emissions. White fallout material in high concentrations was observed during several investigations of corrosion complaints. Laboratory analyses of samples of this material showed sodium concentrations in excess of 10% by weight. The high sodium concentrations are significant evidence that the fallout material is definitely from an unnatural source in the area. We do not as yet, however, have sufficient information to conclusively link the fallout material or the observed corrosion with any particular source or effect.

4. Odors

Odor surveys have been conducted by several methods including odor intensity observations at fixed stations, odor surveys to determine odor intensity patterns for conditions existing at the time of survey and tabulation and follow-up of odor complaints.

It was concluded in the April 14, 1966, staff report that kraft-type odors were observed at such intensities and frequencies to constitute a widespread area odor nuisance in the Eugene-Springfield area. It was further concluded that higher intensity kraft-type odors were observed with greater frequency after expansion than were observed before the expansion.

Odor surveys made at eleven fixed stations subsequent to April 14, 1966, up to September 2, 1966, confirm that existence of an area odor nuisance resulting from kraft-type odors and the increased frequency of higher intensity odors after expansion than before expansion. Recent surveys have indicated that the waste water ponds have intermittently contributed to a localized odor problem.

AISI lead-acetate tape samplers were operated continuously at strategic locations for the purpose of measuring hydrogen sulfide levels. In addition, on three different occasions, samples were collected downwind in the visibile plume by means of gas impingers and analyzed for H_2S and total mercaptans.

H_2S, measured by AISI samplers, was detected at all stations and at levels above the odor threshold (>1 ppb) at most all stations. Highest intensities of H_2S were measured with greatest frequency in areas of most numerous complaints of odor. The maximum H_2S concentration measured was less than 10 ppb. Gas impinger samples collected under the plume in areas of distinct odor showed H_2S concentrations ranging from 0 to 1.9 ppb and total mercaptans concentrations ranging from 0 to 219 ppb. The threshold odor concentrations for total mercaptans is considered to be approximately 0.3 ppb.

5. Health Implications

A number of complaints have been received alleging adverse health effects resulting from Weyerhaeuser emissions. The Sanitary Authority staff is not qualified to evaluate health effects, and especially long-time chronic effects; however, measured concentrations of H_2S and mercaptans have been well below toxic levels reported in the literature.

CONCLUSIONS

1. Reduced visibility frequently occurs in the Eugene Springfield area as a result of emissions from multiple sources and adverse weather and topographic conditions.
2. Particle fallout of a white precipitate has been observed coincident with odors from the Weyerhaeuser emissions. This fallout is eporadic and therefore does not show large amounts on monthly particle fallout measurements.
3. Reported instances of metal and paint corrosion that were investigated by the staff could not be pin-pointed for cause although the occurrences are in general located under the Weyerhaeuser odor plume.
4. Kraft type odors at intensities and frequencies that constitute a widespread nuisance exist in the Eugene-Springfield area during all seasons of the year. The direction of the odor "plume" is determined by the action of wind and topography.
5. Mercaptans and H_2S can be measured at or above threshold intensities coincident with odors.
6. Complaints of Kraft type odors lie in the same general areas as those indicated by Sanitary Authority staff odor surveys.
7. Alleged health problems that have been attributed to the Weyerhaeuser emissions by complainants can not be evaluated or correlated with measured emissions by the Sanitary Authority staff.

RECOMMENDATIONS

It is recognized by the Sanitary Authority staff that the Weyerhaeuser Kraft mill at Springfield utilizes essentially all known, proven techniques and facilities to control and minimize its air polluting emissions.

It is generally conceded that it is doing as good a job or better than any other known Kraft mill in this regard.

The air pollution problem, primarily an odor nuisance problem, in the Eugene-Springfield area results from the residual odorous emissions from the production of 1150 ADT/day of Kraft pulp and paperboard in close proximity to a densely populated area which unfortunately has meteorological conditions unfavorable to dispersing air polluting emissions.

The Sanitary Authority staff does not know of any presently available control equipment or reasonable modifications of the Kraft process which will solve the characteristic Kraft odor problem.

With the above qualifications in mind, methods and procedures to obtain reductions in air polluting emissions to acceptable levels are recommended as follows:

1. That the Sanitary Authority be immediately notified of equipment breakdown or malfunction that is likely to result in increased emission of air pollutants.
2. That a program of production curtailment or shut down be followed as necessary to prevent excessive (widespread) air pollution during periods of equipment breakdown or malfunction.
3. That the use of continuous gas emission analyzers be investigated as a means of insuring maximum efficiency of operation and emission control.
4. That construction of a conventional primary clarifier with continuous sludge removal be considered as a substitute for the existing primary sedimentation pond.
5. That a qualified independent consultant or group of consultants be retained to study the Weyerhaeuser Company's odor problem, in depth, with the objectives of evaluating emission effects, present procedures and controls, and suggesting possible improvements and/or specific research approaches to solution of the characteristic Kraft odor problem.

REPORT TO OREGON STATE
SANITARY AUTHORITY

January 13, 1967

Given by John McEwen

INTRODUCTION

My name is John M. McEwen. I am manager of the Weyerhaeuser Company Springfield Area. This report is in response to a request by the Oregon State Sanitary Authority for information on air quality near the Weyerhaeuser manufacturing complex in Springfield, Oregon.

SPRINGFIELD MILL BACKGROUND

The Springfield kraft pulp mill converts 4 million pounds of waste wood into paperboard daily. The original Springfield kraft installation, which began operation in 1949, was designed for a manufacturing capacity of 150 tons of paperboard per day. The waste wood raw material supply was exclusively provided by the adjoining Weyerhaeuser sawmill.

Today waste wood from large areas of western Oregon is delivered to Springfield to provide fiber for a paperboard manufacturing capacity in excess of 1,000 tons per day.

Utilization by Weyerhaeuser of this wood that was formerly wasted has reduced reliance on alternate methods of disposal, including slash burning and wigwam burners.

THE KRAFT PROCESS

The kraft process is the pulping process best suited for Douglas Fir. This process consists of five major operations:

1. Wood Digestion 2. Pulp Washing 3. Evaporation of residual cooking liquor 4. Recovery of chemicals by burning wastes 5. Regeneration of digestion chemicals.

The digestion process treats wood chips with cooking liquor, commonly called white liquor, in a digestion vessel. This operation may be a batch or continuous process. Under conditions of elevated temperature and pressure the wood is "de-lignified." This means the organic binding material in the wood (lignin) is dissolved freeing the cellulose fibers. The active chemicals in this conversion are sodium hydroxide and sodium sulfide.

In the pulp washing process the cellulose fiber is washed relatively free of spent liquor. The fiber is then available for conversion into paper. The wash water containing wood organics and cooking chemicals is recovered for processing back into white liquor. The residual liquor is commonly called black liquor.

The evaporation process removes water from the residual cooking liquor. The organic binding materials removed from the wood in the digestion process are contained in the concentrated fluid. The concentrated black liquor is burned to destroy the organic matter and recover the cooking chemicals.

The recovery of chemicals by burning wastes occurs in a furnace where the sulfur compounds are reduced to usable sulfides. This is done in a kraft recovery unit which generates steam from heat released by the burning waste. The soluble chemicals in the bottom of the furnace are continuously removed and dissolved in water.

The digestion chemicals are regenerated by treatment with quicklime to form sodium hydroxide. Sodium sulfide passes through this process unchanged. The reaction leaves calcium carbonate which is regenerated into quicklime by heating in a lime kiln.

Principal sources of malodors are the spent sulfides in the cooking liquor and the various organic sulfur compounds formed in the digestion process. Turpentine compounds present a lesser problem. These are recovered and sold as by-products.

Areas in which emissions may occur include:

1. Gases from the digestion process
2. Gases formed during the evaporation process
3. Recovery furnace emissions
4. Lime kiln exhaust gases
5. Odor from the settling basins
6. Odor from the aeration lagoon
7. Miscellaneous exhaust emissions, including tank vents, hood vents, etc.

The Weyerhaeuser Springfield mill has consistently acted to reduce odorous discharges. The capture and incineration of

malodorous digester gases was pioneered at the Springfield plant. Black liquor oxidation was an early installation at Springfield to limit the emissions in black liquor evaporation. Oxygen meters on recovery furnaces and lime kilns help insure adequate oxygen supplies for proper combustion on these units. Among other air protection devices at Springfield are three lime kiln scrubbers, three electrostatic precipitators, two scrubbers for the multi-effect evaporator non-condensable gases, and a turpentine recovery system.

SPRINGFIELD EXPANSION

In July, 1965, the Weyerhaeuser Springfield kraft paperboard mill placed in operation expanded manufacturing facilities which increased production capabilities threefold. Prior to the expansion the company assured the OSSA that the level of discharged water pollutants would not be increased by the expansion. This level was established as a maximum BOD discharge of 4,000 lbs. per day during summer McKenzie River low flow periods. The company furthermore assured the Authority that at least the same efficiency would be maintained in the control of air pollutants for the expanded facilities as was maintained for the operation of the existing plant.

Shortly after the July 1965 startup, it was apparent that several projected operational parameters were in error and that air and water quality was suffering as a result. In addition, a series of both major and minor equipment failures resulted in complaints from the community to the OSSA.

During this early startup period the company was active in investigating the sources of the problems and attempted to control the discharge of odorous gases as best it could under the circumstances. Since a deficiency of black liquor oxidation existed, immediate plans were drawn to install enlarged oxidation equipment at a capital cost of $175,000. In-mill control was strengthened through improvements to equipment and existing waste disposal facilities.

By December of 1965 the company realized a major alteration to the water disposal system would be necessary to assure a maximum of only 4,000 lbs. per day BOD discharge. Several proposals were undergoing serious evaluation when the OSSA advised the company that immediate steps toward improvement must be taken.

In a public hearing before the Authority on February 17, 1966, Weyerhaeuser announced it intended to spend $500,000 on additional waste treatment facilities. The company also reported to the Authority its intent to enlarge black liquor oxidation equipment to reduce the quantity of hydrogen sulfide emissions.

On April 15, 1966 the Sanitary Authority approved the plans Weyerhaeuser submitted for the treatment of waste water. The treatment facilities were to consist of primary treatment through the use of existing settling basins and secondary treatment in an aerated lagoon. A July, 1966 completion date was promised.

During the April hearing significant testimony was given by State witnesses which discounted statements made at the prior hearing concerning alleged health hazards from kraft odors. Levels of hydrogen sulfide in the community could increase many times before they approach levels that might be considered toxic.

The construction of the waste treatment facilities began almost immediately after the April hearing. On July 16, 1966, the water treatment installation was placed in full operation. The results were immediate and dramatic. The BOD discharge since that date has been consistently below 4,000 lbs. per day. The McKenzie River below the outfall has shown substantial improvement.

The Springfield Weyerhaeuser past performance record, both before and after the 1965 expansion is a clear-cut demonstration of "good faith."

RECOVERY EFFICIENCY OF MALODOROUS GASES

The problem of kraft mill odor has not been eliminated at Springfield. The potential for odor has been increased since the July 1965 expansion. It has been alleged that Weyerhaeuser stated that there would be "no increase in odor when the new mill was built." Such is not the case. The staff report for the Sanitary Authority meeting of September 10, 1964 correctly states the company's position: "Essentially the same and perhaps somewhat better efficiency in the control of air pollutants. The company has made no claims, however, that it

will maintain the total quantities of air pollutants discharged at or near present levels."

The efficiency of the new operation is greater than the old operation. Based on sulfur requirements for the batch pulping process and the emission losses of malodorous sulfur gases, the recovery efficiency was about 90% prior to the 1965 expansion. The recovery efficiency for the new mill presently is about 96%.

The frequency and intensity of the kraft odors in the community have not increased nearly in proportion to the increase in production capacity. Furthermore, progress is being made in reducing odors since the new mill was placed in full operation.

OPERATION

The manufacturing equipment in any operation is always vulnerable to failures -- human and mechanical. The immense size of the basic units at Springfield enhances the possibility of something going wrong quickly and with noticeable results.

Recent problems with essential process equipment have been largely responsible for the air quality problems. The failure of a surface aerator in the waste treatment lagoon, late delivery and subsequent failures on the new black liquor oxidation system, and, most recently, a failure of the electrostatic precipitators on the #3 recovery furnace are among the contributors.

The weekend of December 10 is explained in terms of operating problems and inclement weather. A failure to the agitator on the new oxidation system elevated the emission rate of hydrogen sulfide. A steady, strong easterly wind accompanied by a heavy overcast brought the emissions over populated areas of Eugene and Springfield. Several low level inversions occurred under these conditions and significantly increased hydrogen sulfide ground level concentrations until the weather cleared and the oxidation system again became fully effective.

ODORS FROM WASTE WATER TREATMENT LAGOON

On October 20 - 23, 1966, a serious odor problem developed at the aeration lagoon. The odors were the result of gases generated in anaerobic bacterial activity. The severe conditions persisted for less than three days.

The problem occurred when a reducing gear on the #3 surface aerator failed, creating a shortage of oxygen for normal aerobic activity in the lagoon. Steps were taken to minimize the odor as soon as it was apparent that the three remaining aerators could not maintain the required oxygen level in the lagoon. A reduction of nutrients took effect after three days and the lagoon was maintained with borderline odor problems till the aerator was replaced on December 3, 1966. The fourth aerator raised the oxygen content and stopped the abnormal odor problem.

Steps have been taken to eliminate this odor control problem. A fifth aerator has been ordered. It will be installed in the lagoon so another failure of a unit will still leave four units to maintain ample oxygen. An improved distribution pattern is planned for the aerators. This should make the installation more efficient. A spare set of gears has been ordered to minimize the time any unit would be out of service due to gear failure.

SUSPENDED PARTICULATE AND PARTICULATE FALLOUT

Since July, 1965 the mill has experienced several problems with particulate matter. Shortly after the startup of the new mill, two transformers failed on the electrostatic precipitator unit on the #3 recovery. The unit operated at reduced efficiency on temporary repairs until the final replacement unit was obtained in December of that year. The particulate emissions during that period were substantial.

Another incident occurred on the weekend of April 16, 1966. A failure to the #1 C.E. electrostatic precipitators resulted in widespread fallout in the residential area directly west of the mill.

A recent incident occurred December 30, 1966. An umbrella on the strong black liquor influent line to the electrostatic precipitators was dislodged and fouled two liquor agitators. Consequently, recovered fly ash built up in ledges on the bottom of the precipitators and eventually shorted out the unit. The

recovery unit was shut down immediately for inspection when this occurred. After the problem was discovered, the furnace operated at a reduced rate until repairs to the unit were completed.

Although these equipment failures have led to problems during the last 18 months, it is our determined intention to take every possible precaution to avoid recurrence of such incidents.

FUTURE

The Springfield Weyerhaeuser kraft mill is recognized in the industry as a leader in air and water quality protection. The efficiency of the Springfield operations in reducing malodorous emissions ranks the mill among the finest kraft mills in the world. The waste water quality achieved at Springfield is unmatched by any other kraft operation.

Although the company recognizes the high position it already holds within industry, it pledges itself to be responsive to the community's desire for further improvement. Weyerhaeuser Company research has been conducted on this problem for a long time in the laboratory, in the pilot plants, and in the library. This research will continue. The company's support of research by the National Council for Stream Improvement and by the Northwest Pulp and Paper Association has been and will continue to be substantial.

Furthermore, the company is willing to work closely with the OSSA to establish facts in off-mill sampling and in the investigation of complaints. The Weyerhaeuser Company feels that, in order to be particularly responsive to community problems, it must work closely with those in the community who are concerned. The company is willing to work toward this end with the Lane County Air Pollution Control Officer, with the Lane County Department of Health, and with any other group or individuals who are interested in identifying and finding solutions to these air quality problems.

SUMMARY

Like all kraft mills, there is an odor problem from the Weyerhaeuser mill in Springfield. We have been working on the problem for a long time and have increased our control of the odor from about 90% retained before the construction of the expansion in 1965 to about 96% retained at the present time. As with many endeavors, the last steps to the complete elimination of a problem are the most difficult. Although the odors may be unpleasant, they are known not to be a hazard to health. Community levels of the odorous sulfides would have to increase many times before they would approach a level that is considered toxic by public health officials.

We are continuing to improve the reliability and operation of our odor control equipment. We will continue to support our own research and that of the industry toward the eventual solution

of the problem. We will cooperate with the Oregon State Sanitary Authority to clearly establish the facts. We also are willing to work closely with any individuals or groups who have an interest in the solution to this problem.

1994 Potter Street
Eugene, Oregon 97405
January 6, 1967

Mr. Kenneth Spies, State Engineer
State Sanitary Authority
State Office Building
Portland, Oregon

Dear Mr. Spies:

After growing up in the Pacific Northwest, I have spent several years living in smoggy areas like Los Angeles. It was a great shock to me, moving to Eugene recently, to find that this small town in such a beautiful setting has its own serious pollution problems.

While the yearly rye-grass burnings and slash burnings add dreadfully to air pollution, the Weyerhaeuser Plant in Springfield seems the most serious source of air pollution, both because it occurs year-round, and because it smells so awful.

The vulgar odors from this plant are noticeable and bothersome at least one day a week in the University of Oregon area where I live and work, and about twice a month these smells are so strong as to invade and permeate our house.

I have also been told that river pollution is also serious in the area, although I have no personal knowledge of this.

I hope the State Sanitary Authority will fight vigorously to stop completely this and all other sources of pollution in the area.

Sincerely,

Sarah Lichtenstein

(Mrs. Edward Lichtenstein)

SL:mw

Division of
Sanitation & Engineering
Oregon State Board of Health
RECEIVED
JAN 12 1967

DNF	TEMP	PERM

488 East 11th Avenue
Eugene, Oregon 97403

January 3, 1967

Mr. Kenneth Spies
State Sanitary Authority
State Office Building
Portland, Oregon

Dear Mr. Spies:

I am writing in support of those residents in Springfield, headed by Mr. William O. Carey, who have recently protested the pollution caused by the Weyerhaeuser Company. My support is being offered to these residents for the January 13, 1967 meeting between the State Sanitary Authority and the Weyerhaeuser Company.

Although I do not live and work as close to the source of this pollution as do the protesting Springfield residents, I wish to testify that this odor, and any toxic effects that may be associated with it, are markedly and frequently present over Eugene. This holds for my office on 11th Avenue as well as for my home, which is near Spencer's Butte far to the south. I wish to emphasize that this undesirable condition was sharply increased following the 1965 expansion of Weyerhaeuser's operation in Springfield.

My supporting protest against the Weyerhaeuser Company is being made from two points of view. First, the added pollution caused by Weyerhaeuser's 1965 expansion has materially reduced the pleasantness of living in this area for myself and my family. Second, as this pollution makes it more difficult to attract and keep professional personnel in the Eugene area, it is damaging to the type of research and development work in which I am engaged and which I feel Oregon strongly needs.

Sincerely,

Gordon G. Bechtel, Ph.D.
Research Associate
Oregon Research Institute

GGB:bb
cc: W. Carey
F. Elliott, Lane County Commissioner

Division of Sanitation & Engineering
Oregon State Board of Health
RECEIVED
JAN 5 - 1967

| DNF | TEMP | PERM |

Weyerhaeuser Company
Pulp and Paperboard Division

Springfield Branch
Springfield, Oregon

RECEIVED
JAN - 6 1967
Air Pollution

January 5, 1967

Mr. H. M. Patterson
Air Quality Control
Oregon State Sanitary Authority
Portland, Oregon 97201

Dear Mr. Patterson

In response to your letter of December 23, 1966 we are submitting the following information:

1. The black liquor oxidation efficiency (in terms of elimination of Na_2S in weak black liquor) for the enlarged oxidation equipment is presently 90% and over.

2. The stack emissions you requested are as follows:

	Old Recovery	New Recovery Without Full Oxidation	New Recovery With Oxidation	Old Kilns	New Kilns
Total Solids grains/$Ft.^3_a$	0.260	0.109	-	0.171	0.102
Na^+ as Na_2SO_4 grains/$Ft.^3_a$	0.249	0.0956	-	0.140	0.0754
Ca^{++} as CaO grains/$Ft.^3_a$	-	-	-	0.0005	0.0044
Hydrogen Sulfide grains/$Ft.^3_a$	0.0520	0.0211	0.00735	0.00135	0.0075
Methyl Mercaptan grains/$Ft.^3_a$	0.0122	0.00584	0.00306	0.00074	0.00153
Exit Temp. ^oF	251	276	-	156	173
Exit Velocity (fps)	58.6	44.6	-	21.6	33.7
Stack Flow (acfm)	174,800	302,000	-	36,500	57,000
Percent Moisture	28	28	-	28.7	40.2

($Ft.^3_a$ = actual cubic foot of stack gas at stack conditions)

3. The equipment problems we have experienced during the last six months include:

Date	Equipment	Problem
July through Labor Day, 1966	Dissolving Tank Vents #3 Recovery	Abnormal local effects were noted. Source was confirmed by testing and corrected at next shutdown on Labor Day.
7/29/66 thru 10/2/66	Enlarged oxidation system	First trials on oxidation tank begun, 7/29/66. Later trials showed (1) Weak black liquor solids cause foaming problem, (2) Design of defoamer shafts needed revision, (3) Supporting structure needed rebuilding, (4) Agitator impellor required more blades, (5) Overload controls for defoamer not up to specifications.
10/10/66 thru 10/13/66	Aeration Basin	End of irrigation season throws additional load on aeration basin; took 2 to 3 days to adjust to new load, very local problem.
10/20/66 thru 12/3/66	Aeration Basin	#3 aerator down with failure of intermediate reducing gear; aeration basin went septic -- very sever odor in area. Effort to re-cycle aeration basin water causes some overflow of water from the #2 retention pond to the McKenzie slough -- Water Board notified. After three days odors from pond were minimized by reduction of nutrients to slow down action.
10/2/66 thru 10/17/66	Enlarged oxidation system	Oxidation tank in intermediate service. Foam, minor repairs, personnel training, etc. results in considerable down time for unit in this period. In full service on 10/18/66.
11/30/66 thru 12/10/66	Enlarged oxidation system	Enlarged system down. Agitator overloaded -- had to rebuild system. Used standby oxidation system.
12/27/66 thru 12/30/66	Kopper's Precipitator #3 Recovery	Metal fouled liquor agitator in bottom of Kopper's unit. Trouble with unit discovered when salt cake ledge shorted out electrodes on 12/30/66. Unit shut down immediately for repairs.

We hope you find this information sufficient.

Very truly yours,

J. M. McEwen
Area Manager

JMM:aw

cc: H. W. Merryman

WEYERHAEUSER CO.-SPRINGFIELD

Plant Production in Tons per Day

	1966	1965	1964
January	923	435	421
February	990	416	414
March	1031	397	430
April	1064	393	426
May	1067	437	419
June	1049	423	423
July	968	352	419
August	960	621	415
September	930	674	415
October	1023	772	415
November	957	884	---
December	914	934	---

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

		Pounds per 24 hrs.
TOTAL SOLIDS		
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		Gallons per day
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		258,000
After start-up, 1967 data submitted	71,800	
	193,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

CORROSION COMPLAINT SUMMARY INFORMATION

SPRINGFIELD-EUGENE AND VICINITY

Date	Number	Name	Address	Primary Complaint
1-18-67	VA 33	Lee Atkins	1384 N. 33rd, Spfld.	No follow up See Port #1 12-30-66
1-12-67	LC 81	Phillip Lottrell	1295 N. 35th, Spfld.	Car paint No follow up
1-11-67	VA 30	Mrs. Tooker	1080 N. 21st, Spfld.	Car paint
1-10-67	VA 27	Roy Hart	922 N. 18th, Spfld.	No follow up
1-9-67	VA 24	W. A. McBee	266 S. 19th, Spfld.	Car No follow up
1-6-67	LC 32	Mrs. Letha Hendricks	267 Wedgewood Dr. Eug.	No follow up
1-6-67	LC 35	James Senter	3635 Kathryn Av. Spfld.	Car paint No follow up
1-6-67	LC 46	T. E. Shaw	609 N. 34th, Spfld.	No follow up
1-5-67	VA 9	Marie Olinghouse	440 Taylor, Eugene	No follow up
1-5-67	VA 14	Joel Hamburger	4913 E. Street, Spfld.	Car paint
1-5-67	VA 17	Leroy Owings	3500 N. Street, Spfld.	Car paint Window glass
1-4-67	Port 6	Zane May	1147 N. 33rd St., Springfield	Saltcake on car. Pictures
1-4-67	SA 2	Mrs. Harold Greenwood	165 South 44th St., Springfield	No follow up
1-3-67	VA 3	Mr. & Mrs. Lewis	1372 Industrial Av. Springfield	No follow up
12-30-66	Port 1	Lee Akins	1384 N. 33rd., Spfld.	Car paint Trailer paint
12-30-66	Port 5	C. H. Henderson	Springfield Airport	Pitting, Paint damage
12-30-66	VA 5	Bob Drew	35 N. 28th, Spfld	No follow up
12-29-66	VA 1	J. C. Ownbey	5143 Donal St., Spfld.	House paint
12-29-66	SA 1	Wm. Carey	37th & Industrial, Springfield	Car paint Corrosion

NEWSPAPER ARTICLE →

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966

(Values in T/sq.mi./mo.)

Springfield #14
Lynch Residence

	1964	1-4-65 to 7-1-65	7-1-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 10-3-66
PARTICLE FALLOUT					
No. of Samples	10	5	6	6	3
Maximum	31	20	30	22	23
Minimum	3.2	12	6.4	16	11
Median	16	14	27	18	22
Average	18.5	15.8	23	20	19
CALCIUM					
No. of Samples	2	3	6 (2)	6	3
Maximum	0	0	0.6	1.5	0.6
Minimum	0	0	0.4	0	0.2
Median			0.5	0	0.2
Average			0.5	0.3	0.3
SODIUM					
No. of Samples	2 (2)	5	6	6	3
Maximum	1.1	0.8	1.9	1.6	0.7
Minimum	0.9	0.2	0.1	0.8	0.4
Median	1.0	0.4	0.85	1.0	0.5
Average	1.0	0.44	0.9	1.1	0.5
SULFATE					
No. of Samples	2	5	6	6	3
Maximum	3.4	2.9	4.5	5.5	2.6
Minimum	1.6	1.5	1.2	3.4	2.0
Median	2.5	2.0	3.3	3.5	2.1
Average	2.5	2.2	3.2	4.2	2.2

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966 (Values in T/sq. mi./mo.)

Springfield #15
Yolanda Elementary

	1964	1-4-65 to 7-12-65	7-12-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT					
No. of Samples	10	5	6	6	6
Maximum	19	8	11	9.5	8.9
Minimum	3.0	4	3.6	2.8	6.6
Median	8.5	6.1	8	6.6	6.8
Average	9	6	7.4	6.8	7.3
CALCIUM					
No. of Samples	4	5	6	6	5
Maximum	0	0	0	0.3	0.1
Minimum	0	0	0	0	0
Median				0	0
Average				0.1	0
SODIUM					
No. of Samples	7	5	6	6	5
Maximum	0.3	0.1	0.5	0.4	0.5
Minimum	0.1	0.01	0.09	0.1	0.1
Median	0.2	0.1	0.15	0.3	0.1
Average	0.2	0.1	0.4	0.3	0.2
SULFATE					
No. of Samples	9	5	6	6	5
Maximum	1.5	1.3	1.4	1.5	1.3
Minimum	0	0	0.2	0.3	0.1
Median	0.5	0.1	0.5	0.5	0.7
Average	0.5	0.4	0.63	0.9	0.7

OSBH-AQC
1/13/67 - 30

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966

(Values in T/sq. mi./mo.)

Springfield #17
Thurston Sr. High School

	1964	1-4-65 to 7-12-65	7-12-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT					
No. of Samples	10	5	6	6	5
Maximum	21	15	18	20	20
Minimum	6	11	8	5.0	5.2
Median	14	12	15	16	16
Average	13.6	12.6	13	15	15
CALCIUM					
No. of Samples	8	5	6	6	5
Maximum	0.4	0	0.8	0.2	0.2
Minimum	0	0	0	0	0
Median	0.4		0.8	0	0
Average	0.5		0.13	0	0
SODIUM					
No. of Samples	7	6	6	6	5
Maximum	0.8	0.7	1.0	1.4	0.9
Minimum	0.1	0.4	0.4	0.4	0.1
Median	0.6	0.5	0.6	0.8	0.6
Average	0.5	0.5	0.65	0.8	0.6
SULFATE					
No. of Samples	9	6	6	6	5
Maximum	2.0	2.2	2.3	2.9	1.8
Minimum	0.1	1.1	1.0	1.4	1.0
Median	1.5	1.4	1.1	2.0	1.5
Average	1.2	1.6	.16	2.2	1.5

OSBH-AQC
1/13/67 - 30

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966

(Values in T/sq. mi./mo)

Springfield #19
Rainbow W. D.

	1964	1-4-65 to 7-8-65	7-8-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT					
No. of Samples	6	6	6	5	4
Maximum	42	17	31	34	62
Minimum	10	10	15	14	14
Median	22	15.5	19.5	16	25
Average	22.5	14.3	21.5	19	32
CALCIUM					
No. of Samples	7	5	6	5	4
Maximum	0.1	0	0.6	1.8	0.6
Minimum	0.1	0	0.3	0	0
Median	0.1		0.45	0	0.2
Average			0.45	0.4	0.2
SODIUM					
No. of Samples	6	6	6	5	4
Maximum	2.5	1.1	4.1	2.5	1.7
Minimum	0.5	0.6	0.4	1.1	0.7
Median	1.2	0.7	2.3	1.8	0.8
Average	1.4	0.8	2.4	1.8	1.1
SULFATE					
No. of Samples	6	6	6	5	4
Maximum	4.3	2.1	7.5	3.9	2.9
Minimum	0.4	1.3	1.1	2.0	2.2
Median	2.0	1.4	4.3	3.6	2.5
Average	2.2	1.6	3.6	3.2	2.4

OSBH-30
1/13/67

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966

(Values in T/sq. mi./mo.)

Springfield #20
E. Springfield Fire Station

	1964	1-4-65 to 7-1-65	7-1-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT					
No. of Samples	5	6	5	5	5
Maximum	20	26	17	20	24
Minimum	5.3	11	0.3	9	8.9
Median	15	13	15	18	16
Average	13.9	14.8	13.8	16	17
CALCIUM					
No. of Samples	5	6	5	5	5
Maximum	0	0	0	0.5	0
Minimum	0	0	0	0	0
Median				0	0
Average				0.1	0
SODIUM					
No. of Samples	5	5	5	5	3
Maximum	0.8	0.8	0.9	1.1	0.3
Minimum	0.2	0.3	0.3	0.2	0.1
Median	0.3	0.4	0.5	0.4	0.5
Average	0.4	0.5	5.2	0.6	0.3
SULFATE					
No. of Samples	5	6	5	5	5
Maximum	1.8	2.1	2.0	2.6	1.5
Minimum	0.0	0.9	0.8	1.1	1.1
Median	0.6	1.1	1.3	1.3	1.2
Average	0.7	1.4	1.3	1.7	1.2

OSHH-AQC
1/13/67-30

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966 (Values in T/sq.mi./mo.)

Springfield #21
Mohawk Elementary

1964	7-1-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT			
No. of Samples	5	6	5
Maximum	10	9.3	8.0
Minimum	3.6	1.6	2.6
Median	7.6	6.2	5.6
Average	7.1	5.3	5.3
CALCIUM			
No. of Samples	5	6	5
Maximum	0	0.7	0.2
Minimum	0	0	0
Median		0	0.2
Average		0.1	0.1
SODIUM			
No. of Samples	5	6	3
Maximum	0.4	0.3	0.4
Minimum	0.05	0.1	0.1
Median	0.20	0.1	0.1
Average	0.23	0.2	0.2
SULFATE			
No. of Samples	5	6	5
Maximum	0.5	0.8	0.7
Minimum	0.4	0.0	0.2
Median	0.5	0.2	0.3
Average	0.46	0.4	0.4

OSEH-AQC
1-13-66/30

Springfield Fallout Data

Summary of Particle Fallout & Chemical Analysis
of Fallout Sampling Stations 1964-1966

(Values in T/sq.mi./mo.)

Springfield #25
McKenzie - 51

	8-2-65 to 1-3-66	1-3-66 to 7-1-66	7-1-66 to 12-7-66
PARTICLE FALLOUT			
No. of Samples	5	6	5
Maximum	24	19	19
Minimum	10	9.3	13
Median	18	15	17
Average	18	16	19
CALCIUM			
No. of Samples	5	6	3
Maximum	0	0.2	0
Minimum	0	0	0
Median		0	0
Average		0	0
SODIUM			
No. of Samples	5	6	3
Maximum	1.0	0.8	0.5
Minimum	0.3	0.2	0
Median	0.5	0.4	0.5
Average	0.54	0.5	0.3
SULFATE			
No. of Samples	5	6	3
Maximum	2.6	2.3	1.5
Minimum	0.9	0.7	1.4
Median	1.5	1.1	1.4
Average	1.5	1.1	1.4

OSEH-AQC
1-13-67-30

SUMMARY OF SAMPLING FOR HYDROGEN SULFIDE
in the
EUGENE-SPRINGFIELD AREA, WEYERHAEUSER COMPANY
(Using Continuous AISI Impregnated Tape Sampler)
January 10, 1967

Station	Distance & Direction from Plant	Dates	Total No. of Samples	Percentages of Samples Indicating Zero *	0.1 to 1 ppb	1 to 9.9 ppb	Greater than 10 ppb
Defoor	0.9 mi. ESE	3/11/66 - 7/26/66	1830	80.2	15.1	4.7	0
Defoor	0.9 mi. ESE	7/26/66 - 8/15/66 9/2 /66 - 11/ 4/66	454	38.3	56.8	4.8	0
Defoor	0.9 mi. ESE	11/22/66 - 12/14/66	176	39.2	49.4	11.4	0
Defoor	0.9 md. ESE	12/14/66 - 1/6 /67	182	33.5	54.4	12.1	0
Springfield Fire Station	0.7 mi. SSE	2/10/66 - 4/12/66	458	98.1	1.9	0	0
Texaco Sta.	1.2 mi. SE	3/22/66 - 4/12/66	168	56.5	33.9	9.5	0
Myers	0.7 mi. N	3/22/66 - 4/7 /66	230	63	30.4	6.5	0
Myers	0.7 mi. N	4/12/66 - 7/26/66	1025	99.7	0.3	0	0
Cross	0.8 mi. W	3/11/66 - 7/13/66	1526	97.0	2.4	0.5	0
Cross	0.8 mi. W	11/23/66 - 12/7 /66	109	11.9	57.7	30.2	0
Cross	0.8 mi. W	12/14/66 - 1/6 /67	173	52.6	42.8	4.6	0
Hayden Br. Filter Plant	1.4 mi. NW	2/28/66 - 4/5 /66	332	98.8	1.2	0	0
John Jaqua Residence	3 mi. NW	3/1 /66 - 4/7 /66	73	98.6	0	1.4	0
Eugene City Hall	6.8 mi. W	4/5 /66 - 4/12/66	167	97.2	0.5	2.3	0

* Because the plume from the plant shifts position frequently, many of the samples under the column labelled "Indicating Zero" are unrelated to the plant emissions.

SUMMARY OF GAS SAMPLING DATA

in the

Eugene-Springfield Area-Weyerhaeuser Company

January 10, 1967

Test No.	Place	Date	Time	Total mercaptans as CH_3SH in ppb	H_2S, ppb	Remarks
1	40th St. just No. of Kathryn St.	1/10/67	1600-1700	3.3	0	Threshold odors. Plume rising and dispersing. No strong odors in area.
2	Water tower near Hayden Bridge Water Plant	1/10/67	1420-1520	0	0	Threshold odor. Plume going over sample site, dispersing rapidly.
3	High Banks Road & Marcola Road	1/10/67	1225-1325	0	0.4	Threshold odors. Plume high over site, dispersing rapidly.
4	High Banks Road & Smith Way	1/10/67	1115-1215	0	0	Threshold odors. Light east wind, plume rising and dispersing.
5	West of Weyer-haeuser on High Banks Road	1/10/67	1003-1103	8.3	0.4	East wind. Plume blowing from source toward sample site, 1000' up, dis-persing rapidly.
6	1.2 Mi.E of Hayden Bridge Junction-Floye Norman Res.	12/29/66	1400-1500	4.2	0	Lingering odor.
7	High Banks Road W. of intersection with 50th St.	12/29/66	1235-1320	131	1.9	Definite odor.
8	0.5 Mi. SW of Station 3	12/29/66	1120-1205	5.7	0	Odor intermittent.
9	1.2 Mi.E of Hayden Bridge Junction-Floye Norman Res.	12/29/66	0905-1005	26.3	0.4	Odor present
10	McKenzie View Dr. 1 Mi. W-Jaqua Res.	12/28/66	1530-1615	17	0	Definite odor.
11	Mohawk & High Banks Road	12/28/66	1400-1500	6.4	0	Perceptible Odor

Summary of Gas Sampling Data in the Eugene-Springfield Area-Weyerhaeuser Company, January 10, 1967 (cont.)

Test No.	Place	Date	Time	Total mercaptans as CH_3SH in ppb	H_2S, ppb	Remarks
12	DeFoor Logging Truck Shop	3/30/66	1515-1545	119		Odor present
13	DeFoor Logging Truck Shop	3/30/66	1429-1509	12	--	Odor present
14	DeFoor Logging Truck Shop	3/30/66	1413-1428	219	--	Odor present
15	Hayden Bridge Water Treatment Plant	3/30/66	1050-1120	140	--	Odor present

OSBH-AQC
1/13/67-30

SUMMARY OF GAS SAMPLING DATA

in the

Eugene-Springfield Area-Weyerhaeuser Company

January 10, 1967

Test No.	Place	Date	Time	Total mercaptans as CH_3SH in ppb	H_2S, ppb	Remarks
1	40th St. just No. of Kathryn St.	1/10/67	1600-1700	3.3	0	Threshold odors. Plume rising and dispersing. No strong odors in area.
2	Water tower near Hayden Bridge Water Plant	1/10/67	1420-1520	0	0	Threshold odor. Plume going over sample site, dispersing rapidly.
3	High Banks Road & Marcola Road	1/10/67	1225-1325	0	0.4	Threshold odors. Plume high over site, dispersing rapidly.
4	High Banks Road & Smith Way	1/10/67	1115-1215	0	0	Threshold odors. Light east wind, plume rising and dispersing.
5	West of Weyer-haeuser on High Banks Road	1/10/67	1003-1103	8.3	0.4	East wind. Plume blowing from source toward sample site, 1000' up, dis-persing rapidly.
6	1.2 Mi.E of Hayden Bridge Junction-Floye Norman Res.	12/29/66	1400-1500	4.2	0	Lingering odor.
7	High Banks Road W. of intersection with 50th St.	12/29/66	1235-1320	131	1.9	Definite odor.
8	0.5 Mi. SW of Station 3	12/29/66	1120-1205	5.7	0	Odor intermittent.
9	1.2 Mi.E of Hayden Bridge Junction-Floye Norman Res.	12/29/66	0905-1005	26.3	0.4	Odor present
10	McKenzie View Dr. 1 Mi. W-Jaqua Res.	12/28/66	1530-1615	17	0	Definite odor.
11	Mohawk & High Banks Road	12/28/66	1400-1500	6.4	0	Perceptible Odor

Summary of Gas Sampling Data in the Eugene-Springfield Area-Weyerhaeuser Company, January 10, 1967 (cont.)

Test No.	Place	Date	Time	Total mercaptans as CH_3SH in ppb	H_2S, ppb	Remarks
12	DeFoor Logging Truck Shop	3/30/66	1515-1545	119		Odor present
13	DeFoor Logging Truck Shop	3/30/66	1429-1509	12	--	Odor present
14	DeFoor Logging Truck Shop	3/30/66	1413-1428	219	--	Odor present
15	Hayden Bridge Water Treatment Plant	3/30/66	1050-1120	140	--	Odor present

OSBH-AQC
1/13/67-30

SUMMARY OF SAMPLING FOR HYDROGEN SULFIDE
in the
EUGENE-SPRINGFIELD AREA, WEYERHAEUSER COMPANY

(Using Continuous AISI Impregnated Tape Sampler)

~~DECEMBER 19, 1966~~ January 10, 1967

Eugene City Hall 6.8 miles W 4-5 to 4-12-66		%
No. Samples 0	162	97.2
No. " <1 ppb	1	.5
No. " 1 to 9.9 ppb	4	2.3
No. " >10 ppb	0	0.0
Total Samples	167	

Sprfld Fire Sta. 0.7 mile SSE 2-10 to 4-12-66		%
	449	98.1
	9	1.9
	0	0.0
	0	0.0
	458	

John Jaqua 3 miles NW 3-1 to 4-7-66		%
	73	~~100~~ 98.6
	0	0.0
	~~0~~ 1	~~0.0~~ 1.4
	0	0.0
	73	

Filter Plant 1.4 miles NW 2-28 to 4-5-66		%
	332	98.8
	4	1.2
	0	0.0
	0	0.0
	336	

Texaco Station 1.2 miles SE 3-22 to 4-12-66		%
	95	56.5
	57	33.9
	16	9.5
	0	0.0
	168	

Myers .7 miles N 3-22 to 4-7-66		%
No. Samples 0	145	63
No. " <1 ppb	70	30.4
No. " 1 to 9.9 ppb	15	6.5
No. " >10 ppb	0	0.0
Total Samples	230	

Myers (Cont.) .7 mile West 4-12 to 7-26-66		%
	1022	99.7
	3	.3
	0	0.0
	0	0.0
	1025	

Cross 0.8 mile West 3-11 to 7-13-66		%
	1480	97.0
	38	2.4
	8	.5
	0	0.0
	1526	

Cross (Cont.) .8 mile West 11-23 to 12-7-66		%
	13	11.9
	63	57.7
	33	30.2
	0	0.0
	109	

Cross (Cont.) .8 mile West 12-14-66 to 1-6-67		%
	91	52.6
	74	42.8
	8	4.6
	0	0.0
	173	

Defoor .9 mile ESE 3-11 to 7-26-66		%
No. Samples 0	1467	80.2
No. " <1 ppb	276	15.1
No. " 1 to 9.9 ppb	87	4.7
No. " >10 ppb	0	0.0
Total Samples	1830	

Defoor (Cont.) .9 mile ESE 7-26 to 8-15-66 & 9-2 to 11-4-66		%
	174	38.3
	258	56.8
	22	4.8
	0	0.0
	454	

Defoor (Cont.) .9 mile ESE 11-22 to 12-14-66		%
	69	39.2
	87	49.4
	20	11.4
	0	0.0
	176	

DeFoor (Cont.) .9 mile ESE 12-14-66 to 1-6-67		%
	61	33.5
	99	54.4
	22	12.1
	0	0.0
	182	

ODOR LIMIT SURVEYS

Springfield-Weyerhaeuser Co.

Based on 35 odor limit surveys from January 27, 1966 to January 9, 1967, odors were found in 4 general compass quadrants.

1. The area located generally east of the mill. Westerly winds prevail during the Summer months. Odor levels varied from definite to strong kraft mill odors up to 1½ miles from the mill.

2. The area located generally northeast of the mill. The southwesterly winds have blown definite kraft odors 2½ or 3 miles from the mill. Strong odors were found 5 miles east-northeast of the mill. These odors occur up the Mohawk and/or Camp Creek Valleys.

3. The area located generally southeast of the mill. The northwest winds have blown definite kraft odors 1½ miles from the mill, generally up the middle fork of the Willamette River. High ridges terminate within 2 miles of the mill and tend to retard or funnel winds in these directions.

4. The area located generally west and northwest of the mill. Easterly winds at the mill coupled with southerly winds over Eugene have blown definite kraft odors up to 11 miles from the mill. Strongest levels were detected along Coburg Road in Eugene approximately 6 miles from the mill.

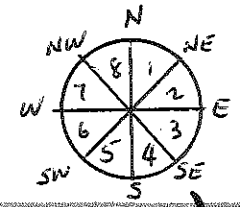
The intensive survey from December 29, 1966 to January 6, 1967 indicates the same trends as the 1966 pattern indicated above. Nuisance levels were shown in all four quadrants with detectable odors reaching as far as 7¾ miles from the mill.

Topography and meteorology directly influence the strength of the odor and the distance the odor is observed from the plant.

The effects of time and topography seemed to be related in that nuisance odors were found along Coburg Road, beyond the immediate influence of valley sides, only in early morning (around 3:00 a.m.) when there was little wind, whereas nuisance levels were found in Camp Creek and Mohawk Valleys and on McKenzie View Drive at the base of Coburg Ridge at all times, being influenced by wind direction and topography than by time.

During this period, the strongest odor detected was a number 4 (nauseating) at a distance two miles northeast of the mill on Camp Creek Road. Strong odors (number 3) were found at Camp Creek School, five miles east-northeast of the mill; near the Springfield Country Club on Mohawk Road three miles north of the mill; on McKenzie View Drive five miles northeast of the mill; and on Coburg Road near Willakenzie School six and one-fourth miles west-northwest of the mill, as well as closer in.

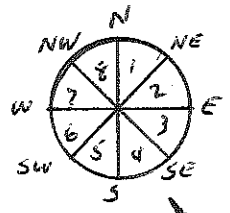
Within about two miles of the mill, the settling pond is a major, distinguishable source of pungent, acrid odor. Farther than about two miles this odor is not separately detectable from the general mill odor. The mill odor was noted at nuisance levels from next to the mill out to seven miles away.



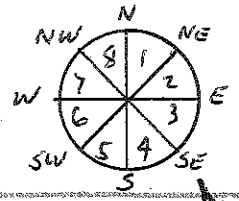
SUMMARY OF ODOR SURVEYS

January 10, 1967

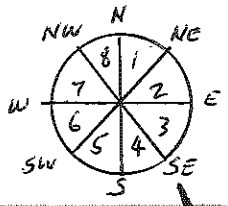
Date	Time	Odor Plume Octant	Odor Intensity vs Distance in Miles 0	1	2	3	4	General Weather	Observer	Remarks
1-9-67	1755	6-7			0.5				WCW	
1-9-67	1755	6			0.6				WCW	
1-9-67	1755	6			0.7				WCW	
1-9-67	1755	6				1.2			WCW	
1-9-67	1755	6		2.2					WCW	
1-9-67	1755	7		1.1					WCW	
1-9-67	1755	7		0.7					WCW	
1-6-67	1033	8				1.4			LGF	
1-6-67	0930	8				4.5		Cool, Cloudy	CAA	Genl., Myers to Hayden Br., on Camp Creek Rd.
1-6-67	0913	1			0.2				LGF	Definite to strong pond odor
1-6-67	0830	8				1.5-2		Cool, Cloudy	CAA	Genl., Myers to Hayden Br., on Camp Creek Rd.
1-6-67	0830	1-8				0.8			LGF	
1-6-67	0805	1-2			0.1				LGF	Definite pond odor
1-6-67	0515	1				1		Cool, Cloudy	CAA	Genl., Myers to Hayden Br., on Camp Creek Rd.
1-6-67	0245	1	3+						CAA	Camp Creek Rd.
1-5-67	1400	1-2				0.4			LGF	Under plume at plant
1-5-67	0925	1-2			2.5				LGF	
1-5-67	0920	1-2				1.0			LGF	Under plume
1-4-67	2045	1				0.4			LGF	Under plume at plant
1-4-67	1525	1-2				4		Cool, Cloudy	CAA	Genl., Y in Camp Creek Rd.
1-4-67	1500	1		7				Cool, Cloudy	CAA	Genl., 2 mi. E of Camp Creek School
1-4-67	1500	1			5			Cool, Cloudy	CAA	Genl., Camp Creek School
1-4-67	1440	2-3				1.0			LGF	Under plume
1-4-67	1230	2			0.5			Hard Rain	CAA	Genl., 52nd & High Banks Rd.
1-4-67	1145	1		6.5				Sunny	CAA	Genl., Mohawk School
1-4-67	1130	1	2+					Sunny	CAA	Camp Creek Rd.
1-4-67	1100	7			0.5			Sunny	CAA	Pond odor, N 42nd, mill to Int. 105



ODate	Time	Odor Plume Octant	Odor Intensity vs Distance in Miles 0	1	2	3	4	General Weather	Observer	Remarks
1-4-67	0955	8			0.9				LGF	
1-4-67	0830	7			2.2				LGF	
1-4-67	0829	7		2.3					LGF	
1-4-67	0822	7			1.6				LGF	
1-4-67	0820	7				0.8			LGF	
1-4-67	0815	7				0.5			LGF	
1-4-67	0300	8			6.3			Cool, Cloudy	CAA	Genl., Coburg Rd.
1-4-67		8				3.3		Cool, Cloudy	CAA	Genl., McKenzie Dr., Near Jaqua res.
1-4-67		8				2		Cool, Cloudy	CAA	Genl., N 23rd from Hayden Br. Rd. to Yolanda
	to									
1-4-67		8		1.5				Cool, Cloudy	CAA	Genl., Hayden Bridge water plant
1-4-67		8			1.5			Cool, Cloudy	CAA	Genl., Mohawk Rd. at Hayden Bridge
1-4-67	0200	7		1.5				Cool, Cloudy	CAA	Genl., Int. 105 at 39th
1-3-67	2115	7			2.3				LGF	
1-3-67	2100	7-8			6.5			Cool, Cloudy	CAA	Genl., Coburg Rd. - Armitage Park to Int. 105
1-3-67	to	8		3.3-6.5				Cool, Cloudy	CAA	Genl., McKenzie View Dr., Jaqua to Armitage Park
1-3-67		6-7		1.5-3.5				Cool, Cloudy	CAA	Genl., South A & Main St. to 38th
1-3-67	2000	6-7		7.3				Cool, Cloudy	CAA	Genl., Mason's Motel, Eugene
1-3-67	1540	8			7.5			Cool, Cloudy	CAA	Genl., N end of Gilham St.
1-3-67	1515	1,8,7			2-6.5			Cool, Cloudy	CAA	Genl., McKenzie View Dr. from intersection w/Hill Rd. to Armitage Park
1-3-67	1500	8			0.5-1			Cool, Cloudy	CAA	Genl., 42nd St., mill to Int. 105
1-3-67	1500	7	0.5					Cool, Cloudy	CAA	Commercial at E to Kathryn & 37th
1-3-67	1345	2					2	Cool, Cloudy	CAA	Genl., Camp Creek Rd., 1-2 mi. E of Hayden Bridge
1-3-67	1105	8		2				Cool, Cloudy	CAA	Genl., Hayden Bridge Rd., from N 34th to Locust
1-3-67	1100	8			1.5			Cool, Cloudy	CAA	Genl., Intersection of Hayden Bridge Rd and Mohawk
1-3-67	1015	7-8		7.5				Cool, Cloudy	CAA	Genl., N. end of Gilham Rd.



Date	Time	Odor Plume Octant	Odor Intensity vs Distance in Miles 0	1	2	3	4	General Weather	Observer	Remarks
1-3-67	1000	7-8		6.5				Cool, Cloudy	CAA	Genl., County Farm Rd. At Coburg Rd.
1-3-67	0945	8				6.5		Cool, Cloudy	CAA	Genl., McKenzie View Dr., 1 mi. SE of Armitage Park
1-3-67	0930	1				5.5		Cool, Cloudy	CAA	Genl., McKenzie View Dr., 1 mi. W of intersection w/Hill Rd.
1-3-67	0300	7-8			6.5			Cool, Cloudy	CAA	Genl., Armitage Park
1-3-67	0300	7-8				6.5		Cool, Cloudy	CAA	Genl., Coburg Road
1-3-67	0200	7-8			0.5			Cool, Cloudy	CAA	Pond odor
12-31-66	0936	7			3.6				IGF	
12-31-66	0935	7				5.0			IGF	
12-31-66	0930	7			6.0				IGF	
12-31-66	0915	7			5.0				IGF	
12-31-66	0830	7			6.2				IGF	
12-31-66	0820	7			6.0				IGF	
12-31-66	0815	7				5.0			IGF	
12-30-66	2340	7			6.4				IGF	
12-30-66	2300	7			5.5				IGF	
12-30-66	2300	7			5.8				IGF	
12-30-66	2230	8			1.3				IGF	Definite pond odor
12-30-66	1012	1-8		0.8					IGF	
12-30-66	0940	6		1.2					IGF	
12-30-66	0930	6		4.6					IGF	
12-30-66	0840	6			0.3				IGF	
12-29-66	2250	6			0.1				IGF	Definite pond odor
12-29-66	1703	3			1.6				IGF	
12-29-66	1700	3			1.2				IGF	
12-29-66	1651	3			0.2				IGF	Definite pond odor
12-29-66	1650	3			0.1				IGF	Definite pond odor
12-29-66	1640	3			0.1				IGF	Definite pond odor
12-29-66	1615	3			0.9				IGF	
12-19-66	1230	1			2.9				IGF	



Date	Time	Odor Plume Octant	Odor Intensity vs Distance in Miles 0	1	2	3	4	General Weather	Observer	Remarks
12-14-66	1125	7			1.0				LGF	
12-14-66	1015	7			7.3				LGF	
12-14-66	1001	7			7.0				LGF	
12-14-66	1000	7			7.5				LGF	
12-14-66	0955	7			7.5				LGF	
12-14-66	0945	7			6.3				LGF	
12-14-66	0940	7			6.5				LGF	
12-14-66	0935	7			6.4				LGF	
12-14-66	0925	7			4.9				LGF	
12-14-66	0915	7			4.9				LGF	
1-28-66	2300	7			5.1				LGF	Time estimated, not recorded
1-28-66	2300	7			5.0				LGF	Time estimated, not recorded
1-28-66	0130	7			11.1				LGF	

LONG TERM ODOR SURVEYS FINDINGS

Period: August 3, 1965 to September 2, 1966

Weyerhaeuser Company, Springfield

OREGON STATE SANITARY AUTHORITY

AIR QUALITY CONTROL

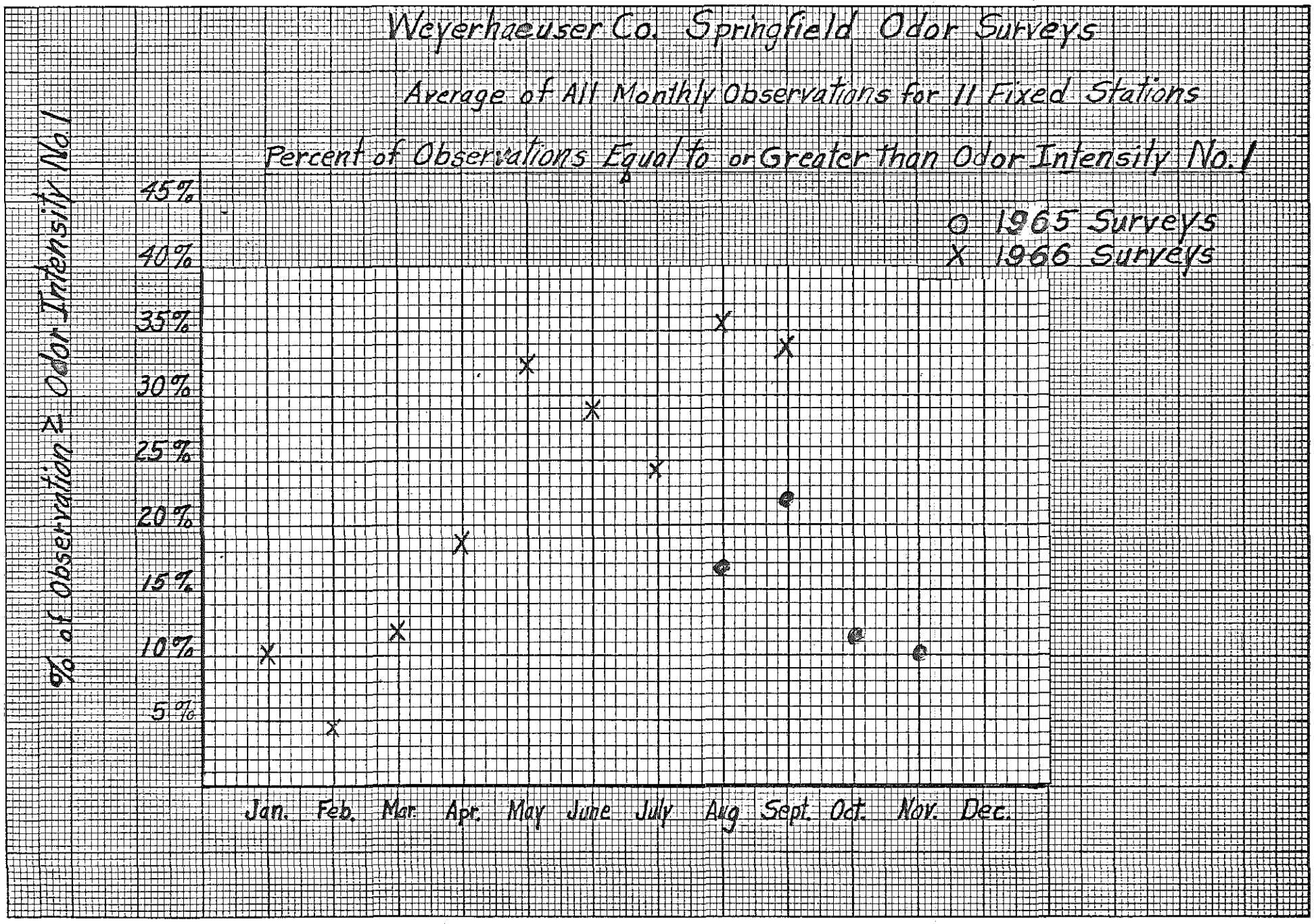
September 14, 1966

Introduction: In June of 1964 the Oregon State Sanitary Authority granted provisional approval to Weyerhaeuser Company for the expansion of the plant from 400 to 1150 AD tons per day of unbleached kraft and container board. The provision of the approval was that the expanded facilities would not increase the existing levels of air and water pollution. It was initially proposed that the plant would reach expanded production in August of 1965. Initial production began July 19, 1965 and increased steadily to approximately 90% of the 1150 ton per day capacity in early September 1966.

Because odor is one of the primary sources of nuisance that originates from a kraft mill, an odor survey procedure was adopted to monitor odors. (See Appendix A and B). Essentially, this procedure included the establishment of 11 odor observation stations located ½ to 1½ miles, generally S.E. and downwind of the plant during the July through September period, also located in areas where complaints had been received, and largely in the more built-up areas. The observation stations are listed in Appendix B and shown on a map in Appendix C. To minimize variations, odor observations were conducted at each station during each survey and a specified procedure and time limit for observations was specified for each observation. Ninety-five per cent of the observations were made by two non-smoking odor observers.

Summary of Odor Observations: The tabulated data show that an odor intensity equal to or greater than No. 1 (threshold) on a monthly average was detected (1) from 10% to 21.6% of the observations in 1965 surveys and from 4.5% to 35.8% in 1966, and (2) the average of all surveys was 17.3% of the observations in 1965 and 22.3% in 1966, and (3) during the summer periods of the year when wind conditions are likely to be similar the per cent observations were significantly higher.

NO. 359-11. 10 × 10 to the half inch, 5th lines accented.
Engraving, 7 × 10 in.
MADE IN U. S. A.
KEUFFEL & ESSER CO.



SUMMARY OF ODOR SURVEYS

Weyerhaeuser - Springfield

The odor intensity recorded is based upon the following intensity scale ranging from 0 - 4:

#0 No odor or no odor of designated component
#1 Threshold level of the component
#2 Definite odor of component
#3 Strong odor of component
#4 Overpowering odor of component

Date of Survey	Observations in Intensity Range					No. of Observ.	Sum. by Mo. of Ratio of Observ. ≥ No. 1 to Tot. Observ.	% Observ. ≥ No. 1 by Mo.
	#0	#1	#2	#3	#4			
8/ 3/65	22	6	7	1	0	36		
8/ 5/65	32	3	8	1	0	44		
8/ 5/65	38	5	1	0	0	44		
8/10/65	40	4	0	0	0	44		
8/10/65	33	7	4	0	0	44		
8/27/65	44	0	0	0	0	44	50	
8/27/65	41	1	1	1	0	44	300	16.7%
9/ 1/65	32	5	4	3	0	44		
9/ 1/65	33	5	5	1	0	44		
9/ 2/65	26	10	7	1	0	44		
9/ 3/65	40	3	1	0	0	44		
9/ 3/65	40	1	3	0	0	44		
9/10/65	42	1	1	0	0	44		
9/10/65	39	2	3	0	0	44		
9/20/65	30	9	5	0	0	44		
9/21/65	30	10	4	0	0	44		
9/24/65	35	9	0	0	0	44	105	
9/24/65	32	5	6	1	0	44	484	21.6%
10/ 1/65	36	6	2	0	0	44		
10/11/65	44	0	0	0	0	44		
10/ 8/65	44	0	0	0	0	44		
10/ 8/65	39	4	1	0	0	44		
10/12/65	28	13	3	0	0	44		
10/13/65	44	0	0	0	0	44		
10/13/65	32	9	2	1	0	44		
10/20/65	42	2	0	0	0	44		
10/20/65	44	0	0	0	0	44	49	
10/26/65	38	5	1	0	0	44	440	11.1%
11/ 2/65	43	1	0	0	0	44		
11/ 2/65	38	16	0	0	0	44		
11/ 4/65	41	1	2	0	0	44		
11/ 9/65	40	0	4	0	0	44		
11/ 9/65	41	2	1	0	0	44		
11/18/65	44	0	0	0	0	44	31	
11/23/65	40	1	3	0	0	44	308	10%

SUMMARY OF ODOR SURVEYS Weyerhaeuser - Springfield (cont.)

Date of Survey	Observations in Intensity Range #0	#1	#2	#3	#4	No. of Observ.	Sum. by Mo. of Ratio of Observ ≥ No. 1 to Tot. Observ.	% Observ. ≥ No. 1 by Mo.
1/19/66	37	5	1	1	0	44		
1/24/66	41	1	2	0	0	44		
1/27/66	40	0	0	4	0	44	18	
1/28/66	40	0	0	4	0	44	176	10.2%
2/ 4/66	44	0	0	0	0	44	4	
2/ 7/66	40	0	1	3	0	44	88	4.5%
3/ 4/66	40	0	1	3	0	44		
3/ 4/66	40	0	2	2	0	44		
3/ 7/66	40	0	0	4	0	44		
3/ 7/66	44	0	0	0	0	44		
3/18/66	40	0	1	3	0	44		
3/22/66	33	1	4	6	0	44	38	
3/25/66	33	4	2	5	0	44	308	12.3%
4/ 1/66	34	1	3	6	0	44		
4/ 5/66	36	4	4	0	0	44		
4/ 5/66	35	8	1	0	0	44		
4/ 5/66	43	1	0	0	0	44		
4/22/66	44	0	0	0	0	44		
4/22/66	36	3	4	1	0	44		
4/28/66	26	12	6	0	0	44	66	
4/28/66	32	6	6	0	0	44	352	18.7%
5/ 5/66	24	6	11	3	0	44		
5/12/66	34	5	1	3	1	44		
5/12/66	27	1	8	5	3	44		
5/19/66	33	2	8	1	0	44	71	
5/25/66	31	7	5	1	0	44	220	32.3%
6/23/66	37	1	6	0	0	44		
6/30/66	29	6	6	3	0	44	38	
6/30/66	28	5	8	3	0	44	132	28.8%
7/ 8/66	28	6	10	0	0	44		
7/13/66	31	9	4	0	0	44		
7/18/66	33	7	3	1	0	44	54	
7/26/66	30	5	7	2	0	44	220	24.5%
8/ 4/66	30	8	2	4	0	44		
8/15/66	28	4	1	11	0	44		
8/23/66	27	13	3	1	0	44		
8/25/66	25	1	5	13	0	44	79	
8/31/66	31	10	2	1	0	44	220	35.8%
9/ 2/66	29	1	11	3	0	44	15	
							44	34.1%

A

OREGON STATE SANITARY AUTHORITY
Air Quality Control
1400 S. W. Fifth Avenue
Portland 1, Oregon

ODOR SURVEY PROCEDURES

Background

The lack of suitable field equipment to describe odor nuisance conditions has encouraged the use of an odor survey procedure by the Oregon Air Pollution Authority. While these surveys are not quantitative, an effective qualitative measurement of odor intensity may be established. Referring to this odor survey method John Van Bergen has stated [1] "no other present method of analysis is capable of distinguishing between, and correctly reporting so large a variety of chemical substances, by a single operation."

Since the odor survey procedure is qualitative in nature, human variations as well as humidity, temperature or other variables do not appear to affect the correlation of numerical odor intensity data. This was partially substantiated by L. H. Beck [2] in a study of alcohols and esters. He found that, (a) subjects can make quantitative odor intensity matches which are consistent in repeated trials and (b) in broad trends the data of one subject agrees with that of another.[3]

Intensity Scale

Kerka and Kaiser, and the experts previously given, agree on the statistical correlation of the generalized subjective odor scale as follows:

#0 - No odor or no odor of the designated component.

#1 - Threshold level of the component.

#2 - Definite odor of component.

#3 - Strong odor of component.

#4 - Overpowering odor of the component.

Instructions

1. Odor surveys should not be attempted when the observer has a cold or any other physical deficiency that reduces the average sense of smell. Tobacco products should not be used for at least one hour prior to the odor observation time (tobacco decreases odor perception level of the individual.)[4]

2. Exposure to high concentrations of odor immediately before making observations should be avoided.

3. Odor survey observations should be limited to periods of good olfactory perception. High concentrations of an odor may limit survey period to 10 - 15 minutes before moving to an odor free location to recover sense of smell before resuming the observations.

4. Odor "sniffs" are made on the minute every minute. Where two "0" observations are recorded in two consecutive minutes, relocate an observation station where the odor is present and resume the survey.

5. Information such as location, suspected source, date, observer's name should be shown on the survey field report. The form should also include the location of the observing station, time, wind direction, and inversion or other weather conditions. Any changes in odor component should be noted under "Other Description."

Bibliography

1. John Van Bergen, Industrial Odor Control
Journal Air Pollution Cont. Assoc. 8, 101-03 (Aug. 1958)

2. Amos Turk, Appraisal of Odor Problems.
Air Repair 4, 3-6 (Aug. 1954)

3. L. H. Beck et. al. Observations on Olfactory Intensity. Annuals N.Y. Acad. Sci. 58, Art. 2, 225 (1952)

4. W. F. Kerka and E. R. Kaiser, An Evaluation of Environmental Odors. Golden Jubilee Meeting of APCA, June 2-6, 1957. 57-1.

Appendix B

OREGON STATE SANITARY AUTHORITY
Air Quality Control
1400 S. W. Fifth Avenue
Portland 1, Oregon

Subject : Odor Surveys at Weyerhaeuser's Springfield, Oregon Plant

Date : August 6, 1965

Procedure:*

A. The following observation stations shall be utilized:

1. 42nd St. directly west of plant near R. R. tracks
2. 42nd St. and Smith Way
3. 45th St. and Main St.
4. 50th St. and Main St.
5. 54th St. and A St.
6. 57th St. and Main St.
7. Thurston High School's N.W. parking lot
8. 58th St. and High Banks Rd.
9. 50th St. and E St.
10. 50th St. and G St.
11. 51st St. and G St.

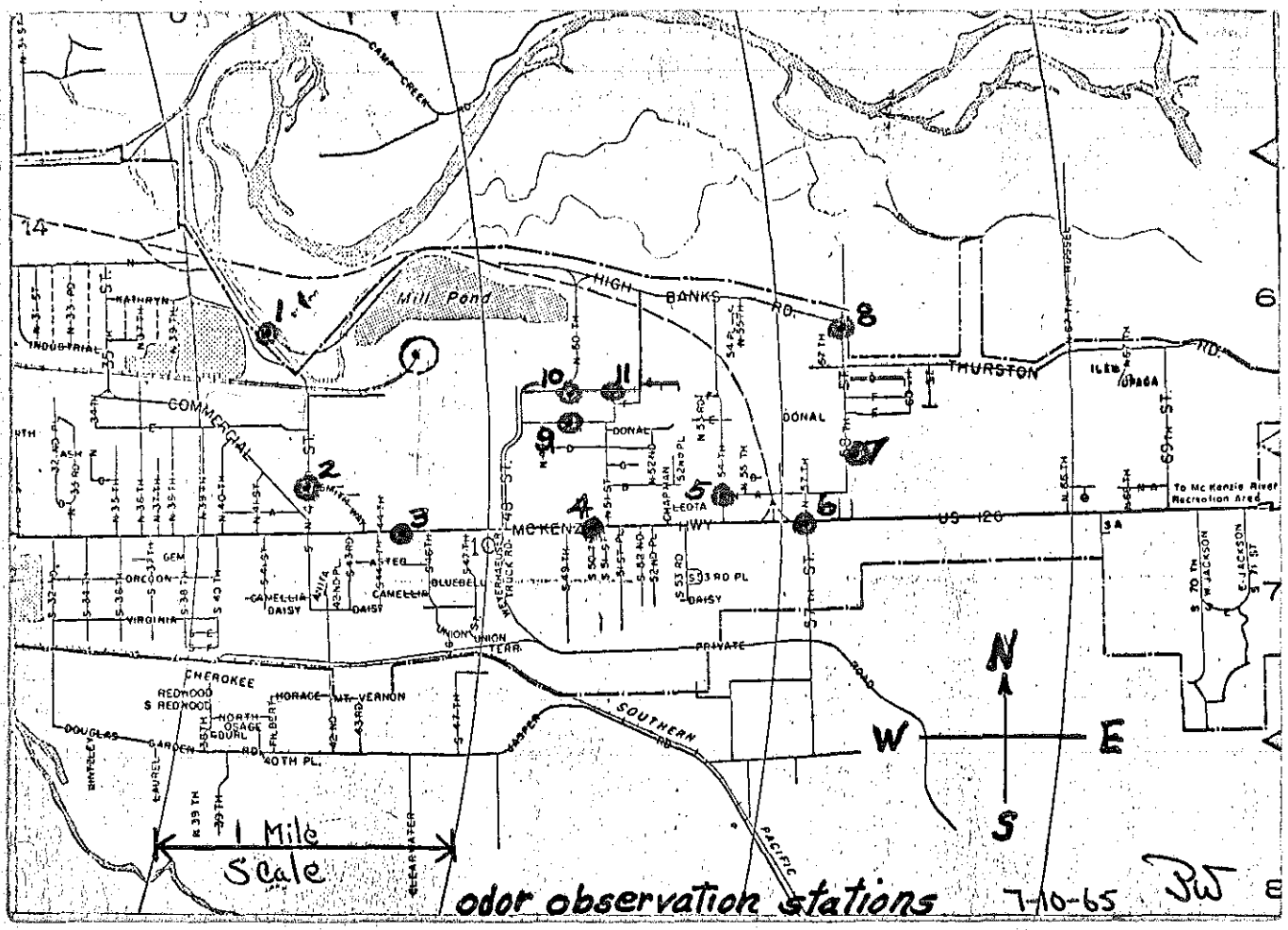
B. At each station the observer will make an observation on the minute every minute for a total of four observations. The first observation at each station should be conducted as soon as possible after arrival.

C. Each observation shall consist of four medium depth "sniffs" so carried out that they will last in total five seconds.

D. Each odor survey must include all stations listed under "Procedure A". More than one such odor survey may be completed each day.

* These instructions supplement OSBH-AQC-2-28-63--100

Appendix C


Mill Pond
HIGH BANKS RD.
THURSTON
COMMERCIAL ST.
McKENZIE HWY
US 126
To McKenzie River Recreation Area
PRIVATE ROAD
SOUTHERN PACIFIC
1 Mile Scale
N
S
E
W
odor observation stations
7-10-65

METEOROLOGICAL FACTORS INFLUENCING POLLUTANT DISSIPATION IN THE EUGENE-SPRINGFIELD AREA

General Weather

In summer, under the influence of the anticyclone over the Eastern Pacific, the area weather is sunny, warm and dry. Winter, however, is cloudy, cool and damp as a result of cyclonic systems moving across the area from the Gulf of Alaska.

Main Summer Effects

Solar heating. Strong insolation on summer days causes strong surface heating in the area. Consequently considerable thermal turbulence, and therefore effective mixing, is generated.

Sea breezes. Stable sea air penetrates the Willamette Valley and moves into the area on many summer afternoons and evenings. This increases stability during the evening and nighttime. In addition, it is possible under certain conditions for this oncoming sea air to cause fumigations.

Inversions. A persistent subsidence inversion aloft is present during the summer and fall. Surface inversions occur on clear nights. Both these conditions hinder dissipation of pollutants.

Canyon effects. Since the area is at the confluence of a number of canyons, it comes under the effects of their nighttime drainage winds. These winds can cause fumigations, and increase the stability of the air near the surface. In addition,

since the prevalent flow during the day is up the canyons, the evening change to down-canyon flow brings pollutants that had been collecting in the canyons just before the wind change back down and out across Springfield and Eugene.

Main Winter Effects

Canyon winds. The down canyon winds at night are an influence in the winter also. In addition, the canyons tend to channel the general windflow.

Late fall fogs. In the late fall periods of calm conditions and dense radiation fogs occur in the area. These are of concern because the calm winds hinder horizontal movement of pollutants and the inversion capping the fog essentially halts vertical movement.

Frontal activity. Fronts pass through the area quite frequently during winter. Conditions associated with frontal passages can result in fumigations.

METEOROLOGICAL CONDITIONS DURING THE PERIOD DECEMBER 29, 1966 THROUGH JANUARY 7, 1967

General Weather

The weather during the study period was generally cloudy and showery, with moderate winds. Fronts passed through Eugene just before midnight, December 31, and just after noon on January 4.

Atmospheric Stability

The twice daily (4 a.m. and 4 p.m. PST) radiosonde soundings made by the U. S. Weather Bureau at Salem provide vertical profiles of temperature, and thus indications of atmospheric stability, over the Willamette Valley. Although the temperature profile over Eugene cannot be expected to coincide in every detail with that over Salem, it is felt that during the study period the average stability of the air over Eugene is well represented by the Salem data.

For the period from December 29, 1966 through January 7, 1967, the stability of the lower atmosphere over Eugene can be most closely described as neutral. Neutral conditions are neither conducive nor restrictive to non-mechanical vertical mixing.

Winds

Wind data for the study were obtained from three sources: the AQC staff set up and maintained a wind system at Mohawk Shopping Center in Springfield, the Eugene airport observations were extracted from the U. S. Weather Bureau Hourly

Airways teletype transmissions, and data from the Springfield plant's wind system was requested from Weyerhaeuser Co. The three sources presented the wind direction data in such a manner as to prohibit direct comparison. However, the airport data indicated prevailing southerly winds varying from southeast through southwest, while the Mohawk data showed easterly or southerly winds prevailing, and the Weyerhaeuser data indicated prevailing winds somewhere from easterly through southerly. The wind data are summarized in Table M-1.

TABLE M-1

Summary of Wind Data
From Dec. 29, 1966 through Jan. 7, 1967

Mohawk Station

Direction	N	NE	E	SE	S	SW	W	NW
% Frequency	0	0	49	4	25	13	8	1
Avg. Speed (mph)	0	3	4	3	5	5	7.9	5

Eugene Airport

Direction	Calm	N	NE	E	SE	S	SW	W	NW
% Frequency	5	1	0	0	9	57	21	6	1
Avg. Speed (mph)	0	7.5	0	0	8	9	10	8.5	5.7

Weyerhaeuser Co.

Direction	0-90°	90°-180°	180°-270°	270°-360°
% Frequency	12	55	30	3
Avg. Speed (mph)	8.5	7	11	8.7

REFERENCES FOR H_2S AND ORGANIC SULFIDE

THRESHOLD LEVELS AND EFFECTS FROM PUBLISHED LITERATURE

I Odor Perception Levels

Compound	Threshold	Description	References
H_2S	1-80 ppb	Rotten eggs	1 (a), 2, 7
Methyl Mercaptan	41 ppb		7
Dimethyl Sulfide	3.7-430 ppb		7
n-Propyl Mercaptan	1.6 ppb		7
Organic Sulfides (mercaptans)	0.3-40 ppb	Decayed cabbage or onion, skunk	2, 3, 7

Note: The literature on organic sulfides is scanty. Most authorities agree they are perceptible at concentrations a tenth that of H_2S.

Their odors are described as like rotten vegetables, skunk, or just unpleasant or nauseating.
Ref 1 (a) states sensitive people may detect H_2S and organic sulfides down to 1 ppb.

II Levels of Record

The best discussion is in reference 1 (c). Measurements reported there were made during a study of air pollution in the Lewiston, Idaho--Clarkston, Washington area. The measurements were specific for hydrogen sulfide, and the levels were:

0-2 ppb	70-90% of the time in commercial and restricted parts of the cities.
3-9 ppb	28% Lewiston commercial district 7% Residential district above Lewiston
$\geq$ 10 ppb	3.7% Lewiston commercial district 0.5% Residential district
The average was around	2 ppb
Daily maximum was	14.4 ppb
2-hour maximum	51 ppb

The principle source was a kraft mill about 1 mile from Lewiston, and two miles from Clarkston. The levels measured are near the low limit of published minimum odor perception levels. Unfortunately, levels of organic sulfides were not specifically measured. The levels of all odorous gases together were enough to generate vigorous complaints and eventually an official request from the Clarkston mayor for a Public Health Service study of the problem.

III Occupation Health Consideration, Toxic Effects

The American Council of Industrial Hygienists has allowed H_2S at 10 ppm for eight hours as a threshold limit concentration. This would presumably be for healthy humans who would be exposed for only eight hours per day. Obviously, levels in ambient air must be lower to prevent nuisance levels and levels injurious to the health of the very young and very old, and to people already suffering respiratory diseases.

Reference 3 has a table as follows:

H_2S ppm	Local Effects	Systemic Effects
10 ppm	Threshold	Threshold
50	Irritant to conjunctival & corneal epithelium	
50-100	Eye & respiratory tract irritation in one hour	
100-150		Slight systemic symptoms after several hours
150	Olfactory nerve paralysis	Fatal in 8-48 hours
200	Pulmonary edema after long exposure	Nervous system depression
250-350		Fatal in 4-8 hours
350-450		Fatal in 1-4 hours
500-600		Excitement, headache, dizziness, unconsciousness, death in ½-1 hr.
600-700		Rapid collapse, death in 2-15 min.
700-2000		Cessation of respiration, rapidly fatal

Note: 10 ppm, the threshold exposure, is 10,000 ppb, 200 times the maximum measured in Lewiston.

The organic sulfides are less toxic, and by factors of 20-140 (4).

IV Paint Damage

Reference 1, pp 73 and 118 states that blackening of paint by H_2S depends on several factors, the least of which is the concentration of H_2S. The concentration only affects the rate of blackening, but any concentration will, in time, blacken paint if other conditions are present. These are:

1. The paint must contain lead pigments.

2. The paint film must be wet, regardless of humidity.

IV Paint Damage (Continued)

3. The surface should be weathered (presumably discontinuous), at least not glossy.

Note that the type of lead pigment is not important, and that the blackening varies directly with the amount of lead present. (See also reference 8)

V Silver Tarnishing

Reference 1, pp 108-117, contains a description of experiments with silver tarnishing, of electroplated samples, in the Lewiston, Idaho--Clarkston, Washington area. Normal ambient temperatures in that region (monthly averages from November to April, the time of the study reported in this reference, ranged from 32 to 53°F) had practically no effect on the tarnish rate, and the critical level of humidity for silver to tarnish, if it exists at all, is very low.

A short period of high H_2S concentration can have a drastic effect on silver, tarnishing it so badly it becomes almost insensitive to lower levels. The mechanism is one of forming an almost impervious film of silver sulfide. The reference notes that an atmosphere conducive to silver tarnishing would probably be similarly conducive to accelerated corrosion of other metals and alloys, notably iron and steel.

In reference to both of the foregoing sections, the OSSA's Air Quality section has noted that where gaseous sulfide levels are high enough to be a continuing odor nuisance, (about 10 ppb) often there is also paint damage to the extent that the life of a coat of paint is decreased by a half or more, and that metal corrosion (automobile trim and even panels, metal window and door sashes) also is accelerated.

VI Standard Adopted by State Laws

Two states, New York and California, have written limits on allowable H_2S in their standards. New York (5) has set 0.10 ppm (100 ppb) for 1 hour as the ambient air quality objective. California (6) has defined these levels:

"Adverse"	"Serious"	"Emergency"
Sensory irritation possible	Alteration in bodily function, likely to lead to chronic disease.	Acute sickness, death in sensitive people.
0.1 ppm for 1 hour	5 ppm-Interfere with appetites of sensitive people. Loss of smell at 100 ppm for exposure to 15 min.	Several hundred ppm-Acute sickness and death, neurotoxicity.

References:

1. A study of Air Pollution in the Interstate Region of Lewiston Idaho and Clarkston, Washington. Public Health Service, Division of Air Pollution. 1964.

   a. Page 73, Quoting Wright, R. H., "The Reduction of Odors from Kraft Pulp Mills". Technical Bulletin #27. British Columbia Research Council, Vancouver, Canada. 1961; and others.

   b. Ibid, Page 75.

   c. Ibid, PP 74-92

2. Dudley, H. C. and J. M. Dalla-Valle. A Study of the Odors Generated in the Manufacturing of Kraft Paper. Technical Association Papers 22: 312-315, 1939.

3. American Association for the Advancement of Science. Air Conservation, 1965. Page 69.

4. Bergstrom, H. Pollution of Water and Air by Sulfate Mills. Pulp and Paper Magazine of Canada. 54: 135-140, November 1953.

5. New York State Air Pollution Control Board.

6. California Administrative Code.

7. Manufacturing Chemists Association. Air Pollution Manual, 1952. Chapter 5, pp 16-17 (Table III).

OSBH - AQC
4/13/66 - 50

1-6-67

Sheet 1-2

Weyerhaeuser Co. Springfield — Stack Emission Data Summary

pounds per day (unless indicated otherwise)

	Old Recovery* Before Start	Old Recovery* After Start	Old Recovery** 1967 data	New Recovery* After Start	New Recovery** 1967 data	New Recovery** with Oxidation	Old Kiln* Before Start	Old Kiln* After Start	Old Kiln** 1967 Data	New Kiln* After Start	New Kiln** 1967 data
Total Solids	6690-19950	6690-19950	9,349	3300-6670	6,772	—	1405	1405	1284	497	1196
Na^{+} as Na_2SO_4			8954		5,939	—			1051	1	8841
Ca^{++} as CaO			—		—	—			3.8		52
Hydrogen Sulfide***	2600?	1820	1870	2250	1311	456	169	63	10	87	88
Methyl Mercaptan***	1290?	1290	439	814	363	190	172	167	5	72	18
Temp °F	250-270°	250-270°	251°	292-305°	276	—	158°	158°	156°	167°	173°
Flow cfm	153,000-174,000	same	174,800	260-300,00	302,000	—	36,500	36,500	36500	59,700	57,000
Velocity, fps	51-58	51-58	58.6	38-45	44.6	—	21.6	21.6	21.6	35	33.7
% Water	28	28	28	28	28	—	32	32.	28.7	37	40.2

* 2-11-66 letter, calc. rev. 3-30-66

** 1-5-67 letter, calc 1-6-66

*** Where a range was given, the higher figure was used

Weyerhaeuser Co., Springfield
Stack Emission Data Summary

1-6-66

Pounds/24hrs

Total Solids

Recovery Furnaces

Prior to Start up — 6,600 - 19,950
After Start up, 1966 data subm. — 9,990 - 24,630
" " 1967 data subm. 9,349
6,772 — 16,121

Lime Kilns

Prior to Start-up — 1405
After Start-up 1966 data subm — 1902
After start-up 1967 data subm 1284
1196 — 2480

Hydrogen Sulfide

Recovery Furnaces

Prior to start up — 2600
After Start up, 1966 data subm. — 4,070
After start up, 1967 data subm. 1870 or 1870
1311 or 456 — 2326 - 3181

Lime Kiln

Prior to start up — 169
After Start up, 1966 data subm — 150,
After Start up, 1967 data subm 10
88 — 98

Methyl Mercaptan

Recovery Furnaces

Prior to Start up — 1290
After Start up 1966 data sub — 2104
After Start up 1967 data sub 439 or 439
383 or 196 — 529 - 802

Lime Kiln

Prior to Start up — 172
After Start up 1966 data Sub — 239
After Start up 1967 data Sub 5
18 — 23

Water

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

		Pounds per 24 hrs.
TOTAL SOLIDS		
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WARER VAPOR		Gallons per day
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		Pounds per 24 hrs.
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		Gallons per day
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS			Pounds per 24 hrs.
Recovery Furnaces			
Prior to start-up			6,600-19,950
After start-up, 1966 data submitted			9,990-26,620
After start-up, 1967 data submitted	9,349*		
	6,772		16,121
Lime Kilns			
Prior to start-up			1,405
After start-up, 1966 data submitted			1,902
After start-up, 1967 data submitted	1,284		
	1,196		2,480
HYDROGEN SULFIDE			
Recovery Furnaces			
Prior to start-up			2,600
After start-up, 1966 data submitted			4,070
After start-up, 1967 data submitted	1,870-1,870		
	1,311	456**	2,326**-3,181
** With oxidation			
Lime Kiln			
Prior to start-up			169
After start-up, 1966 data submitted			150
After start-up, 1967 data submitted	10		
	88		98
METHYL MERCAPTAN			
Recovery Furnaces			
Prior to start-up			1,290
After start-up, 1966 data submitted			2,104
After start-up, 1967 data submitted	439-439		
	383	198**	529**-802
Lime Kiln			
Prior to start-up			172
After start-up, 1966 data submitted			239
After start-up, 1967 data submitted	5		
	18		23
WARER VAPOR			Gallons per day
Recovery Furnaces			
Prior to start-up			253,000-288,000
After start-up, 1966 data submitted			688,000-766,000
After start-up, 1967 data submitted	292,000		
	486,000		778,000
Lime Kilns			
Prior to start-up			88,100
After start-up, 1966 data submitted			238,000
After start-up, 1967 data submitted	71,800		
	153,000		224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.

SUMMARY OF STACK EMISSION DATA

Weyerhaeuser Co.-Springfield

January 10, 1967

TOTAL SOLIDS		**Pounds per 24 hrs.**
Recovery Furnaces		
Prior to start-up		6,600-19,950
After start-up, 1966 data submitted		9,990-26,620
After start-up, 1967 data submitted	9,349*	
	6,772	16,121
Lime Kilns		
Prior to start-up		1,405
After start-up, 1966 data submitted		1,902
After start-up, 1967 data submitted	1,284	
	1,196	2,480
HYDROGEN SULFIDE		
Recovery Furnaces		
Prior to start-up		2,600
After start-up, 1966 data submitted		4,070
After start-up, 1967 data submitted	1,870-1,870	
	1,311 456**	2,326**-3,181
** With oxidation		
Lime Kiln		
Prior to start-up		169
After start-up, 1966 data submitted		150
After start-up, 1967 data submitted	10	
	88	98
METHYL MERCAPTAN		
Recovery Furnaces		
Prior to start-up		1,290
After start-up, 1966 data submitted		2,104
After start-up, 1967 data submitted	439-439	
	383 198**	529**-802
Lime Kiln		
Prior to start-up		172
After start-up, 1966 data submitted		239
After start-up, 1967 data submitted	5	
	18	23
WATER VAPOR		**Gallons per day**
Recovery Furnaces		
Prior to start-up		253,000-288,000
After start-up, 1966 data submitted		688,000-766,000
After start-up, 1967 data submitted	292,000	
	486,000	778,000
Lime Kilns		
Prior to start-up		88,100
After start-up, 1966 data submitted		238,000
After start-up, 1967 data submitted	71,800	
	153,000	224,800

* In this column-top figure represents old recovery furnace, bottom figure represents new furnace.