

ROBERT T. WALSH,

called as a witness, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

THE WITNESS: My name is Robert T. Walsh. I am with the Federal Environmental Protection Agency. My position is chief of the Performance Standards Branch of the Standards Development and Implementation Division of the Environmental Protection Agency.

The principal responsibilities of the Performance Standards Branch are the development of performance standards for new stationary sources of air pollution pertinent to Section 111 of the Clean Air Act of 1970. I believe there was testimony entered into the record earlier, in one of your earlier hearings, that I had presented at a similar meeting in the State of West Virginia. This had to do principally with the control of sulfur dioxide in power plants as related to the new source standard of performance that was promulgated by the Environmental Protection Agency December 23, 1971. I have modified this testimony to a slight degree. It no longer speaks so much to the West Virginia problem.

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I have added just one small portion that speaks to the installation of the Union Electric Limestone scrubber at St. Louis, and have added a table that lists the several installations that are now going on on limestone scrubbers and lime and magnesium oxide as well as the Wood River cat-ox system.

B19 I believe in discussing your needs that you also would like me to speak on a few other points here.

Now, I might say that this testimony as prepared was on fairly short notice. I did not have time to tailor it to the Illinois situation regarding existing units. I think your regulations for new steam generators is essentially the same as the federal regulation. I have not gone over all of the details of it.

I think a couple of minor discrepancies were brought out this morning such as the definition of what is a new source, and I think there was a point on how you calculate sulfur dioxide emissions when there are mixed fuels.

I think, as I understand your regulation, it requires a limit of 1.8 pounds of sulfur dioxide per million btu's of heat input, and this limit

would be applied, I think, May 30, 1975. That would be approximately three years. This would seem reasonable from the knowledge that we have picked up in considering new source standards. I think you are assuming that you leave the option of both low sulfur fuels and scrubbers, the economics and the practicalities of the situation will dictate one or the other.

In setting our standard, we decided that a new source, it was determined when a firm contract was signed with the vendor, designer of the equipment, and it may or may not precede ground breaking. In the case of large steam generators, I assume this would mean about a five-year lead time.

Now, the lead time for the boiler and turbine is usually considerably longer than the scrubber when it is required, and so on a new installation the lead time is about two years to design and construct a calcium-based scrubbing system. So it would appear then you have two years plus about one year in which the utilities could decide what is the best system for their particular situation. The times on this lead

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time might vary a bit on a retrofit system as contrasted to a new unit.

The point also was brought up on deterioration of collection efficiencies for particulates. Our experience has been, and this applies principally to electrostatic precipitators which have been the principal particulate collector in the past, it is also feasible to use scrubbers of course and fabric filters can be applied to coal-fired and oil-fired if need be. But almost the entire experience in the utility industry has been with precipitators.

There certainly have been instances where precipitators have, I would not say lost their efficiency, but they do not perform as well one or two or five years after they were installed. This is kind of an ongoing argument between the designer and the operator, but we have discussed this at length with designers, manufacturers of precipitators. They maintain there is no really good reason why a precipitator will not function five or ten years later as well as it did when it was put in. It is a matter of maintenance and the operation of basic equipment that feeds gas to the

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precipitator.

In looking through information to document this, we found a few items where they had been tested, one time tested a few years later. We also found installations that were three or four years old, were found to meet their original guarantee. We could not get a record of the original test. We have a case of an incinerator in Europe that was tested at about two and one-half year intervals, got about the same high efficiency in the range of .02 to .04 grains per standard cubic foot.

A basic oxygen furnace as operated by the Ford Motor Company in Michigan was tested on an interval of 1964 to 1974, on two different throughputs at two different oxygen blow rates, and found they have the same efficiency in 1971 as it had in 1964.

Our own test crew has tested a unit of Consolidated Edison in New York. It was some three to five years after it was originally installed with a guarantee of 98.5, and we got an efficiency ranging from 98 to 98.8. We also recently completed a test of a precipitator on a catalyst

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regenerator at a West Coast refinery. It had been in for several years, and it was also still in the original design efficiency range, down around .02 per standard cubic foot. This range, I might point out, of .01 to .03 usually puts you in the high 98's to the middle 99's percent efficiency.

I think another point concerned sulfuric acid mist. Your regulation for existing sources would require an acid mist emission limit which is essentially identical to our new source standard which is 0.15 pounds of acid mist per ton of acid produced. This is equivalent to less than one milligram per standard cubic foot. There has been a question on this standard with the industry. I think it has been resolved to our mutual satisfaction. We proposed a test method for measuring both acid mist and sulfur dioxide in series. It uses an isopropenyl impinger and filter, and then the material in the impinger is titrated as acid, and this determines the acid mist concentration.

Being as there are several methods of measuring acid mist, the industry brought out various points that this might not be attainable. We tested three different plants and found that

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they all were down in the range of .08 to some as low as .02. The highest of ten samples was, on three different plants, was .15 which was the actual limit. These were achieved with conventional high density, and what they term panel demisters. The three plants are significant in that they represent a wide range of operation. One is a newer type of dual absorption plant which gives a low sulfur dioxide emission around the range of three pounds per ton to four pounds per ton. This meets our new source standard both for sulfur dioxide and acid mist.

On those they have an acid mist eliminator between the two acid stages as well as on the tail end. The second was a conventional single pass acid system with a sodium sulfite scrubbing system, and this also used a high mist acid eliminator, and was able to meet the standard, ranged from .04 to 1.5 pounds per ton.

Thirdly, we looked at a single absorption plant that manufactures both sulfuric acid and oleum, fuming sulfuric acid. It didn't have any type of SO_2 control on it. It also had the high density tubular demister, and the concentrations in terms of pounds per ton ranged from .07 to .09.

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I think this essentially backs up the contention that your standard can be achieved if you use the test method that was specified in the Federal Register for the New Source Standard. I think the acid mist is somewhat like the particulate matter in that the standard and limits have to be compatible with the test method. With a different test method you might be able to achieve a more stringent or a larger limit.

I think that covers the principal areas of testimony.

HEARING OFFICER LAWTON: Are there any questions of Mr. Walsh.

CROSS EXAMINATION

By Dr. Roberts:

Q Mr. Walsh, I just have a quick question on the last topic that you were addressing, namely the testing method for sulfuric acid mist. In our regulation we state that sulfuric acid mist, this is on page 38, if you have a copy of our regulation, the regulation as proposed this morning, page 33, pardon me -- I am sorry. If you will wait a second, I will get the proper citation. This is on page 30

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of the document that was handed out this morning. It appears as Rule 204 (e)(2), sulfuric acid mist and sulfur trioxide measurement. It states:

"Measurement of sulfuric acid mist and sulfur trioxide shall be according to the barium-thorin titration method as published in 36 Federal Register 24893."

Now, is this the method that you refer to as the method which is compatible with your observations as to the ability of sulfuric acid plants to comply with the sulfuric acid mist regulation?

A Yes. That is the December 23 publication?

Q To the best of my knowledge it is.

A Yes, the number, if that is the right number, that is correct.

Q We will check that citation ourselves and make sure that it is the December 23 method recommended by the Federal Environmental Protection Agency for New Source Performance Measurements.

A Yes. It recommends the referenced method, use this method for something that you show to be equivalent.

Q I have a short question. You did not

discuss visible emission standards. There are Federal New Source Performance Standards governing visible emissions. Particularly you require a new source greater than 250 million btu to meet a No. 1 Ringelmann. First, do you feel that this is attainable? It comment on its reasonableness?

A Yes. we found in our survey of coal-fired boilers and oil-fired boilers that if they met the particulate standard they would be usually far less than -- we have now deleted the Ringelmann No. 1 in our regulation. Everything is in terms of opacity. It amounts to the same thing. It is a little redundant. You don't find that much black smoke any more.

Q Now, you also say that you will allow, if I can just refer to the opacity statement, instead of the Ringelmann you will allow opacity greater than 20 percent but not greater than 40 percent for periods aggregating two minutes in any 60-minute period. What is the purpose of this exception and is it a reasonable exception?

A The purpose is to accommodate periods of soot blowing, and we found it to be reasonable, that the boilers that we looked at sometimes were higher

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during the soot blowing period.

Q Statements have been made to the effect that sources that have multiple units attached to a single stack can have trouble meeting such a two-minute restriction in any 60-minute period, no more than four times in any one day. Basically then you have a total of eight minutes of soot blowing out of one stack, I presume, or does this refer to any one boiler?

A Our standard, a boiler is a unit, and so the standard refers to the boiler as the pollution source. It becomes a little complicated in actually enforcing the thing if there are multiple boilers attached to one stack. 250 million btu per hour, you don't really find it too often. I may have to bite my tongue when I find that someone has put a 1,000-foot stack in and put a lot of boilers into it.

Q According to you, as you see the New Source Performance Standard, if one had five units hooked to one stack, one could in an hour put out ten minutes worth of opaque emissions within the bounds of 20 to 40 percent, assuming they could justify that in truth it was a sequential soot

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blowing?

A Yes, if they connect the emissions with the particular source.

Q Let me give myself a quarter of a minute to consider whether we have covered all of the New Source Performance Standards that we have entered and incorporated in our proposal.

There is a visible emission standard for Portland Cement plants. Could you comment on the reasonableness of that? It requires one-half Ringelmann or 10 percent opacity.

A From the kiln, yes, that is compatible with ours.

Q Could you comment on its reasonableness?

A Yes, we found that the best controlled plants that we saw tended to be controlled with fabric filters. There were some close. The best units had no visible emissions whatever.

Q What you are saying in effect then is your visible emission standard for Portland Cement is compatible with your emission limit for Portland Cement plants, new?

A Yes.

Q Would you say that your visible emission

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standard for fuel combustion units is compatible with your fuel emission standard?

A Yes.

Q If one were to meet the one-tenth of a pound per million btu, proper operation, he might be reasonably well assured of meeting the 20 percent opacity and vice versa?

A Not so much vice versa. The primary standard we used was the mass emission. There were units we found for instance that had visible emissions less than 20 percent that had more than the .1 pounds per million btu.

Q You are saying enforcement strategy relying solely on visible emission would not be suitable?

A There would be some that would slip by.

Q If a plant though violated the visible emission regulation, is it likely he would be in violation of the fuel combustion mass emission?

A Yes, the converse would be true.

Q You do not state in your visible emission regulation that I know of an actual procedure for conducting a visual observation, do you?

A There is a method, on the last page or so

of the Federal Register appendix, visual determination of the opacity.

Q I will refer to that.

DR. ROBERTS: Thank you very much.

By Mr. Prillaman:

Q I just have one question. There has been a lot of testimony, most of which has been controversial, on what words such as commercial availability, adequate demonstration, and that kind of thing mean, and a lot of it centers around what the National Academy of Sciences has defined as available technology. Being a layman, I am confused as to why that definition or any other type of definition should be embraced by this Agency, the Board, or by you. Would you comment upon whether or not you embrace that definition, and if you don't, why not?

A I think the definition you are speaking of was the one that was put together by the National Academy of Sciences on what the commercially demonstrated sulfur dioxide had to do, had to be in operation for a year. This really is not part of the Act at all. The National Academy has no legal impact. This was their opinion concerning -- I

wouldn't say exactly what the Academy based all of their opinions on. But our New Source Standards had to go with just the verbiage of the Clean Air Act, the direction that was found in both the Senate and the House bills that preceded the final bill, and their statements in there certainly would not indicate that that would be constrained to that degree. It is the degree of control that can be achieved with equipment that is available, and I think it is a judgment on the part of the administrator, technical judgment, as to whether some system has been demonstrated to a point where it can be applied to sources.

Consider the history and the need for it, the time they have put in.

22 Q When you say you consider the need for it, you are injecting a new consideration into that definition.

A If you didn't have a need, you wouldn't establish a new source standard. Maybe that is not germane to this argument. I think we try to use essentially the same definition for all of our New Source Standards. You get the intent of Congress into the standard, namely that control techniques

that are available be applied, and it is much less expensive to put them on when the equipment is built than to have to retrofit the installation a few years later, cramped for space, and what have you.

MR. PRILLAMAN: Thank you.

MR. POWELL: My name is Richard Powell, attorney for Commonwealth Edison.

Q What degrees do you hold?

A I have a Bachelor of Science degree in Chemical Engineering, a licensed chemical engineer in the State of California.

Q If I understood correctly your response to questions of Dr. Roberts, you said that a source could comply with your emission regulations and never be in violation of your opacity test, is that correct?

A Yes, I said if they meet the mass emission limit. We found that all the ones that meet the mass emission limits also could meet the 20 percent opacity.

Q Under what temperature conditions did you examine those stacks?

A Normal temperature that they operate.

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Q What was the outside ambient air temperature?

A Well, the tests on these were conducted like in March, I guess. Observations were made both in warm and cool days. I cannot really tell you.

Q Isn't it a fact that a fuel combustion source which meets the emission limit proposed by the Agency could under certain climatical conditions because of the emission of water violate the opacity standard?

A Not our standards. We don't consider water as being, if something is only water, it would not be in violation.

Q Can someone who is judging the opacity of emissions based on a Ringelmann chart distinguish between water vapor and a particulate vapor?

A You realize a Ringelmann chart is for black smoke. Usually a modern boiler won't have black smoke. They will have white, gray, something like that.

Q You believe that the application of your test, the two are totally consistent?

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A You are down in the very low range, barely visible emissions is what you are talking about, something less than 20 percent.

Q Really it serves no purpose for a fuel combustion emission source which meets a particulate standard to meet an opacity standard if they are identical standards?

A They are not identical. It is ease of enforcement. It is less expensive to teach a person to read a stack visually.

Q In view of the extensive testimony put into this record by people who actually operate fuel combustion boilers, you can meet the particulate limitation but violate the opacity test because of the evaporation of water. Wouldn't it be a more reasonable regulation to make it a defense to an opacity charge that you are in fact complying with the particulate level?

A You mean if you could show 30 percent opacity and show you are below the mass rate?

Q Yes.

A It would be a defense. It would be another piece of judgment. You are worried about coal-fired units, I think. You are talking about

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water vapor. Really there is less water vapor in the plume from a coal-fired boiler than there is from oil or gas. In fact, much more from natural gas than from either of the other two fuels. It is not a problem with gas-fired units.

Q It is a problem for all of them.

A Well, I wouldn't agree to that.

Q It is a problem for a water cooling tower, isn't it?

A I think you could easily discern water vapor from smoke.

Q Your smoke readers will be trained to discern water from smoke?

A Yes. They do it in several agencies around the country, been doing it for several years.

Q On page 1 of your testimony you said that the New Source limits reflect technology which the Environmental Protection Agency considers adequately demonstrated. How do you define adequately demonstrated?

A It is a judgment factor of the administrator. We don't have a firm definition if you are looking for that in writing.

Q You cannot tell us what considerations are

taken into account?

A Well, the technology has to be available at a price.

Q How do you determine whether or not it is available?

A We survey what is being done, what has been done, to determine if this thing can be applied. This was done in all five of the standards.

Q With particular reference to the sulfur removal technology, what are the standards which determined whether or not it was available?

A Well, you have to consider everything, both the plants that are using it, have used it as far back as in the 1930's. The pilot installations that have gone on, that show really better -- our standard requires something like 75 percent control of three percent sulfur coal. If you go with lower sulfur coal, you would need less control. And really the pilot information would indicate that you could go to a higher level. We felt that we had to stick with the 70 percent because that was really what had been demonstrated, the calcium systems that had been demonstrated, rather than the sodium systems, would indicate considerably greater removal but really

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a question of what to do with the end products.

Q The degree of efficiency required, that you are going to be requiring for new sources, varies, does it not, depending on the sulfur content and the btu content of the coal?

A Yes.

Q What is the upper range, for example, a coal typically burned in Illinois?

A What is coal typically burned in Illinois? Four percent?

Q It varies.

A The 75 percent, the idea would be, the upper range would probably be three percent if demonstrated SO₂ scrubbing unit was the only thing there. You could put a second stage on, wash the coal from four percent down to three percent, then scrub it. You could do what the state here is doing. They have apparently set a limit of 1.8, which is about 72 percent control of average Illinois coal.

Q Assume that Illinois coal ranges in sulfur from three percent to 4.8 percent, the btu from 9,900 to 11,300.

A You might have to be selective about what

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coal you burn.

Q Does it sound right that the efficiency required would be in the range of about 81 to 87 percent on that combination?

A Is that one percent of the total coal supply? It is kind of facetious to put that kind of argument. If you had a coal with 8,000 btu and five percent sulfur, it would require a large efficiency, yes.

Q Is it your testimony that technology at that efficiency is available?

A We have only testified it is available at the 75 percent level.

Q And only for three percent coal?

A No, coal as it goes into the boiler would be three percent. Actually you could wash that coal. Our studies indicate that you can wash most of the Illinois coal down to three percent. You could wash it before you burn it.

Q What is the btu content of your coal under that example?

A I did not bring that information along with me.

Q It is 12,500, isn't that correct?

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A I told you I didn't bring it.

Q Does that sound right?

A It is probably in that range. You have fairly high btu coal.

Q Do you know of any that is 12,500?

A It seems to me I have seen Illinois coal analyses that were in that range.

Q Check Mr. Risser's testimony in this case as to what the averages are.

A You don't have any coal with that btu? I have trouble understanding what you are saying.

Q Now, precisely which technologies of the many ones that you discuss in your paper do you consider to be available?

A The limestone injection and limestone scrubber.

Q They are the only two?

A Yes, if you are talking about the cat-ox system, the magnesium oxide, and the sodium systems. There are additional ones besides that.

Q Which are specifically the precise systems that you include within your definition of technology that has been adequately demonstrated?

A Limestone injection and the limestone

scrubber. The limestone injection followed by a scrubber.

Q Is anyone working on the injection system any more?

A You mean dry limestone injection?

Q Yes.

A I think they have decided it only gives 50 percent removal unless you use a scrubber on the end of it, depending on what the requirements are.

Q What are the facts that led you or the Agency to say that the wet limestone scrubbing is available? What documents do you have to support that?

A You mean the tail end scrubbing?

Q Yes. What wet limestone scrubbing do you say is available?

A The Kansas Power & Light, Combustion Engineering is a boiler injection followed by a scrubber as opposed to the Banco which is a tail end limestone scrubber.

Q Which one is included in your definition of technology which has been adequately demonstrated?

A The lime system and the boiler injection.

Q Are there any others? On what basis do

you think that the Bahco system is available?

A They are getting well in excess, they are working on oil-fired units, but they are getting well in excess of the high 90's percent removal. They are operating on 25 megawatts.

Q Is there any difference in the technology required for oil firing as opposed to coal firing?

A I don't see why there would be. The technology is available to take particulate matter out of flue gases. You take particulate out of coal-fired gases in the same way.

Q You are saying you not only have to put in a scrubber, put in a precipitator ahead of it?

A Yes.

Q Even though in your determination of the cost of sulfur removal technology you take a credit for not having to install a precipitator?

A There is such a range, I think it overshadows the cost of a precipitator. The precipitator is fairly small compared to the scrubbing system.

Q You deducted across from \$6 to \$15 per kilowatt for not having to install a scrubber. You

said there was a savings.

HEARING OFFICER LAWTON: Scrubber or precipitator?

By Mr. Powell:

Q The precipitator?

A There are all kinds of combinations you can come up with.

Q What is the current cost per kilowatt of precipitators?

A Those were down in the range of \$4 to \$8 a kilowatt. I think a lot of people have been quoting numbers up as high as 15. If you were putting something like this in, you may or may not want to go to the real high efficiency. You might want to put something in that would give you a low efficiency precipitator followed by a scrubber. If you had an outage of a scrubber, you would still get a collection of particulate. You wouldn't have to shut it down to prevent excessive discharge.

Q Would you be violating any standard?

A It depends on what standards there were.

Q Would you be violating new source standards?

A You are going to have breakdowns I don't care who has standards. You are going to have

equipment breakdowns. These will have to be handled on a case by case basis.

Q Now, you say that the Bahco was one of the scrubbing systems that you determined is available. It is based solely, is it not, on the experience on oil-fired installations, not one of which is greater than 25 megawatts?

A Yes, that is right.

Q It is your testimony that you can extrapolate that technology from a 25-megawatt boiler up to an 800-megawatt boiler?

A Yes.

Q Did you consult Research Cottrell in making that determination?

A We have consulted with any number of companies.

Q Research Cottrell is the Bahco licensee in the United States, are they not?

A I believe they are.

Q In Environmental Science and Technology, the issue of January 1972, an interview with the chief executive officer of Research Cottrell, he is quoted as saying, "But it is important to note that the process would not be applicable to the

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large 800 to 1,000-megawatt units that are being built today."

On what basis does the Environmental Protection Agency disagree with Research Cottrell?

A Research Cottrell has picked up the Baheo unit and put it in 40-megawatt modules that they think, they have done some market research, and they think there is a call for this thing. Never had any real indication that the thing cannot be, it would be applied in modules. For instance, they did not say they would not take and put ten of those units on a 400-megawatt. They have implied they maybe want some little experience here to go to an 800. I did not read that exact article. Whether it is taken out of context, I have no idea. The system of lime scrubbing, I see no reason why it is restricted to 400 or 800 megawatts.

Q. You testified that you believe that the technology for an oil-fired boiler, 25-megawatts, could be extrapolated up to a coal-fired boiler of 800 or larger. If that is true, why could not the units at Kansas Power & Light, Lawrence, be successfully extrapolated from 125 megawatts to 400 megawatts?

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A Who said there weren't?

Q Is it your testimony they are?

A They are operating a 400-megawatt unit.

Q At what efficiency?

A They maintain they have not tested it, but they feel they are getting around, that they are utilizing most of their lime, probably in the 65 percent range.

Q Have they had any problems?

A I am sure they have had problems. You don't start up something like that without a few problems, but you persevere.

Q How long has the 430-megawatt unit operated?

A It just went on in December. They may have had one week of operation in the fall, and they found they had to inject the lime in a different spot, the limestone into the boiler, and they did make that modification which took a few weeks and then went back on in December. They have had some outages in that period.

Q How many outages?

A I really don't have a log on that. I don't think anyone has except the plant.

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Q For how long a period of time have they had outages?

A We have just talked with the operator. He says that he is happy with the results to date.

Q Didn't he tell you that they had to derate the unit?

A No. This is a new boiler, I might add. They are taking it slow. They don't want to cause problems. I think that is true in starting up many new boilers. You don't operate fully.

Q Isn't it a fact they still have scaling and erosion problems on the smaller unit that has been operating since sometime in 1968?

A Basically there is a chemical process. Like any chemical process, you have to determine the operating parameters. What they have done is look very carefully at what they can do as far as slurry content, pH, and find out what ranges are optimum, and after just going through a lengthy discussion with the people out there in December, they explained to us what they had done, and they felt they knew the ranges that they could operate and not have a problem.

Q Isn't it a fact that they have been

operating the scrubber on the smaller unit at about 50 percent efficiency in order to avoid scaling?

A No, 65 percent a lot of times. They operate it as high as 90 percent at some times. When tested last spring, they operated at 70 percent.

Q When they get above 70 percent, don't they get scaling which makes them shut down?

A The scaling is easier to control at lower efficiencies. That is why they don't go to 90.

Q At what efficiency can they control?

A They feel they can control between 65 and 75.

Q So 75 is the upper limit of what they feel?

A It is a generalization.

Q Even though they operate at a lower efficiency to control scaling, isn't there still a corrosion problem?

A The corrosion problem gets into the pH, the acid base thing, and really I think, too, at too low a pH they get somewhat better removal

efficiency sometimes, but they corrode -- that is why they have the ranges in different parts of the system. They control different pH ranges. They try to stay away from the very acid pH which is down below three or four.

Q Did I hear you correctly, did you say the lower the pH the better the removal efficiency?

A For some things they are okay.

Q Isn't it the other way around?

A If you could operate at a high, you get a scaling. They get fairly good removal down in low pH ranges.

Q Fairly good being what, 50 percent?

A No. They have never been able to run a curve, you see. It is a case of getting out all of the variables and deciding which is the optimum area.

Q On the little unit, what was the longest period of continuous operation at or above 75 percent removal?

A They don't keep a continual log, according to what we have on that, of the removal efficiency. They say four or five weeks, that they operate for four or five weeks. They bypass, go in and look at

it, check it out. If they had to make changes, they would do it. Their basic period of testing was three months in 1971. They operated pretty much continuously on coal except for these intermittent inspections.

Q That is when they did get scaling, didn't they?

A They had scaling problems.

Q They had to shut down for maintenance?

A They weren't shut down necessarily for maintenance. What they did, they had this very carefully observed situation where they tried to figure all of the variables in this system, and so they would have a periodic shutdown just to inspect the internals to see that nothing was going wrong.

Q But they also had shutdowns for necessary maintenance because of scaling?

A I can't tell you exactly that answer. I don't think anybody can except the KPL.

Q That is a relevant factor in determining whether or not the technology has been adequately demonstrated?

A It is to be considered.

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Q You don't have the facts to consider it?

A In going over the technology with them, we still consider the thing to be demonstrated.

Q You say in the course of your paper somewhere that the Kansas Power & Light system has great flexibility built into it. Is that flexibility other than the ability to operate on natural gas?

A It is the ability to bypass the unit.

Q Have you made tests to see whether when they bypass they are complying with your proposed new source regulations?

A I am sure they wouldn't be.

Q So then it would be your view they can operate in violation of the new source regulations if it is necessary to do so?

A While they are determining the operating parameters of this thing from 1968 to date, they had this flexibility.

Q If they spent from 1968 to date working on the technology for the 125-megawatt unit, why aren't they able to apply that technology without problems today to the 430-megawatt unit?

A Well, the system is larger. It takes

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"more time to work out the detail. I think they have been operating for only about six weeks now. You take a coal-fired boiler without any SO₂ controls on it, they do a lot of monkeying around with that system before it goes on, before the designer turns it over to the operator.

Q Isn't it a fact that on the 430-megawatt unit they derated it to 320 megawatts to avoid scaling?

A I know they are operating at something maybe less than what the full capacity is. Six weeks of operation on a 400-megawatt coal-fired boiler, there are a lot of variables on that. I don't think they start -- you go slowly on it. It is a lot of pieces of equipment.

Q You mean it takes time to decide whether the technology works?

A That is not what I mean. I am talking about a coal-fired boiler with or without SO₂ controls.

Q Let's talk about a 400-megawatt --

A We didn't say it was not based on that observation. We came to the conclusion before that.

Q Other than the Baheo experience, what

supported your conclusion?

A The 125-megawatt unit.

Q You don't know what the operating statistics are on that, how long it was out for maintenance?

A There is a peculiarity of the operator, all of the details of this thing are not available. We have convinced ourselves, we have observed on several occasions, we were there for three solid days while it was being operated at 70 something percent efficiency. We stack tested at that time. We could see no problem. The statements that have been given to us by the operator, by the designer, appeared quite reasonable. I think they are, if anything they tried not to overplay it.

Q The operator told us on the 430-megawatt unit they had corrosion and scaling problems. There is testimony in the record here they had to shut down one-third of the plant to remove part --

A They had to replace a metal lining with a plastic lining.

Q How often does this occur?

A You only have to make a mistake like that

once. The next time you know to put in a plastic lining.

Q Have they solved the scaling problem they reported to you?

A The reports that we get are that they are happy at this stage of the operation.

Q I am not interested in whether or not they are happy. I am interested in how the system is working. Have they reported to you they have scaling problems?

A You are always going to have a little bit of scaling. You have soot blowers in there, various things that take care of the scaling. I don't quite understand what you mean.

Q Haven't they in fact told you they are having such scaling problems they derated from 400 megawatts to ---

A No.

Q Your paper also covers the experience on scrubbing systems in England. Have you seen any of those systems?

A No.

Q What is your testimony based on?

A We didn't use those as a basis.

Q They are covered in your testimony. Let me examine you on the basis of your statements in here.

A It is in the literature. I don't doubt they are over there.

Q It is not clear to me at all from your statements on the Fulham plant what kind of a plant you are talking about. Is it a pilot plant?

A It is a large unit.

Q How large?

A We will have to check that out.

Q On what basis do you make the statement here that you make about the plant, it operated satisfactorily, high efficiency, corrosion problems were solved?

A Well, this is the information that we get out of the literature. In any technical matter you rely heavily on literature. The peculiarities of the British system, we did not feel we could rely on that as the basis for setting our standard. I think what the British system showed was that yes you can remove sulfur dioxide with scrubbing, and as demonstrated years ago, somebody had to pick it up and decide

to do it before it would actually be available. And in recent years with the interest in SO₂, very high emissions, they got serious.

Q You say, your paper indicates there are two systems still operating in England. What are they?

A I think they are the Bank Side and Battersea.

Q Is it your testimony that the Battersea is still in operation?

A To the best of my knowledge.

Q It has been reported in the press it was shut down.

A When?

Q In the past few months.

A One of our engineers talked to some of the British people eight months ago. They were still getting a high 90's percent removal. I don't know which plant. They were fairly successful. There were a few things that weren't typical there that you could apply to a United States system. It has been kind of hard to get all of the information out of the thing. We didn't feel it fruitful enough to send someone over there.

Q What are the non-typical aspects?

A The whole thing uses Thames water. They are able to dump some back into the Thames. Originally they must have dumped a lot of it back in with the high COD, acid, and what have you. Now, they neutralize this, take care of the waste disposal problems.

Q In any of the literature that you consulted concerning the Battersea plant, did you discover any problems of disposal?

A There were problems because of the very cold gases. They were having some going back down to the ground.

Q The plume reached the ground around the plant, didn't it?

A Close by. I don't know what they meant by close by, whether a block or two miles.

Q Isn't it a fact because of the effect on the immediate ambient air quality that is why they shut down the Battersea facility?

A I am sure it wouldn't cause them to shut down. It is a minor engineering problem to heat stack gases a few degrees.

Q How much operating capacity of the unit

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does it take to heat the stack plume?

A The units are operating 180 degrees, reheat to 120 degrees maybe.

Q How much capacity would that take?

A It wouldn't take much. It would be a fairly small portion.

Q Testimony in the record is that it could be up to 20 percent.

A I would disagree with that.

Q On what basis?

A Just an eyeball decision. It doesn't take that much heat. Besides, there is a fairly large amount of waste heat around a steam power plant anyway. If you are familiar with all of the stuff, they condense the steam out of the turbines, and this creates the turbine pollution. They are trying to waste the heat, emitting parts of that.

Q Are there any water pollution problems solved with the English systems?

A I would assume there would be. Again, we have this limited information. If you were to dump materials with a high COD content or high solids content into a stream, it would not be allowed in this country.

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Q On page 8 of your statement, the second paragraph, you refer to certain pilot work at the TCA. The implication of the paragraph is that pilot plant, where it indicates to the Federal EPA problems with scaling and plugging had been solved, is that correct?

A That is my understanding. That is on the pilot units.

Q Is that the basis for the EPA determination that scaling and corrosion will not be a problem?

A No, there are several other things, the Bahco experience, Mitsubishi, different types of scrubbers, wide open or using salting processes, use self-cleaning.

Q The Mitsubishi is an oil-fired unit, isn't it?

A I believe it is.

Q As a matter of fact, have they ever done any work on an electric utility power plant?

A I don't think so. Of course, the Japanese have that system where they have installed it on some large sized units and regenerated sodium.

Q Isn't all of the power work based on

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oil-fired, sulfuric acid, industrial plant, not for electric utility boilers?

A I will have to get the answer. The Japanese on the large scale have been reportedly quite successful. That is a regenerative deal where you get the SO_2 back.

Q It has been used on sulfuric acid plants?

A In this country. In Japan it has been used on oil-fired boilers.

Q Can you tell us which one that is? Would you submit that for the record?

A We will get a statement from the people. We said that the system was available for sulfuric acid plants. There is no reason really why that couldn't be applied to a boiler, but it hasn't been done. We did not take the position that it was demonstrated. It does regenerate SO_2 .

Q With respect to the pilot work at the TVA which you cite on page 8, isn't it a fact they have had scaling and corrosion problems?

A Any of these installations have experienced some scaling. We say that in our statement.

Q Isn't it a fact they have reported to you they don't know how to solve those problems?

A They reported they are going to make the large units work.

Q Will they tell you when it is going to work?

A They have a system on line, let's see, 550-megawatt unit, I think, that will not supposedly be operable until 1974, 1975.

Q They have done, before the pilot work that you refer to on page 8, the TVA has done a lot of work trying to develop a sulfur removal system?

A They have worked on an ammonium system.

Q How long?

A Several years.

Q They still have not solved the corrosion problem and scaling?

A Maybe not to their satisfaction. They are going ahead with the full-scale unit.

Q They are also going ahead with studies in which the Federal EPA is participating?

A Yes.

Q If the technology is commercially available, why is the EPA, the Federal EPA financing it?

A We think there is reason to put money into the systems, to possibly make them cheaper and more effective. The 75 percent removal, people are shooting for 90 percent at those levels.

Q When do you project that the Shawnee studies will be completed?

A I am not really sure. Shawnee is not the only one.

Q Isn't the study project at Shawnee projected over a period of four or five years before you get into a plant installation?

A It could be. They have had an ongoing pilot study there for several years.

Q It will still be five years before they can put in a system?

A No, by 1974.

Q What part of the work will be completed by 1974?

A We have the scheduled startup in late 1974 or 1975.

Q Startup of what?

A You mean the SO₂ removal system? They may want to make some further adjustments after that.

Q When is the startup date for a plant scale system at Shawnee?

A We were talking about -- maybe we ought to introduce an engineer on my staff, Tom Kittelman. Some of these points I would like to make sure that we get it in the record.

(At this point, Mr. Tom Kittelman was sworn as a witness to answer several questions.)

MR. WHALEN: Can I repeat a question to Mr. Kittelman? Didn't Kansas Power & Light tell you, Mr. Kittelman, they had to derate a 400-megawatt unit?

MR. KITTELMAN: No.

MR. WHALEN: Didn't they tell you by telephone?

MR. KITTELMAN: What was reported to me by telephone was they were easing up on full scale.

MR. WHALEN: Easing up what?

MR. KITTELMAN: They had not derated, running three-quarters coal, one-quarter gas, easing up.

MR. WHALEN: The gas is a derating of how much sulfur removal is going on?

WITNESS WALSH: It is not derating the unit.

MR. WHALEN: Insofar as it is burning coal, it

is a derating, it is a derating for a utility which cannot substitute 25 percent natural gas?

MR. KITTELMAN: It is starting the unit up slowly. This is the reason they gave.

By Mr. Whalan:

Q Back to Mr. Walsh, if you please, to the pilot work at TVA, what if any problems have been reported to you by the TVA concerning the self-cleaning?

A They have had corrosion problems with the spheres.

Q The spheres are worn out, aren't they, even though the plant has not operated but six months?

MR. KITTELMAN: They will have to find better spheres.

MR. WHALEN: What is the cost of replacing the spheres?

MR. KITTELMAN: I have no idea.

MR. WHALEN: What size pilot plant are we talking about?

MR. KITTELMAN: I have the data.

MR. WHALEN: It is one megawatt, isn't it?

MR. KITTELMAN: I don't know. I would have to

check.

MR. WHALEN: Now, with respect to the open type scrubber involved in that pilot plant work, how long has it operated?

MR. KITTELMAN: How long has it operated? I don't understand.

MR. WHALEN: What was the maximum period of time it operated without having to shut down because of maintenance work?

MR. KITTELMAN: I am afraid I cannot answer that.

MR. WHALEN: Would it be about 400 hours?

MR. KITTELMAN: I don't know.

MR. WHALEN: Isn't it a fact that the demister was plugged after 400 hours of operation and it had to be shut down?

MR. WALSH: I think we have said we don't have the details.

MR. WHALEN: Have there been any problems with respect to that pilot plant work at TVA with respect to water pollution or with respect to air pollution other than sulfur?

MR. KITTELMAN: Not that I am aware of.

MR. WHALEN: Is there any work --

check.

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MR. WHALEN: Have there been any problems with respect to that pilot plant work at TVA with respect to water pollution or with respect to air pollution other than sulfur?

MR. KITTELMAN: Not that I am aware of.

MR. WHALEN: Is there any work --

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MR. WALSH: On these pilot systems, you can have a particular control system that went out completely. I can envision that in almost any pilot system. Part of it is makeshift. I am sure you can encounter problems. That is why you run a pilot plant, to see what problems you are going to have.

By Mr. Whalen:

Q Isn't it a fact you don't know whether or not the scrubbers at TVA will be able to control the emission of calcium particulates?

A I would not agree with that. We think that the principle has been demonstrated, and that the peculiar problems they might be having at TVA, I see no reason why they cannot be resolved also. It is a chemical reaction, chemical process. Like any process, I suppose you have to in applying it to some of the retrofit installations, you might come across something different.

Q How would you control the emissions?

A From the stack gases.

Q On page 9 of your testimony, Mr. Walsh, you indicate the EPA has not yet solved any water pollution problems that may be involved with the

scrubber systems, is that correct?

A I don't believe I stated it in those words. I think I stated, I have my revised testimony with me, I think, the water and solid waste problems can be handled on a case by case basis. You obviously cannot dump material from this process into a stream, and you want to recycle water and salt out the calcium sulfate.

Q I take it that is your condition number one? You say there are several precautions that have to be taken.

A Well, we enumerate precautions I think from one to four. I have the revised testimony here which I believe is the same, where we talk about insuring that you oxidize the sulfites to sulfates to remove the high COD.

Q How do you do that?

A You, essentially what you do, probably let the stuff sit there, oxidize in the pond, remove it from the pond, or you could aerate it.

Q So that condition could be complied with only at a location where there was space for a settling pond?

A You could aerate. You could do this on a

smaller scale. On the TVA work, their paper indicates a ten-minute holding time is sufficient for some of this de-salting.

Q What quantity are they talking about?

A It wouldn't make any difference. It is a holding time between the time that you take it out of the scrubber and you pump it back in.

Q The size of the pipe would be influenced by the quantity?

A You would have to decide how much liquid you are going to handle. That would depend on the size of the steam generator, and the sulfur in the fuel.

Q How much pipe would be involved for an 800-megawatt unit?

A I couldn't tell you that. Probably I can figure it out. Figure it out and submit it to someone later on. You can figure it out as well as we could.

Q Your precaution No. 2 is only high calcium reactants should be used. Are they available everywhere?

A The limestone is a readily available commodity. There may be some areas where purity

would be a problem. Our approach to SO₂ control, you have the option of low sulfur fuel or scrubbing. This is something that has to be considered.

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Q The availability of low sulfur coal has to be considered on whether or not it is an option?

A As Dr. Roberts indicated earlier, they have done studies to indicate that western coal was available. Certainly a lot of coal in the United States can meet this standard.

Q Has the Federal Environmental Protection Agency estimated how many coal-fired units would have to meet the new source standard by using low sulfur coal or by using one of these processes? Have you made a breakdown?

A I think there is something like 45 units a year, utility steam generators. Of those, I think about ten of them would be gas-fired; about nine of them would be oil-fired. The others would be coal. Some of the coal would be the western coal anyway. I suppose it is somewhere in the range of 20 units a year.

Q That does not give any account of the existing units which are going to have to go to low

sulfur coal or sulfur removal technology to comply with the standard for existing sources under state law?

A My number was only for new plants.

Q Your Precaution No. 3 is ponds should be lined in order to prevent the leaching to ground water of any toxic compounds that might be present. Is that possible in all locations?

A It is possible. I think --

Q Regardless of the ground water pressure?

A It is my understanding it is possible. You might do some selection, site selection. It might be one more consideration. There might be some soils that wouldn't need lining. There might be some localized conditions that would warrant against doing something like that.

Q Are there conditions that could preclude you from lining?

A I am not certain there are, but it is not my area of expertise.

Q In connection with Point No. 3, to avoid contaminating ground water, how do you protect against an overflow from a rainfall?

A These ponds are usually big enough, I

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think, well, there usually is a certain amount of free water. You wouldn't be going at the limit all of the time. There is some water in the existing condition that is carried out with the stack gases. This is balanced off by the cooling. Below your cooling water, put it to a different source.

Q Would the blowdown be in compliance with proposed water effluent standards?

A There again that is not an area -- you have that problem really with the plant anyway, cooling tower blowdown. There are certain things like handling coal ash and cooling tower blowdown that aren't really changed much.

Q Discharge of water would require a permit from the Federal Environmental Protection Agency?

A I believe so.

Q Is there any way of getting those permits?

A Discharge of water to a stream, they are in some hangup right now. I am not close to that situation. There is some legal situation.

Q At some point in your paper, Mr. Walsh, you said that guarantees are being offered in many

areas. Could you be a little more specific and tell us what guarantees are being offered by whom and where?

A Kansas City Power & Light, the Hawthorne Station, a 100-megawatt plant, retrofitting to go on stream late 1972. Kansas City Power & Light, which is not the Kansas Power & Light that we spoke of before, this is a Missouri station, they have two installations here. They have guarantees from Combustion Engineering. They are both 100-megawatt units to go on late in 1972, guaranteed for 70 percent SO_2 removal. You represent Commonwealth? Will County Station No. 1, which we have going in operation February 1972 with 76 percent SO_2 removal guarantee.

Here is Northern States Power Company, Minnesota, a 700-megawatt plant, the scrubbers are to be built by Combustion Engineering, and the startup is scheduled for 1975. It is 50 percent SO_2 removal of 0.8 percent sulfur coal.

Duquesne Light Company, the Pittsburgh area, installing a chemical unit, 100 megawatt, scheduled to start up January 1973, guaranteed 80 percent SO_2 removal.

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Louisville Gas & Electric Company,
70-megawatt unit, designed by Combustion Engineering,
to go on stream mid or late 1972, 80 percent SO₂
removal, three percent sulfur coal.

A sodium based scrubbing system at the
Nevada Power Company, Reid Gardner station, 250
megawatts, the control system being installed by
Combustion Equipment Associates, to go on stream
in 1973. It is burning one percent sulfur coal,
guaranteed for 90 percent SO₂ removal.

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The last one I have with a guarantee is
is a catalytic oxidation system of Monsanto going
in at the Illinois Power Company Wood River Station,
100 megawatts, scheduled for June 1972, 3.5 per-
cent sulfur coal, 85 percent SO₂ removal.

Q Those are all of the guarantees that you
know about?

A Those are the ones that we could scare
up, yes.

Q Do you know the terms of the guarantee?

A I think they all vary. I couldn't testify
to those.

Q Does a single one of the guarantees
guarantee that you will meet that efficiency for

any particular period of time, more than a month?

A I couldn't tell you exactly. The guarantees are different on all pieces of equipment as they have been for a number of years, like precipitators. Some of them are a one-shot guarantee where they guarantee for a three-day period, a limited period. Others might have a situation where they guarantee it for so many years. You can put that into whatever form you work out between the vendor and the utility.

Q Do you know of any manufacturer that is willing to guarantee a scrubber removal system at 75 percent efficiency for more than one month?

A They tell me they are. We haven't explored that situation. You are the one that brought it up in those terms.

Q Is that a relevant factor to consider in determining whether or not the technology is adequately demonstrated?

A We had designers of the control equipment at our review meetings on the standards, and they indicated in general terms they would back these up. These were not one-shot guarantees. Whether or not they put those in writing, I don't know.

Q Which manufacturer told you that?

A Combustion Engineering.

Q Anyone else?

A I am talking off the top of my head, from memory. I cannot really testify more than that. I think all of these design companies have a lot invested. They are not about to get away with just running a one-shot test and going away, saying it is your problem. They realize the conditions that you are talking about.

Q But the problem is you have to operate in compliance with the law or you don't operate, Mr. Walsh. Isn't that the problem that the New Source faces?

A Yes.

Q And until the manufacturer solves the problem, do you propose to shut them down?

A We say they have essentially solved the problem.

Q It seems to me you have said so on the basis of your examination only of one, the Bahco process, the 25-megawatt oil power plant, and 125-megawatt Kansas City operation which has been operating since 1968, and which is not working

right today.

A I don't think the operators would agree with you on that.

Q Why did they shut it down for maintenance work? Why have they derated the larger unit?

A They were having a problem of mist carry-over. That was really the only change they made on the last go around. I think they made a few changes in the piping just so they could control the pH better and scaling.

Q Is it your testimony they solved the problem with the Ping-Pong balls in the self-cleaning?

A They don't have Ping-Pong balls in the scrubber.

Q When were your cost estimates made?

A We have gotten cost estimates, most of them in 1971.

Q What is the basis of your estimate that new units would cost from \$20 to \$35 per kilowatt?

A Pardon?

Q What is the basis for your estimate that new units would cost \$20 to \$35 per kilowatt?

A We still stay with that.

Q Can you furnish us the basis for the estimate?

A I think it is interesting that you find quite a variation in the cost. I think some low values -- well, let's see. The lowest ones, Northern States Power has a figure of \$18.7 per kilowatt. And I think they go up to, some of the TVA numbers are in the \$55 to \$62 area. It is interesting that TVA also has estimates, the larger numbers tend to be for retrofit. It is also interesting that we have information from TVA, again in 1971, which estimates cost of closed circuit two-stage for limestone, which might be a little more expensive, at \$19.2 per kilowatt. One of the manufacturers gives an estimate for a hypothetical new plant in the Midwest in the 800-megawatt range that was at \$25.7 a kilowatt. The City of Key West, a typical situation, \$24. Louisville Gas & Electric, \$28.6. Duquesne Light, \$35; Detroit Edison, \$29.6; Commonwealth Edison, \$49.

Q So the estimates are actually greater than \$35?

A The retrofit. I think we are still in the same range for the new units. The retrofit are

the ones that are high.

Q The \$49 for Edison was for retrofit?

A The Commonwealth Edison --

Q That is based on old testimony. The current cost is \$67. Have you examined Dr. Stukel's testimony in this record?

A No.

Q Comparing estimated cost by manufacturers with what it actually turns out to be.

A No. I have gotten a copy of Dr. Stukel's testimony, but I haven't had time to go through it.

Q Is Mr. R. E. Harrington employed by the Federal Environmental Protection Agency?

A Yes.

Q In a symposium in May 1971, Mr. Harrington with respect to sulfur removal technology said, "The technology will require several years more work before it is developed to the point where control processes can be purchased, installed and operated at a level of confidence approaching that with which power generating systems can be acquired."

A That is Mr. Harrington's opinion. You get an occasional statement from someone, they are people like anybody else. Mr. Ruckelhaus is head of the

operation, signed off on this thing on December 23, and that is EPA's position.

Q Mr. Ruckelhaus is a lawyer, isn't he?

A I believe he is a lawyer.

Q What is Mr. Harrington?

A Mr. Harrington is an engineer.

Q Are you aware of the fact that the Council on Environmental Quality, second annual report, page 18 stated: "Technology to control sulfur oxide and nitrogen oxide emissions is not yet commercially proven."?

A I certainly think we would disagree.

Q Mr. Ruckelhaus disagrees with the Council on Environmental Quality and with Mr. Harrington?

A Obviously.

Q Are you aware that the President of the United States reported in his message to Congress that removal technology was not available?

A When did he say that?

Q I don't have the date in mind. I will furnish the clipping.

HEARING OFFICER LAWTON: He is a lawyer, too.

THE WITNESS: You are implying that you cannot trust lawyers?

By Mr. Whalen:

Q I don't think that is what I am implying.

Finally, it is reported in the Wall Street Journal of January 10, 1972, page 22, that with respect to sulfur removal technology, "It is a mess," one EPA air pollution research man blurts out in a moment of candor, but we have no choice, we have to push utilities."

Do you know who the EPA air pollution research man who had a moment of candor was?

A No, but I think if you want to read that you might read the whole article.

Q You cannot identify that source for us?

A No, I certainly don't. He didn't identify that in his article.

MR. WHALEN: I have no further questions.

HEARING OFFICER LAWTON: Are there any further questions? Are there any further questions of Mr. Walsh?

By Mr. Zabel:

Q Are you familiar with a publication in January 1969 of the Federal Government called Control Techniques for Sulfur Oxide Pollutants?

A VOICE: Would the gentleman please identify

hi...self?

MR. ZABEL: I am Sheldon A. Zabel representing the Illinois Power Company.

Q Are you familiar with that publication, Mr. Walsh?

A That was a publication that was put out in conjunction with the air quality criteria, is that correct?

A That is correct. It stated, "The most promising SO₂ processes currently under investigation in the United States are limestone dolemite injection, catalytic oxidation, alkalyzed alumina absorption." That was in 1969, three years ago. Isn't it a fact that two of those three, the alkalyzed alumina absorption and the limestone dolemite injection have been abandoned?

A Every once in awhile I hear someone trying to resurrect the dolemite process.

Q The Federal Government proposed three in 1969, two of those were abandoned already, is that correct?

A More or less, without putting any money into dry limestone.

Q Do you know who Dr. John Middleton is?

A Yes.

Q Are you familiar with his testimony before the Joint Congressional Committee on Atomic Energy in which he stated that sulfur removal processes "could be fully tested and approved and ready for bid application in the next four years."? That would make it November of 1973.

A He was being overly optimistic is now the Agency's position, currently ready.

Q He said four years, four years in November of 1969. That would make it November 1973. I take it he was being overly pessimistic.

A You can never tell exactly, I suppose. I think we are in the same ball park as far as time is concerned.

Q Will you state who Dr. Middleton is or was in 1969?

A Dr. Middleton was the Commissioner of the National Air Pollution Control Administration, the predecessor of the various parts of the Environmental Protection Agency. The Environmental Protection Agency is a little differently organized.

Q The April 7, 1971 Federal Register, on

page 6692, stated: "Technology now being demonstrated will allow 80 percent removal of sulfur oxides from combustion gases of most existing boilers. It is reasonable to expect that these processes will be improved in the near future and thus permit attainment of 90 percent or greater collection efficiencies at a wide range of boilers."

That was in April 1971.

A You quoted 80 percent, 70 percent or 80 percent?

Q I quoted what the Federal Register published as the EPA's position, 80 percent technology now being demonstrated, will allow 80 percent, and it goes on "will be improved in the near future and thus permit attainment of 90 percent." That is April of 1971.

A All right.

Q In November 1971 when those implementation rules were adopted, six or seven months later in the same portion, this is on page 22,407. Volume 36, No. 228 of the Federal Register, it says: "Technology has been demonstrated which will allow 70 percent removal of sulfur oxide from combustion gases of most existing fuel burning

units." A month after this, you have testified here and in West Virginia that it is 75 percent removal that has been demonstrated on three percent sulfur coal, the btu content of which you don't remember. I would like to know which of these is correct, if any?

A I said --

Q You don't know the btu content, I accept that.

A Of what?

Q The three percent sulfur coal referred to in your statement. He asked if it was --

A I thought he was asking me what is the average btu of Illinois coal. It is based on a 12 to 12.5 btu coal.

Q I am asking which of the three statements in the last year is correct. They are all different.

A You can add another one. We published the proposed standards in August, and essentially we had the same position in August that we have in December.

Q Actually the November one I was reading was a recodification of August. Four months after April you changed from as much as 90 percent down to

70 percent. What were the events that occurred in that time to cause that change?

A Where was the 90 percent?

Q Eighty percent you said was being demonstrated --

A All these changes are variations between 70 and 80 percent.

Q I will ask why was there a change in that four-months span of the ten percent? In the August publication you said it had been demonstrated. In the April publication you said the Agency, not you personally, now being demonstrated. I want to know in that four-months span why there was the ten percent drop, why there was a change in the tense of the verb, now demonstrated you said in August, being demonstrated in April. What specific events in those four months?

A. I think it is really a matter of confusing words. I don't think there is all of the sinister implications that you read into it. The 70 percent we are saying is demonstrated more for the existing units. The 75 would be for what we think is possible on new units. I am not really so sure that the difference between 70 and 75 or

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70 and 80 is that significant. I think we are talking about systems --

Q It would be significant to a utility if it was a difference between complying with the law and not complying. That would be pretty substantial.

A The finalized thing is now 70.

Q The latest EPA statement I have is yours which is 75.

A We have not changed that, our position on new sources.

Q You changed it from what was published in the Federal Register. Your statement says 75. The Federal Register says 70.

A The Federal Register, in both cases, they were proposed regulations, and there were finalized regulations.

The August 14 said 70, and the April 1 said 80.

Q But it changed the verb. I don't have the facts for the change in the verb.

A I can't tell you. I can't say why they changed the verb. The August 17 to December 23 has to do with Section 111.

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Q. One is existing sources, one is new sources.

A. One is a regulation under EPA. The other, they are just requirements for the implementation plan. They carry no real mandate. You have to achieve your air quality standards. These are some --

Q. You have to achieve, the state has to achieve an ambient standard --

A. That is right.

Q. Under this subject of available technology that Mr. Prillaman asked about, Mr. Powell asked about, Part 51 of the recodified rules of the Federal EPA define reasonably available control technology. Are you familiar with that?

A. Where is that?

Q. Section 51.10.

A. Of what?

Q. I will read the definition.

A. What register or publication are you speaking of?

Q. Reading in the November 25, 1971, but I am sure it is also in the August one. I can give you that too if you like. The recodification

was in November. I think that is the current correct citation.

A That has to do with implementation?

Q Right. Talking about reasonably available control technology, something we have been talking about this afternoon. I would like you to explain this definition to me if you can.

"Reasonably available control technology means devices, systems, process modifications, or other apparatus or techniques the application of which will permit attainment of the emission limitations set forth in Appendix B to this part."

I would like you to explain how, you can look at it if you like, how reasonably available fits into that definition. It sounds to me --

A These are just suggested regulations.

Q That is the regulation adapted by the Federal EPA defining that term, presumably under statutory authority. That is not a suggested regulation of the state.

A These are guidelines they are giving to the states that are preparing implementation plans. They don't require them to demand 70 percent,

80 percent for existing sources. They suggest they can do these things if they have to in order to meet their SO₂ ambient air quality standard.

Q My question to you, where do the words "reasonably available" fit into that definition? It talks about application of processes, not whether they are available at all, that definition.

A This has really no connection whatever with the new sources.

Q This state and this hearing has adopted pretty much the new source standards.

A I do think it is relevant.

Q It doesn't say anything about availability.

A I don't think they are using the thing in the same context that we have talked of available technology earlier. These things are there. They can be used. I think those things will be used as guidelines in judging, if the states are really using all the means necessary to achieve a standard.

Q All I am asking, Mr. Walsh, the Federal definition adopted, the rules for the implementation plan, uses the phrase "reasonably available technology". The fact is the definition of that phrase

has nothing to do with availability, does it?

A I think they are pointing these out. It kind of blends in with the regulations in Appendix B, that is what it does.

Q I think my question is fairly simple.

A The people that put the verbiage together on that, I don't like to speak entirely for them. I think maybe there are other people in our organization that could answer the question more directly.

Q We had enough difficulty getting you here, Mr. Walsh.

You testified as to a number of available guarantees. Possibly Mr. Powell asked this question. Have you read any of those contracts?

HEARING OFFICER LAWTON: I think you are going over identically the same ground.

MR. ZABEL: I didn't hear that question.

HEARING OFFICER LAWTON: Let's not have him repeat everything that he said before.

MR. ZABEL: I don't mean to.

HEARING OFFICER LAWTON: Then go ahead.

By Mr. Zabel:

Q Have you read the contracts?

A No.

Q Are some of those with the Federal EPA, is it a party to any of those contracts?

A No, these are contracts --

Q Is the Federal EPA a party to the cat-ox contract?

A Okay. The cat-ox, and anything on the Boston Edison, TVA, they would be available in the EPA files.

Q You yourself have not reviewed them?

A The guarantees could be reviewed. They are not secret. They could be brought out in the open.

Q Some of them are in the record already.

A hypothetical question, Mr. Walsh: You are building a new power plant. Money is not an object. You are building it in Illinois. What would you do to meet the Federal New Source Standard? You are an engineer?

A I would either -- this is an existing plant?

Q No, a new plant.

A You would certainly have to look at the economics and the practicality of putting low sulfur

fuel --

Q I grant that you would have to look at the economics. I assume that money is no object. What would you do?

A If money is no object, that is probably the only decision.

Q You still have a choice of apparently technologies of fuel. Which would you choose? Would you use low sulfur western coal or would you put in one of the control techniques you have talked about in your statement?

A I cannot envision a utility plant being built where economics are not considered.

Q I used to think that, too.

A What you are saying, you flip a coin.

Q You have no preference, you think they are equally adequate solutions to the problem? You think the technology is just as good and just as reliable as burning low sulfur western coal?

A The answer to that question is just as practical as the question.

Q The answer is no?

A I didn't say that.

Q You are telling me the --

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A You have problems with shipping in coal. No, to answer your question, I think that the technology is there.

Q It wouldn't make any difference to you at all?

A No.

Q You did testify they have had some outage time, a variety of different problems. Do the New Source Standards make exception for that or would it violate the law?

A Any regulation, whether it be local, state or federal, has to consider practical situations.

Q Does the new source --

A We had quite a go-around with this, more with the chemical industries than the utilities. As a result, all elements of the Environmental Protection Agency got their thoughts in on this. The Office of General Enforcement has the responsibility in these areas. Didn't quite see the need for it as much as we did. I think the thing may be modified to put that phrase in there, you know, the verbiage in there whereby you actually allow --

Q Probably a malfunction is a violation, --

answer yes or no. Maybe I am missing something.

A I would say no more so than it is in a federal or state -- you don't fine somebody if his plant is burning down and he is causing a smoke violation. You don't have anything without reasonableness.

Q It is subject to the whim of the enforcing agency?

A We felt it was in there. A lot of the chemical industries feel it should be spelled out more explicitly. To do that I think the regulation might be modified to that degree.

Q One last question. At the very beginning of these hearings Dr. Roberts suggested that it be asked to a representative of the Federal Environmental Protection Agency. I assume you are familiar with the National Environmental Policy Act?

A Yes.

Q In general. Section 4332 in that act requires basically the filing of an environmental impact statement by all agencies of the Federal Government on any major action significantly affecting the quality of the human environment. Does the Federal Environmental Protection Agency propose to file an environmental impact statement

in connection with the approval of the state implementation plans, if you know?

A I would say I don't know. Does anybody have an answer to that last question?

MR. VAN MERSBERGEN: The implementation plan itself is an environmental impact statement.

By Mr. Zabel:

Q Are you saying it is a plan as defined by the Act?

MR. VAN MERSBERGEN: We are determining the effects of the Implementation Plan, to give the Implementation Plan a review.

MR. ZABEL: I think my question is simpler than that. The Act is fairly straightforward about filing environmental impact statements on major federal action. I am asking if the Federal Environmental Protection Agency proposes to do that in connection with approving state implementation plans, or if it is going to treat the implementation plan as such a filing, or if it is going to take a position that no such filing is required. I think that is a pretty straightforward question.

MR. VAN MERSBERGEN: I think the latter is the

extent of my knowledge.

MR. ZABEL: It is taking the position no such filing is required?

MR. VAN MERSBERGEN: That is right.

MR. ZABEL: Did it take the same position with the adoption of the new state standards?

MR. VAN MERSBERGEN: I have no information on that.

MR. ZABEL: Thank you.

HEARING OFFICER LAWTON: Are there any further questions of Mr. Walsh? Thank you very much.

Do you have anything further, Mr. Van Mersbergen?

MR. VAN MERSBERGEN: I have the testimony relative to the Implementation Plan.

MR. PRILLAMAN: Mr. Walsh did amend the testimony that was given in West Virginia hearings, did you not? I think that should be marked. He has referred to this document throughout which is a little different than what was distributed earlier.

HEARING OFFICER LAWTON: We would like to receive it then. That will be marked and received as EPA Exhibit 83.