

1                   IN THE UNITED STATES DISTRICT COURT  
2                   FOR THE EASTERN DISTRICT OF VIRGINIA  
3                   NORFOLK DIVISION  
                  CIVIL ACTION NO. 2:94CV344

4     LEE A. ARTIS,  
5             Plaintiff,  
6     VS.  
7     CSX TRANSPORTATION, INC.,  
8             Defendant.

9  
10  
11    STATE OF FLORIDA)

12    COUNTY OF DUVAL  
13

14               Deposition of MARK E. BADDERS, taken on behalf of the  
15    Plaintiff herein, pursuant to Notice of Taking Deposition,  
16    at 8:40 o'clock a.m., on Friday, September 9, 1994, at 500  
17    Water Street, Jacksonville, Duval County, Florida, before S.  
18    Leigh Bryan, a Notary Public in and for the State of Florida  
19    at Large.

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I N D E X

WITNESS

Mark E. Badders

DIRECT:

4

EXHIBITS

FOR IDENTIFICATION

Plaintiff's Exhibit No. 1	13
Plaintiff's Exhibit No. 2	13
Plaintiff's Exhibit No. 3	13
Plaintiff's Exhibit No. 4	38
Plaintiff's Exhibit No. 5	38
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Plaintiff's Exhibit No. 7	73
- - -	

1 APPEARANCES:

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1 MARK E. BADDERS,  
2 having been produced and first duly sworn as a witness on  
3 behalf of the Plaintiff, testified as follows:

## 4 DIRECT EXAMINATION

5 BY MR. SHAPIRO:

6 Q Could you state your full name, please.

7 A Mark E. Badders.

8 Q All right. Mr. Badders, as you know, I represent  
9 the plaintiff in this case, Lee Artis, who has a suit  
10 pending against CSX.11 If I ask any questions that seem to be ambiguous  
12 or hard to understand, please, ask me to rephrase them and I  
13 will do so.

14 A Okay.

15 MR. RINGER: Before we go on, let me say for  
16 the record, as I said to Mr. Shapiro off the record  
17 before we started, we have not yet made a  
18 determination as to whether to take an appeal or  
19 exceptions from Magistrate Judge Miller's ruling on  
20 Wednesday, to the effect that the September, 1992  
21 AAR Industrial Hygiene Working Group Meeting did  
22 not fall within the joint defense or common  
23 interest privilege.24 And because we have not yet made that  
25 determination, in order to preserve our rights to

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I claim that privilege, I have told Mr. Shapiro that  
2 we are not going to allow the witness to answer any  
3 questions about that meeting today.  
4 And I restate what I said in court the other  
5 day that I understand if we decide not to pursue an  
6 appeal or if we do pursue one and get an adverse  
7 ruling from the district court judge, a  
8 redeposition of Mr. Badders for the purpose of Mr.  
9 Shapiro inquiring about that subject will be at our  
10 risk and expense.  
11 MR. SHAPIRO: All right. With the  
12 understanding, for the record, that I would ask the  
13 defendant to cover the cost of coming back down  
14 here, unless Mr. Badders happens to come to  
15 Virginia for some other purpose, we would like the  
16 defense to take care of that, if the judge is  
17 upheld in this ruling.  
18 MR. RINGER: Well, if it works out such that  
19 a special trip has to be made for that purpose, I  
20 think that will be fair.  
21 Since you have asked us to produce a whole  
22 vast of other witnesses to be produced here, I  
23 don't imagine you are going to have any extra  
24 travel expense.  
25 Anyhow, we will work that out in a fair way

1 if you should incur any.  
2 BY MR. SHAPIRO:  
3 Q All right. Let's go ahead, Mr. Badders.  
4 ir, how old are you today?  
5 A Today, I'm --  
6 Q Just your age, first?  
7 A I am 41.  
8 Q All right. And how many years have you been  
9 employed with CSX or its predecessor railroads?  
10 A Fourteen years.  
11 Q Okay. And what date did you begin with CSX or  
12 its predecessor railroads?  
13 A In January of 1980.  
14 Q All right. And I believe your background, I am  
15 looking at your resume, is that you have a -- I guess you  
16 have two BS degrees from Indiana State University; is that  
17 correct?  
18 A Yes.  
19 Q One is in biology and the other one is in  
20 environmental health; is that correct?  
21 A Yes.  
22 Q And after that, you took course work in  
23 environmental health emphasizing industrial hygiene for a  
24 two-year period or a year-and-a-half period at the  
25 University of Minnesota?

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1           A     It was actually about a year.  
2           Q     Okay.  
3           A     It traversed over two years because of the way  
4 the semester systems work out.  
5           Q     I guess you were a candidate for a graduate  
6 degree, but did not obtain one from the University of  
7 Minnesota; is that correct?  
8           A     Yes.  
9           Q     You have been the primary industrial hygienist  
10 with CSX since pretty much, I believe, by the time you  
11 started; is that correct? Within a year of when you  
12 started?  
13          A     On one of the other predecessor railroads, the  
14 Chessis System, they had an industrial hygienist, as well.  
15          Q     Were you appointed to be essentially the chief  
16 industrial hygienist within a year or two after you began  
17 working for the railroad?  
18          A     I was the only industrial hygienist working on  
19 the Seaboard System Railroad.  
20          Q     All right.  
21          A     So I guess since I was the only one, I guess,  
22 maybe I was chief.  
23          Q     All right. How do you define industrial hygiene?  
24          A     There are many definitions. But one definition  
25 is that it'B the art and science related to the occupational

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1 that correct?

2 A Yes.

3 Q All right, sir. And take a quick look at this.  
4 It looks to me to be a five-page document entitled Position  
5 Description Industrial Hygiene (tenders to witness).

6 Does that appear to be the document? Except for  
7 the first page, which is just flipped there, does it appear  
8 to be genuine --

9 A That appears to be my current job description.

10 Q All right. Actually you also prepared the  
11 document for CSX, it seems, by the first page; is that  
12 correct?

13 A Yes, I -- they asked me to write up what my  
14 duties are.

15 Q And, apparently, as of 1988, they decided, "We  
16 better have something typed, written as formal -- setting  
17 forth what the position of industrial hygiene director  
18 was?

19-- RINGER: Object to leading. Object to

20 tions that are in the question.

21 Ask you might just ask him why that was  
22 done.

23 MR. SHAPIRO: Well, I think I can lead the  
24 witness, since he is clearly one of the defendant's  
25 officers or officials.

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1 MR. RINGER: That remains to be seen.  
2 You to  
3 form.  
4 BY MR.  
5 ll right. Go ahead, Mr. adders.  
6 A It was -- in 1988, we wrote up a job  
7 description. I wrote up -- I wrote up most of the  
8 description. I did not prepare the organizational chart you  
9 see at the end.  
10 Q But the first four pages, you outlined?  
11 A Right. The only difference -- the only things  
12 that are not mentioned in that particular document is the  
13 fact that I supervise two industrial hygiene specialiBtS.  
14 Q Are they degreed industrial hygienists, also, or  
15 what is their background?  
16 A One gentleman has a background in engineering and  
17 has had some experience with hazardous material response.  
18 The other gentleman has had some industrial  
19 hygiene experience and working for a state agency, he had  
20 worked in the mining industry.  
21 Q All right.  
22 A And in a coal mine industry. And had also worked  
23 as a teacher in junior high, which was probably his hardebt  
24 job.  
25 Q You report to the CSX Medical Officer, the chief

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1 medical officer, according to your job description; correct?

2 A Yes.

3 Q And as of 1988 this department that you are in,  
4 which I believe is categorized as risk management, had a \$6  
5 million budget; is that correct?

6 A That is -- as far as I know, those figures are  
7 accurate for the time.

8 Q As of that year?

9 A At the time that they were -- that document was  
10 prepared.

11 Q As of 1988 you indicated that one of your  
12 specific duties was to manage and maintain a CSX Chemical  
13 Hazard Information Program to inform employees how to safely  
14 use chemicals in the workplace and the possible effects of  
15 chemical exposure; is that correct?

16 A Yes.

17 Q It also verified that you were required as the  
18 director of industrial hygiene to have specialized training  
19 in industrial hygiene sampling methods and the  
20 interpretation of the data needed to properly identify and  
21 control exposure to chemical and physical hazards.

22 A That sounds like the description that is in  
23 there.

24 Q And also according to your job duties, as  
25 outlined here, your duties require the integration of

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1 various kinds of toxicological, environmental, and  
2 operational information to develop appropriate control  
3 strategies; is that correct?

4 A Yes. I think that correctly states what is in  
5 the document.

6 Q one thing it says is that you had a large degree  
7 of latitude in resolving these problems; however, the  
8 appropriate control measures must fulfill the needs of  
9 corporate officers, local supervision, and employees that  
10 must utilize the control measures.

11 Do you agree that is in there, alBO?

12 A Yes.

13 Q Okay. So in instituting any type of control in  
14 hazardous or in any situation that you were going to  
15 evaluate, one of the things that you would have to also look  
16 at would be whether corporate officials would agree to  
17 institute whatever you suggested?

18 A They would have -- they are -- the corporate  
19 officials over the individual departments would have to do  
20 the implementation. My position is a staff position.

21 Q If you recommend, which you have, I am sure, many  
22 times over the years, a particular control or change in some  
23 procedure, these other corporate officials could essentially  
24 veto your decision?

25 A They could either veto it or they could possibly

1 ignore it.

2 Q Ultimately, though, you have the responsibility  
3 for the health and safety of the employees as a direct duty  
4 of your position, though?

5 A It was my responsibility to identify, and is my  
6 responsibility to identify exposures that may be  
7 potentially harmful to employees in CSXT workplaces, and to  
8 recommend control measures appropriate for that type of work  
9 environment.

10 However, I do not have line authority that I  
11 could go out and specifically order somebody to perform a  
12 certain task.

13 Q Well, one of the other duties of your  
14 accountabilities, as it is titled here in your position, is  
15 to determine what are acceptable exposures to chemical  
16 substances and physical agents for CSX employees; correct?

17 A Yes.

18 Q You consider that --

19 A Although, I do have input from the -- from the  
20 chief medical officer, and it's -- I don't remember if it is  
21 actually written in the job description, but we have, on  
22 occasion, talked about those particular exposures.

23 Q It also says that control measures that you may  
24 suggest are involved defining company policy and are Subject  
25 to review by the chief medical officer and top management

1 officers; correct?

2 A That is what it sayb in the document, yes.

3 Q And you direct the activities of outside  
4 consultants who collect employees' exposure data?

5 A Yes.

6 Q Another point here, under No. 6, is, " Result of  
7 Error," is the title.

8 And it says that errors of omission and judgment  
9 can occur, which may result in having employees exposed to  
10 chemical and physical hazards above acceptable exposure  
11 limits, or unnecessary control measures may be started; is  
12 that correct?

13 A Yes. At least that is what it says in the  
14 document.

15 Q So you acknowledge that in your POBition, if any  
16 errors are made in the way something is implemented, you  
17 acknowledge that it could result in employees being exposed  
18 to chemicals or physical hazards above acceptable exposures,  
19 whatever it may be?

20 A That is a possibility. We try to minimize that.

21 Q And you mention in here that the errors that  
22 would -- it says, "would be found," I guess, "Could be found  
23 to exist, can be corrected as a result of periodic  
24 monitoring of workplaces"?

25 A Yes, we are very proactive, and we actually go

1 out into the workplace and try to identify the potential  
2 exposures and try to control them, as soon as possible.

3 Q Now, it also says occupational diseaseb often  
4 require years to develop and the remonitoring of appropriate  
5 control measures would reduce the possibility of  
6 occupational disease development.

7 Is silicosis the type of disease that you might  
8 have been referring to when you wrote this, one of the types  
9 of diseaseb that you may have been referring to?

10 A Yes.

11 Q And silicosis disease is a disease which is, in  
12 theory, entirely preventable with appropriate control  
13 measures; isn't it?

14 A Yes.

15 Q And based on what you know about silicosis  
16 disease, it is never hereditary; is it?

17 A Some people may have a more susceptibility do  
18 developing silicosis than other people.

19 So in that case, there may be a hereditary  
20 factor.

21 Q Besides the susceptibility, naturally, it can  
22 only be caused by some repeated inhalation of silica dust  
23 over some repeated long period of time; do you agree with  
24 that?

25 A That is my understanding of silicosis and the

1 exposure profile for it

2 MR. SHAPIRO: I have not marked these all now.

3 I'm going to put a number here, No. 1, for the  
4 resume.

5 Let me make sure you identify that.

6 BY MR. SHAPIRO:

7 Q Is that your resume, sir, that I asked a few  
8 questions about?

9 A Yes.

10 (The instrument last above referred to was  
11 marked as Plaintiff's Exhibit No. 1 for  
Identification.)

12 MR. SHAPIRO: I would like that marked as No. 2.

13 (The instrument last above referred to was  
14 marked as Plaintiff's Exhibit No. 2 for  
Identification.)

15 MR. RINGER: If thib is a good place to do  
16 it, can we go off the record so I can get these  
17 copied.

18 (Off the record.)

19 BY MR. SHAPIRO:

20 Q Mr. Badders, at an early date, soon after around  
21 the time that you joined CSX or its predecessors, there was  
22 another industrial hygienist with one of the railroads by  
23 the name of Jay Rupp; is that true?

24 A Yes. Mr. Rupp came on sometime in the early  
25 'SOS. I want to say 182 or '83.



1 Q And I believe he was an industrial hygienist with  
2 the Chessis System at that time you first got to know him,  
3 because the railroads came together?  
4 A Yes.  
5 Q He, for whatever purposes or reasons, retired  
6 Boon thereafter; correct?  
7 A He retired in the mid to -- I don't know if  
8 retired is the right word. Resigned in, like, 186 or early  
9 '87.  
10 Q It is your understanding that he is still working  
11 as an industrial hygienist in the Baltimore area?  
12 A Yes.  
13 Q Who is he employed by?  
14 A I'm not sure who his current employer is.  
15 I think he was working -- last time I heard, he  
16 was working for Martin Marietta.  
17 Q How long ago was that information or was it  
18 provided?  
19 A That was probably about a year or so ago.  
20 Q Have you had any occasion to communicate with him  
21 since that time?  
22 A no.  
23 Q All right. For the record, we did have a prior  
24 deposition in another case not too long ago; is that  
25 correct?

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1 A I recall that we had a deposition, yes.

2 Q It was also on a silicosis related claim of a  
3 plaintiff; correct?

4 A As I recall the deposition, yes.

5 Q if I say something in this deposition about, "Do  
6 you recall previously testifying," that is what I will be  
7 referring to.

8 You recall previously mentioning that you and Mr.  
9 Rupp may have had at least one discussion regarding silica  
10 dust testing by the Chessie System?

11 A I don't know that I recall that in the  
12 deposition. I may have said it, but I don't recall that.

13 Q I'm going to try not to belabor points where it  
14 is not really a big deal. But I think you mentioned that  
15 you may have had a discussion with him, there may have been  
16 some silica dust testing by Chessie, but you said that you  
17 were not positive?

18 A That is probably a fairly accurate representation  
19 of what I said earlier.

20 MR. RINGER: Well, let's ask him questions  
21 here. I don't think there is any purpose to be  
22 served in this form by your asking him if he  
23 recalls what he said in his other deposition. You  
24 are not cross examining him now, nor has he made  
25 any statements to which you can say there were

1 inconsistencies.

2 MR. SHAPIRO: That is true. But I was trying  
3 to refresh his recollection. That is what I was  
4 trying to do.

5 MR. RINGER: Well, he didn't evidence a need  
6 to have his recollection refreshed.

7 MR. SHAPIRO: All right. Your objection is  
8 noted.

9 BY MR. SHAPIRO:

10 Q Mr. Badders, let me show you a document which is  
11 entitled Specifications for Timber, Crossties, Switch Ties  
12 and Ballast. It's dated March 1990.

13 Can you skim through that and see if you  
14 recognize it (tenders to witness).

15 The portion to the rear regarding ballast is the  
16 portion that I am going to be asking you about.

17 Have you seen that document before, first  
18 question?

19 A Not this document. I have seen an earlier  
20 version of it.

21 Q So you would agree that CSX has generally, since  
22 it's become CSX, at least, in the formal title, has  
23 maintained certain specifications for the type and  
24 composition of the rock that underlies and makeb up the  
25 track bed on its railroad track?

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1           A       Yes. They have specifications for the ballast  
2 rock that they purchase.

3           Q       And, let's see, from pages 14 through 18 of the  
4 document, those specifications for the railroad ballast or  
5 rock are set forth; agreed?

6           A       Yes. Pages 14 through -- it appearb to be 18.

7           Q       All right. And those specifications deal with a  
8 number of aspects, but also include the type or general  
9 category of rock that is acceptable for use on the CSX  
10 Railroad lines?

11          A       I believe I saw that mentioned in there. We can  
12 look and see.

13          Q       And here under Quality Requirements, capital C,  
14 section under number seven on page 15, it says that granite  
15 ballast list is predominately considered CSX Standard,  
16 dependent upon economic evaluation.

17                   Is that true?

18          A       That is part of what is under capital letter C,  
19 yes.

20          Q       The only other rock that I see listed here that  
21 is POSBibly to be utilized iB Dolomite LimeBtone?

22          A       Yes. I think that is in there, as well.

23          Q       That type of rock is not to be used on main line  
24 CSX track; however; correct?

25                   MR. RINGER: If you want to do this, I can't

1 make you stop. But I don't know what purpose is  
2 served by you reading from a document that has been  
3 produced in discovery and asking the witness if the  
4 document says what you have read.

5 I don't know how that adds anything.

6 And if you are clearly wanting not to take  
7 more time than you need to take, I don't know why  
8 we are doing this.

9 I would say, as well, that I believe the  
10 witness is not the author of the document that you  
11 are asking him to read from, and I don't know what  
12 you are accomplishing.

13 MR. SHAPIRO: Hopefully, I'm accomplishing  
14 some things, because I want to establish certain  
15 things about granite rock.

16 THE WITNESS: Well, it says in here that  
17 Dolomite Limestone is to be used with -- on lines  
18 that are -- that don't exceed a certain amount of  
19 tonnage.

20 BY MR. SHAPIRO:

21 Q Granite rock is the standard stone that is used  
22 on the main line track; do you agree?

23 A Well, I don't set the specifications for the  
24 engineering department regarding the ballast.

25 However, I have seen a lot of granite on main

1 line track. I don't know if it is the standard. I

2 Q Well, you have had much correspondence with  
3 quarries and you have done a lot of analysis of the makeup  
4 of the stone on the railroad track in the 1980s and the last  
5 few years; haven't you?

6 A In the last few years I have had some  
7 correspondence with the suppliers of our ballast.

8 Q Almost all of that correspondence has been with  
9 suppliers of granite rock; hasn't it?

10 A I believe the majority of them have been -- have  
11 been supplying us granite rock, although some have been  
12 supplying Dolomite Limestone.

13 Q What is your understanding as to your findings of  
14 the granite rock quarries that have distributed rock to CSX  
15 as to the minimum and the maximum percentage of quartz  
16 that you have found to be contained in the granite  
17 distributed to CSX?

18 A I can give you an approximate range of what I  
19 recall.

20 Q That is what I would like.

21 A But there may be -- it may be outside that range,  
22 as well.

23 Q As I recall, it's typically in the range of  
24 anywhere from about 13, 14 percent, maybe up to about 25  
25 percent quartz in the granite analysis?

1           A       I don't recall seeing any that are higher than  
2 than, but there may be.  
3           Q       What about in Dolomite Limestone, what percentage  
4 of quartz have you -- what is the range of percentage of  
5 quartz in the Dolomite Limestone that you have seen?  
6           A       I don't recall.  
7           Q       That particular stone does contain quartz; you do  
8 know that, some percentage?  
9           A       You know it contains quartz, is the question.  
10          A       Yes, it can contain quartz.  
11          Q       Well, I didn't say can.  
12                 I said, you know it contains some percentage of  
13 quartz?  
14          A       I don't know -- I'm not a mineralogist or a  
15 geologist, so I cannot tell you that there is not a  
16 possibility that there isn't limestone that doesn't contain  
17 quartz.  
18          Q       But it is your understanding from any of the  
19 studies that you have read regarding that stone, that it  
20 normally contains some percentage of quartz?  
21          A       It's my understanding that it may contain quartz.  
22          Q       Has there been any change in or -- okay, let me  
23 rephrase this.  
24                 You began with the railroad in 1980 or 181?  
25          A       1980.

1 Q Have you had occasion to review whether granite  
2 was the predominant stone on the railroad prior to 1980 that  
3 you went to work for?

4 A No.

5 Q I'm sorry. Clarify your answer. You don't know  
6 what?

7 A I have not

8 Q You have not looked at what the railroad was  
9 using prior to that date?

10 A That is correct.

11 MR. RINGER: The question was: Had he had  
12 the occasion to review?

13 MR. SHAPIRO: Right.

14 BY MR. SHAPIRO:

15 Q So have you reviewed anything that indicated what  
16 type of rock was being used on the railroads that you worked  
17 for prior to 1980 Since the time that you had gone to work?

18 A No.

19 Q So looking back, you also haven't studied that  
20 issue?

21 A No.

22 Q Do you have any reason to believe that granite  
23 wasn't the predominant stone on the tracks utilized by CSX  
24 prior to 1980?

25 A I don't have any knowledge about that, so you



1 will need to talk to Bomebody from the engineering  
2 department who maybe does.

3 Q All right. Would someone in research and  
4 standards have any information regarding that?

5 A I d6n't know which group you are talking about.

6 Q For example, Mr. Hardy, the director or iB the  
7 director, he is in the engineering department?

8 A Mr. Hardy is in the engineering department. If  
9 it's the same Mr. Hardy that we are talking about, and he  
10 may have some knowledge there. I don't know what his  
11 knowledge is.

12 Q Are you aware of what the total number of --  
13 approximate total number of trackmen and machine operators  
14 there are on the entire CSX Railroad presently?

15 A I don't know that I can give you an accurate  
16 figure. But I think it's somewhere in the neighborhood of  
17 about -- I want to say right around 4- to 5,000.

18 is Q Would that still be accurate as of the early  
19 1980s, within a thousand?

20 A I don't know.

21 Q You think it materially changed in the last ten  
22 years?

23 A It may have.

24 Q If anything, it got lower?

25 I mean, it has gotten lower now than it was then,

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1 is what I am asking.

2 A If you are talking about all the trackmen that  
3 worked on all the railroads that currently make up CSX.

4 Q Right.

5 A What the population of trackmen were in 1980, I  
6 have no idea. It might be lower now. I don't know.

7 Q All right. When you began with the railroad in  
8 1980, had you had any training or had you learned from any  
9 of your industrial hygiene resources as to what the disease  
10 silicosis was?

11 A I don't recall anything specific. However, it  
12 was a -- it is an occupational disease and it -- I'm sure  
13 that if I looked through some reference books, it may be  
14 mentioned.

15 Q Well, as of the time that you started to work  
16 with the railroad, have you ever known anything prior to  
17 that time about the disease silicosis?

18 A I may have -- I may have known something about  
19 it. I suspect that I knew a little bit about it, anyway.

20 Q What is silicosis disease?

21 A Well, I'm not a physician or a toxicologist, so  
22 I'm going to have to give you a layman's answer.

23 As far as I know, it is a disease -- it's a  
24 fibrinogenic disease that is induced by exposure to crystal  
25 and silica over a long period of time at relatively high

1 exposure rates.

2 Q Well, what do you mean by fibrinogenic?

3 A That is the term that I have seen in the  
4 literature as far -- as far as defining what fibrinogenic  
5 is, I don't -- I don't know.

6 Q Well, does silicosis cause permanent lung  
7 disease?

8 A You'll need to speak to a doctor about that.

9 Q Well, you've testified already that one of your  
10 duties is to draw together toxicological industrial hygiene  
11 information.

12 Most industrial hygiene books, a number of the  
13 resources that you have said that you relied on, prior  
14 testimony, talk about the disease silicosis; don't they?

15 A As I said, a number of the industrial hygiene  
16 references do discuss silicosis.

17 Q And they touch on medical aspects of the disease  
18 in those textbooks; don't they?

19 A They give a very broad brush of it. They  
20 describe it in general terms, not in the specificity that  
21 you seem to be asking me.

22 Q Well, they do describe that, first of all,  
23 silicosis is a permanent disease. It's not reversible;  
24 correct?

25 A As far as I know, it's not reversible. If it is,

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1 indeed, silicosis.

2 Q That is what we are talking about.

3 In a case of confirmed silicosis, there are  
4 fibrous rounded nodules that damage the lung tissue; isn't  
5 that correct?

6 A It's my understanding that there are fibrous  
7 round nodules associated with the diagnosis of silicosis.

8 Q And those fibrous round nodules in a confirmed  
9 case of silicosis essentially represent permanent damage to  
10 lung tissue; don't they?

11 A As far as I know, yes. As far as -- but to go  
12 any -- to actually clarify what that damage is, you need to  
13 speak to a physician.

14 Q All right. And according to these industrial  
15 hygiene textbooks that talk about the disease in basic  
16 terms, they indicate that those rounded nodules can be seen  
17 in chest radiographs, or chest X-rays; can't they?

18 A That may be mentioned in one or more of the  
19 textbooks that I think I previously testified about.

20 Q It's possible to monitor for a worker's  
21 contraction of silicosis disease by conducting the chest  
22 X-rays on a periodic basis; isn't it?

23 It's one method of monitoring; right?

24 A I think your question is: Is it possible to take  
25 X-rays of persons who have a potential exposure to silica?

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1 Q Yes.  
2 A Yes.  
3 Q Because reviewing chest X-rays is one way to look  
4 for the rounded nodules that represent permanent damage to  
5 lung tissue; right?  
6 A I don't look at chest X-rays, BO if you want to  
7  
8 Q Didn't ask you that. That wasn't the question.  
9 A Well, I don't know anything about X-rays, other  
10 than the fact that, you know, I know X-rays exist and --  
11 Q Well --  
12 A YOU started asking me about details on what an  
13 x-ray contains.  
14 Q Right.  
15 A I don't have that kind of knowledge.  
16 Q I'm not asking you if you evaluate X-rays, Mr.  
17 Badders.  
18 I'm saying: Is it possible to monitor workers  
19 for potential exposure to silica dust by periodically having  
20 chest X-rays conducted? Correct?  
21 A It's possible to take X-rays on persons who are  
22 exposed to silica.  
23 Q And X-rays are one way of monitoring workers'  
24 exposure to silica by having a medical person review those  
25 X-rays; correct?

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1           A     No.  
2           Q     Why not?  
3           A     Because you are asking about exposure to silica.  
4                 What the x-rays show is how the person has  
5 responded to that exposure.  
6           Q     Well, in some sense, that evaluates whether they  
7 have possibly been exposed to silica dust; right?  
8           A     There you are getting into a determination of  
9 what is causing the nodules, and that is medical area and I  
10 don't have that knowledge.  
11          Q     Right.  
12                 But you can draw on the information from a  
13 medical doctor, and if the medical doctor has told you aB  
14 the industrial hygiene director that a number of thebe chest  
15 X-rays show what we think are silicotic nodules, that would  
16 help you evaluate whether there is a silica dust exposure  
17 risk in the workplace; right?  
18          A     If I knew where those particular people worked,  
19 how long they have exposureb -- an awful lot of information  
20 other than just --  
21          Q     There are other variableb that you would bring  
22 together, but certainly the chest X-ray reports could be one  
23 that would assist you; wouldn't they?  
24          A     lio.  
25                 The information from the physician who had

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1 evaluated the chest X-rays where that physician said that  
2 there may -- that there appears -- that they may have some  
3 silicotic individuals, or people with SiliCOSiB, that would  
4 -- that would be information that I would use.

5 Q All right. Now, are you familiar with pulmonary  
6 function or breathing testing?

7 A Generally. In a general fashion, yes.

8 Q Well, have you had some involvement in  
9 coordinating pulmonary function or breathing studies of  
10 various workers that are employed by CSX?

11 A Yes, I coordinate that program.

12 Q What is it that a pulmonary function or breathing  
13 test is designed to determine?

14 A Basically from my knowledge of it, it's  
15 essentially, I think of it as a performance test of the  
16 lung.

17 I don't know if that is an accurate description  
18 or not, but that is my layman's understanding of it.

19 Q Is there anything that can be gathered from a  
20 pulmonary function test to give you any feedback on  
21 evaluating whether there is a silica dust risk in the  
22 workplace?

23 A Well, since I don't do the evaluations on  
24 pulmonary function tests, I can't tell you. I don't know.

25 Q Well, I am getting at the same area we were

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1 talking about in chest X-rays.

2 If the medical doctor in the medical department  
3 of CSX assists in reviewing those and gives you feedback, is  
4 there anything you can learn from those pulmonary function  
5 test results that could assist you in evaluating the  
6 workers' silica dust exposure risk in the workplace?

7 A Not that I know of.

8 Q Then why would you ever give them?

9 A Basically they are given for a respirator  
10 certification, although there may be other uses that  
11 physicians have for those values.

12 Q Well, isn't it true that pulmonologists often use  
13 pulmonary function testing as one of the diagnostic tests  
14 they use in evaluating a particular lung disease?

15 A I think you need to ask a pulmonologist what he  
16 uses for his evaluations.

17 An industrial hygienist is not one to advise a  
18 pulmonologist on medical issues.

19 Q But I'm not asking you if you advise the  
20 pulmonologist.

21 I'm saying from your knowledge as an industrial  
22 hygienist, you work very closely with the medical officers  
23 at CSX; don't you?

24 A Yes.

25 And you report to the chief medical officer at



1 CSX; right?

2 A Yes.

3 Q You have conferences informally probably every  
4 day -- almost every day you are in the office with someone  
5 who is a medical officer here; don't you?

6 A Not necessarily, but I may.

7 Q All right. You have helped coordinate the  
8 pulmonary function testing that is ongoing right now with  
9 maintenance of way workers on a periodic basis?

10 A Yes.

11 Q You know that pulmonologists use pulmonary  
12 function testing as one of their means to evaluate lung  
13 disease, very commonly?

14 A They may very well. But if you want to get into  
15 what a pulmonologist does with those values, you talk to a  
16 pulmonologist.

17 Q I'm not asking you that. I am not asking you to  
18 state what a pulmonologist does.

19 My question was: When you get reports back from  
20 a doctor on the results of the pulmonary function, can't  
21 that, along with other items, help you evaluate whether  
22 there is a silica dust risk in the workplace?

23 A I don't specifically get the reports back. They  
24 actually go through the chief medical officer. Although I  
25 may see some of the data, or I will see the data.

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1 All right. But you didn't answer my question. I  
2 will move on as soon as you give me that answer.  
3 You said that you didn't see the reports.  
4 I said: Isn't it true that pulmonary function  
5 testing in the reporting that you get back can assist you  
6 along with other variables in the evaluation of whether  
7 there is a silica dust risk amongst the workers at CSX?  
8 A No.  
9 Q You don't think it assists in any way?  
10 A I don't know if it assists or not. I would have  
11 to depend on the opinion of a physician.  
12 Q That is how I phrased the question.  
13 A To make that -- no. You asked if I could look at  
14 those values -- the question I understood. Maybe I am  
15 understanding you wrong.  
16 You asked me: If I looked at the pulmonary  
17 function values, could I use those values to make a  
18 determination of silica exposure risk?  
19 My answer to that is no.  
20 Q No. I asked you: If the doctors report back to  
21 you on the results of the pulmonary function testing, is  
22 that information from the doctors something that can have  
23 value in evaluating silica dust risks of your employees  
24 working?  
25 A I'm not sure exactly what you are asking of me.

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1 Well, when breathing tests are done --  
2 A Um-hmm (indicating affirmatively).  
3 Q -- there are a number of criteria that are  
4 evaluated in the breathing tests; do you agree with that?  
5 A Yes.  
6 Q And there are certain relatively normal ways of  
7 looking at different kinds of lung impairment in the  
8 pulmonary function tests as in obstructive verbus  
9 restrictive impairment of a lung; right?  
10 A I know there are diagnoses that physicians have  
11 made from that, yes.  
12 Q Well, someone who has contracted the disease  
13 silicosis generally will have certain patterns of pulmonary  
14 function; is that your understanding?  
15 MR. RINGER: I think you are getting into an  
16 area that is way beyond the expertise of thib  
17 witness.  
18 MR. SHAPIRO: Let's not make a speaking  
19 objection. What is the objection to the question?  
20 MR. RINGER: My objection is you are getting  
21 into an area beyond the expertise of this witness,  
22 unless he tells you it is within his expertise.  
23 We can go on all day long with your trying to  
24 inSiBt that he is an expert on things that he says  
25 he doesn't know about. Take as long as you want,

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1 but you are just wasting time.

2 MR. SHAPIRO: Glad you stated your opinion.

3 BY MR. SHAPIRO:

4 Q Okay.

5 A As far as a pulmonary function test, it's --  
6 would you mind asking your question again. I kind of lost  
7 track.

8 Q There are certain parameters and tests that a  
9 doctor would look for to see -- let me phrase it this way.

10 You have said that you have understood that there  
11 are obstructive or restrictive parameters that can be noted  
12 in a pulmonary function test. That is your understandin

13 A Yes.

14 Q Well, when you get the reports back and review  
15 this with the chief medical officer, I mean, you have had  
16 these done on hundreds of workers, is there any discussion  
17 as to what is turning up?

18 I mean, you are doing the testing on a constant  
19 basis.

20 A I don't review the reports with the chief medical  
21 officer. The chief medical officer reviews the reports and  
22 he makes his determination.

23 Q All right. Let me go back to some of your  
24 underbstandings about the disease silicosis, also.

25 Is it your understanding from your reading

1 industrial hygiene textbooks that disease symptoms of  
2 silicosis can progress, that is, they can worsen, even after  
3 a worker has been removed from the exposure to the silica  
4 dust?

5 A It's my understanding that there is a small  
6 percentage of people who -- who may have a progression of  
7 the disease when they are no longer exposed, yes.

8 Q Do you agree from your readings in industrial  
9 hygiene textbooks that the disease silicosis can become a  
10 disabling lung disease?

11 MR. RINGER: What do you mean by disabling?

12 BY MR. SHAPIRO:

13 Q By disabling, a person cannot work in a heavy  
14 labor type job in certain cases of confirmed BiliCOBiS  
15 disease.

16 A I know from my readings that silicosis can have  
17 varying degrees of severity.

18 As far as the physiological ability of a person  
19 to continue to work in a heavy work job, I don't know for  
20 sure. I think you need to refer to a physician for that.

21 Q Based on your evaluation of the workplace,  
22 particularly we are talking about track maintenance and  
23 track repair, what are the Bources that you have determined  
24 exist of fine particles of silica dust being cause to -- how  
25 would I finalize the sentence?

1 I guess, cause to go into a dust cloud or to be a  
2 visible source of dust -- it's hard to -- in other words,  
3 what sources have you seen that you believe cause the --  
4 cause there to be concentrations of fine particles of silica  
5 dust in the air?

6 A The operations -- if I understand your question,  
7 you are asking: Are there operations that we have measured  
8 that we have seen silica dust in?

9 Q Sure. Exactly. That have caused --

10 A Those are normally operations where ballast is  
11 disturbed in one way or another. It is almost always either  
12 with a piece of machinery or when ballast is being unloaded.

13 Q All right. And ballast being unloaded is a  
14 process, I take it, you are describing where a hopper car, a  
15 train car called a hopper car, is filled up to the top,  
16 normally, with granite rock, and there is a process where  
17 workers for CSX have to unload the rock out of the train car  
18 onto the railroad track.

19 A Yes, although I don't know that the hopper cars  
20 are always filled to the top. But those are heavy cars.

21 Q Sometimes they are and sometimes they are not.  
22 But they are filled to some extent with rock; correct?

23 A Yes.

24 Q And these trackmen have to, in their job duties,  
25 stand -- we're talking from 1980 to -- well, up until 1990,

1 from before, historically. These trackmen would have to  
2 stand essentially adjacent to the hopper cars, manipulate  
3 certain implements on the cars, and allow the rock, by force  
4 of gravity, or the opening of shoots, go down onto the track  
5 bed; correct?

6 A YeB.

7 Q Now, in dry conditions, have you observed and  
8 seen visible dust being generated from that operation?

9 A Yes, at times, yes.

10 Q And it is your understanding that that dust that  
11 has been generated -- maybe that is the word I was looking  
12 for before -- contains some portion of silica dust, if it is  
13 granite rock?

14 A Yes.

15 Q And it's visible, normally, when the dust is  
16 generated. You can see the dust; correct?

17 A Usually you can see the dust at least sometime  
18 is during the dumping process.

19 Q Does it take on a certain color to the eye?

20 A It kind of looks like brown dust to me.

21 Q Brown?

22 A That is the color I have normally seen, like a  
23 light tan.

24 Q All right. Have you seen it where were the dust  
25 in this unloading process can essentially depending upon

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1 how far away you are standing, become so thick that you  
2 cannot see a worker standing next to the car?

3 A I have not seen that situation where I could not  
4 see the worker.

5 Q Have you seen it where it is almost like a fog  
6 and you can just barely make out the worker in the dust?

7 A I have seen a heavy dust cloud when unloading  
8 ballast, particularly in the early 1980s when I did the  
9 ballast dust sampling.

10 Q What caused you to go out and test for silica  
11 dust being generated in the air in 1981?

12 A I had started with the medical department, I had  
13 been transferred in from another department, and I was  
14 becoming acquainted with the railroad, and as part of that,  
15 I went with some maintenance of way gangs and had been them  
16 dumping ballast and thought that the dust exposure was high  
17 enough that I needed to evaluate it.

18 So I obtained the equipment and made the  
19 evaluations.

20 Q You wrote a memorandum on November 10th, 1981 to  
21 the then chief medical officer regarding your testing of the  
22 air for silica dust in the zone of a ballast regulator  
23 operator; correct?

24 A I wrote a report sometime in that time period.  
25 That may, indeed, be the date, but --.



1                   Take a look at this, if you would, please, and  
2    tell me if that appears to be the report (tenders to  
3    witness).

4                   That will become No. 4. if it is identified.

5                   (The instrument last above referred to was  
6                   marked as Plaintiff's Exhibit No. 4 for  
                  Identification.)

7                   THE WITNESS: Yes, it appears to be a copy of the  
8                   report that I wrote to the chief medical officer in  
9                   1981.

10                  BY MR. SHAPIRO:

11                  Q        At that time, a Dr. Mead was the chief medical  
12                  officer for the railroad?

13                  A        Yes.

14                  Q        By the way, there is a Dr. Joseph Thomasino who  
15                  is also a medical officer with the railroad; correct?

16                  A        Yes.

17                  Q        When did he become the chief medical officer,  
18                  what year, approximately?

19                  A        This is a little complicated because he was a  
20                  chief medical officer on the Chessie System, so I'm not  
21                  exactly sure of the date that he became the chief medical  
22                  officer on the Chessie System.

23                  Q        As of 1981, had the Chessie System merged with  
24                  one of the railroads that became CSX, or was that after that  
25                  date?

1           A     The merger of the Chessie System and Seaboard  
2 System Railroads to form CSX was later on.

3           Q     Okay. So Dr. Thomasino was no part of this  
4 railroad in 1981?

5           MR. RINGER: No part of the railroad for  
6 which Mr. Badders was working in 1981, is what you  
7 want to ask.

8           BY MR. SHAPIRO:

9           Q     Right.

10          A     He was not working for Seaboard System Railroad  
11 or one of its predecessor railroads.

12          Q     Okay. Now, on September 30th, 1981, you took  
13 some air samples of a ballast regulator operator that you  
14 reported on in this November 10th, 1981 memo; correct?

15          A     If that is what it says in the report, yes.

16          Q     All right. So I don't spend a lot of time, is  
17 there anything in this that you at this time believe is  
18 inaccurate?

19          A     No. The exposure limit has changed, but not  
20 other than that.

21          Q     Well, let me go right to that.

22                 On Page I here, you outlined an exposure level  
23 for silica dust.

24                 What particular measure or permissible exposure  
25 limit for dust did you utilize in your 1981 report?

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1                   What was the source of the formula or  
2 calculation?  
3           A     If I can look at the report, it may be listed in  
4 there.  
5           Q     (Tenders to witness).  
6           A     I think -- well, this is a --  
7           Q     It comments on it later, I think.  
8           A     It is the OSHA Permissible Exposure Limit, and  
9 the threshold limited value, at that time, were the same for  
10 respirable particles, which is what this formula is that you  
11 see in the report.  
12          Q     On Page I?  
13          A     On Page 1.  
14          Q     So you determined to look to the Occupational  
15 Safety and Health Administration exposure level for silica  
16 dust in reporting on the silica dust risk in your 1981  
17 report?  
18          A     Well, that formula was in both the OSHA  
19 permissible exposure limit and the ACGIH --  
20          Q     ACGIH stands for --  
21          A     American Conference --  
22          Q     -- American Conference of Government Industrial  
23 Hygienists?  
24          A     Yes. I think it is governmental, not government.  
25                Okay. You felt that was a reasonable standard to

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1 utilize for determining a permissible exposure level of  
2 silica dust at that time?

3 A Yes.

4 Q You mentioned in this report, did you not, that  
5 the dust generation was enough to completely hide the  
6 ballast regulator machine from an outside observer; didn't  
7 you?

8 A It is possible under certain operations that that  
9 could happen, and I may have well stated that in the report.

io Q Well, in fact, you did state it on Page 2; didn't  
11 you?

12 A AB I said, I put -- I mention it in here during  
13 the sweeping operation, but that is the brooming operation.  
14 That is what the report says.

15 Q In reporting on this condition, you felt it was  
16 relatively representative of the conditionb facing a ballast  
17 regulator operator on the railroad, at least as far as dry,  
18 dusty condition; didn't you?

19 A I don't recall if I stated that in the report.

20 Q I am asking you if that was your opinion. You  
21 reported on it.

22 In other words, you picked that as a condition to  
23 report on, that is, a ballast regulator in dry conditions;  
24 right?

25 A Well, what I reported was the exposures for

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1 ballast regulators under the conditionb that were  
2 described. And they were -- that was dry dust -- dry rock.

3 Q That would not be unusual for a ballast regulator  
4 who was engaging in dry conditions and sweeping operations;  
5 right?

6 A It may vary some from location to location and  
7 operation to operation.

8 But at the time, that was the sample that I had,  
9 and I made my recommedations based on the sample.

10 Q All right. You knew and reported on the fact  
11 that doors couldn't be sealed properly in the cab, and also  
12 that dust was observable coming up between spaces and where  
13 actual control levers were in, I guess, the floorboard of  
14 the machine; right?

15 A If you let me look at the report, I will  
16 confirmed what I wrote.

17 MR. RINGER: I thought we were not going to  
18 do this.

19 MR. SHAPIRO: Well, I have to clarify certain  
20 points, Wayne. Sorry.

21 THE WITNESS: That is what the report eays.

22 MR. RINGER: You have not clarified anything  
23 except that the words say what they say. The  
24 document speaks for itself.

25 BY MR. SHAPIRO:

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1 Q Now, you actually suggested that the men involved  
2 in this type of operation, in this exposure to silica dust  
3 -- I'm sorry.

4 You described two different personal protective  
5 devices, one being a disposable mask, and the other being  
6 something called an air-powered hood; correct?

7 A Yes.

8 Q Now, you admit that under general industrial  
9 hygiene principles that the personal protective devices are  
10 the least preferable method of controlling silica dust,  
11 that is, the more preferable methods would be either  
12 engineering controls or administrative controls; correct?

13 A If engineering controls or administrative  
14 controls are available, they would be more desirable than  
15 personal protective equipment. However, they may not be  
16 available for that particular type of machinery.

17 Q Right.

18 A or able to be maintained in a satisfactory manner  
19 because of the movement of that machinery.

20 Q Now, one type of engineering control that was  
21 available at that time, that means technically available,  
22 would be to some method, in some method, wet the ballast  
23 rock prior to these operations of disturbing the ballast;  
24 correct?

25 A It would be pretty hard to wet the ballast rock

1 for a ballast regulator operator.

2 Q My question is: Technologically available, not  
3 cost, not economics, but technologically available.

4 A If you are asking could you put water in a tank  
5 car and roll over it, or have a water truck, you may be able  
6 to do that. I don't even know if that has been tested with  
7 a ballast regulator, and I don't know if it would actually  
8 do any good. Because you have to thoroughly saturate the  
9 ballast. And as a result of the activities that you are  
10 doing, you are going to be -- you are moving that rock, you  
11 are using a broom to move the rock, so you are going to have  
12 collisions of the rock and you may have dust generated.

13 It may be reduced if you have wet ballast.

14 Q It may be reduced, it would be technologically  
15 available.

16 You are identifying feasibility limitations;  
17 right? Not technological limitations.

18 is In other words, water cannons are available,  
19 water trucks are available. You are commenting on why it  
20 would not be economically or from a feasibility standpoint;  
21 correct?

22 A Well, I think I'm talking, also, about not only  
23 economics.

24 I am talking about, number one, how do you know  
25 how to wet the ballast enough so that it is fully saturated

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Q I don't want to --  
MR. RINGER: Let him finish.

BY MR. SHAPIRO:

Q I don't want to stop your answer, but I want to get an answer to whether it is technologically available. Then you may explain all you would like.

Technologically, would it be available to wet the rock, prior to a ballast regulator operator doing their operations?

A I don't know if it is technologically available, but you can wet the rock adequately to reduce the dust exposure below the permissible exposure limit during the time that you are doing certain operations.

Q But it could be wetted using a water cannon; couldn't it?

You are again stating a what if.

I mean, we know as of 1981, if you wanted to take a water cannon out there, you can wet the rock.

A I don't think it could actually be done because you are talking about trying to wet miles and mileb of track and how to get to it. Where do you get the water to it? You cannot even get to some of these places. There are no roads there.

So I don't think technologically that it is even



1 f easible.

2 Q But isn't technological a question of: Do they  
3 make water trucks?

4 The answer is, yes, right, those are made.

5 A They make water trucks, okay.

6 Q And there are water vehicles that have containers  
7 of water that run on railroad tracks; correct?

8 A I don't know that I have ever seen one, but I  
9 suppose it could happen.

10 Q All right. Now, what other types of engineering  
11 controls would have been available as of 1981 or that you  
12 may have even suggested besides the one we just talked  
13 about, wetting?

14 A If I suggested one, it would be in the report.

15 Q Do you remember any others that would have been  
16 available?

17 A Well, I don't know that I suggested -- said that  
18 it would be available to be able to wet the ballast, miles  
19 of ballast, but you are saying that you think that is  
20 technologically feasible.

21 Q No. I asked about that. I am moving to another  
22 point.

23 I am saying: Are there any other points of  
24 engineering controls that would have been available in 1981?

25 A I don't know if there are other techniques

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1 available or not. You -- with engineering controlb --

2 Q You mentioned --

3 A I don't recall any. I may have -- if I mentioned  
4 something in there (indicating) --

5 Q Well, I wasn't looking for any others. But I see  
6 clearly that you mention the enclosure of the cab and a dust  
7 barrier on the regulator controls.

8 A Right.

9 Q Okay. As of 1981, there were ballast regulator  
10 manufacturers who were then offering air conditioning in  
11 ballast regulator cabs?

12

13 BY MR. SHAPIRO:

14 Q Correct?

15 A I don't know if they did it or not.

16 Q Did you check?

17 A No.

18 Q You indicate in your report that that waB  
19 something, that is air conditioning, which should be looked  
20 at, but you never contacted the manufacturers yourself?

21 A Wo. That report was provided to the engineering  
22 department.

23 Q For them to check on it?

24 A For them to check on it, because they knew their  
25 own operations.

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1 Q Okay. What type of administrative control,  
2 which, again, you agree is preferable to protective  
3 equipment on the worker, what typeb of administrative  
4 controls could have been implemented as of that time?

5 A I don't know if there is any administrative  
6 control that could have been used.

7 Q Give me an example of what are administrative  
8 controls.

9 A Basically administrative control is -- like an  
10 example would be that I had someone who is exposed to heat  
11 near a blast furnace, and I would have, maybe, four, five  
12 people who work that job, and they would only spend a  
13 certain amount of time in the vicinity of intense heat with  
14 their protective equipment on.

15 Q So, for example, limiting a person's exposure to  
16 a known dangerous substance or condition would be an example  
17 of an adminibtrative control?

18 A Well, limiting their exposure by some method of  
19 reducing their time of exposure, primarily. Although there  
20 may be other engineering controls. That is the one I am  
21 most familiar with.

22 MR. SHAPIRO: Let's take a quick break. We've  
23 been at it a while.

24 (Off the record.)

25 BY MR. SHAPIRO:

1 Q Mr. Badders, I've got a document here which is  
2 four pages, and it talks about silica dust and silicosis.  
3 First of all, is that something that you either  
4 authored or helped to draft (tenders to witness)?

5 A Yes.

6 Q All right. Do you remember when that was  
7 created, during what calendar year?

8 A I believe it was during 1992. Probably 1992. It  
9 may have been -- 1991. Probably 1992. Probably.

10 Q I would like for you to scan through it, because  
11 I want you to be relatively careful about this, and simply  
12 tell me if you still believe it is accurate, but also if  
13 there are any facts in there as far as silica dust or  
14 silicosis which you didn't know, to your best knowledge,  
15 before 1991.

16 In other words, if there is something in there  
17 that you feel is very recent information that you may have  
18 learned after 1992, tell me; otherwise I'm going to assume  
19 that you knew of it, say, as of 1991, 1990, at least.

20 MR. RINGER: I don't think your assumption is  
21 admissible in evidence, but I think it is dAU  
22 appropriate for your question.

23 MR. SHAPIRO: All right.

24 MR. RINGER: While the witness is reading,  
25 may I say for the record that we, pursuant to the

1 Court's order, on September 6th, produced another  
2 -- about an inch and a quarter or an inch and a  
3 half worth of air sampling testing data. And this  
4 morning I have handed to Mr. Shapiro two more  
5 packets of things that were discovered, one being  
6 three pages topped by a letter from Mr. Badders to  
7 a man named Rodney Harris reporting some air  
8 sampling done on October 17, 1986.

9 And the other one is a packet about a third  
10 of an inch thick with various air sampling  
11 records.

12 As far as I know, at this moment, we have now  
13 produced all of the known silica sampling data with  
14 the exception of the dioxide parallel testing which  
15 the Court ordered that we did not have to produce.

16 If others are discovered, they will be  
17 produced.

18 BY MR. SHAPIRO:

19 Q All right?

20 A Can I ask him --

21 Go ahead. I don't care. You got a question?

22 MR. RINGER: About what I just said or about  
23 this document?

24 THE WITNESS: What you just said.

25 MR. RINGER: Yeah, you can ask me.

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1 THE WITNESS: There was a -- another set of  
2 sampling that was done as part of attorney work  
3 product for a specific case and they were not  
4 included and they were not respirable zoned dust  
5 samples, but they were for silica.  
6 MR. RINGER: That is something else that has  
7 not been produced.  
8 MR. SHAPIRO: All right. That is fine.  
9 BY- SHAPIRO,  
10 Q All r t Getting back to ilica outline  
11 there.  
12 Okay. I guess my first question is: Do you  
13 still believe what was stated in that training outline on  
14 silica dust and silicosis to be accurate today?  
15 A To the best of my knowledge, yes.  
16 Q And more importantly, for the purposes of this  
17 case, was there anything in there that, as far as your  
18 knowledge as an industrial hygienist, that you didn't know  
19 in, say, the calendar year 1990 that you saw outlined?  
20 A When I prepared this, I looked at some literature  
21 that helped to refine some of the items that are mentioned  
22 in here.  
23 So there is a few items very specific in nature  
24 that I may have had some general idea but didn't know the --  
25 didn't have an idea of the specifics as much -- as well as

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1 they are stated in this.

2 Q Well, the portions that deal with your knowledge  
3 of the disease silicosis or that deal with the attributes of  
4 silica dust and what it can do, those portions you would  
5 have known prior to 1990; correct?

6 A I knew there was a disease SiliCOBiS, and I knew  
7 it was a fibrinogenic disease before 1990.

8 As far as going into the detail and describing it  
9 as discrete nodules and things like that, I researched that  
10 out when I wrote this document.

11 Q Well, much of it is basics of silica dust and  
12 silicosis you talked about in your two reports of 1981 and  
13 1982; correct?

14 A Yes.

15 Q And --

16 A Well, I think the reports basically state  
17 exposure to silica over -- at a high enough exposure rate  
18 for an extended period of time can produce silicosis. And I  
19 think I include some symptomatology of that with that in  
20 those reports.

21 Q In the outline of the symptoms of the disease  
22 here, referring to what is going to be marked for  
23 identification as No. 6, the symptoms of the disease, you  
24 knew about those by the time you drafted your 1981 report to  
25 Dr. Mead; correct?

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1           A     What symptoms did I mention?

2           Q     You mentioned shortness of breath, dry cough,  
3     fatigue, reduced lung capacity.

4           A     I think I mentioned some very basic symptoms  
5     associated with silicosis in my report, and I think some of  
6     them were discussed in that one, as well.

7                     I don't know that I had all the parts that you  
8     have just described in both of those reports. I had some of  
9     them, I'm pretty sure.

10          Q     And, again, in this report that you outlined here  
11     in No. 6, which is '92 or '93, you referenced the  
12     occupational Safety and Health Administration Standards as  
13     being -- well, you referenced those as being .1 milligram  
14     respirable quartz particles per cubic meter of air; correct?

15          A     Correct.

16          Q     As the reference standard that you relied upon?

17          A     That is the standard that I used

18                     (The instrument last above referred to was  
19                     marked as Plaintiff's Exhibit No. 6 for  
                      (Identification.)

20          BY MR. SHAPIRO:

21          Q     And you stated here that these workers that had  
22     possible exposure to silica dust would be asked to take part  
23     in a medical surveillance program that may include chest  
24     X-rays, pulmonary function test, and their medical history;  
25     correct?

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1           A        I don't think that is what it states. I think  
2 what it states is they may be asked.

3           Q        Right. I said may be.

4           A        That they may be asked to participate in a  
5 medical surveillance program.

6           Q        If I understood your question, it WaB phrased a  
7 little bit differently.

8           Q        All right. But those workers that had that type  
9 of exposure might be asked to participate; right?

10          A        There may be selected employees based on the type  
11 of job they do in their exposure that they may be asked to  
12 participate in a medical surveillance program.

13          Q        So the medical department felt that chest X-rays,  
14 pulmonary function test, and medical history may have some  
15 relevance in monitoring silica dust exposure; right?

16          A        No.

17          Q        Then why would you include it?

18          A        It is to monitor the impact of silica dust  
19 exposure on the people who are exposed.

20          Q        Right. Impact.

21          A        But it would help you evaluate what types of  
22 hazards were existing to silica dust once you got all this  
23 data back.

24          A        No, other than if -- without a very accurate work  
25 history and knowing what their exposures were for each type

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1 of job that they did and how long they did it, it's -- as  
2 far as for exposure assessment, medical surveillance is not  
3 really set up for exposure assessment, other than the fact  
4 that you may need to do exposure assessments.

5 Q What I have here is what we have numbered  
6 No. 5, which is a document dated February 10, 1982. It is a  
7 report by you to Dr. Mead.

8 Can you quickly review that and tell me if that  
9 seems to be the report you drafted (tenders to witneBS).

10 A It appears to be the report that I prepared for  
11 Dr. Mead on Billica exposure when unloading ballast.

12 Q This was the proceBS we were describing earlier  
13 where the men have to stand beside hopper cars as they are  
14 unloading granite rock out of the hopper cars?

15 A Yes.

16 Q And this was a few months after your other report  
17 of November of 1981 that we marked as Exhibit No. 4.

18 And in this, as reference for Dr. Mead as to what  
19 were the permissible exposure levels, you utilized  
20 Occupational Safety and Health Administration limits which  
21 we described as .1 milligrams of dust per cubic?

22 A That was not the PEL at that time.

23 Q Which one were you relying upon here?

24 A The calculated formula, which was the one that  
25 was reported earlier, and it is at the top of Page 2 of the

1 report.

2 Q Okay. This is before the .1 milligram standard  
3 had come into existence?

4 A Yes.

5 Q Was this the OSHA general industry permissible  
6 exposure limit standard that you referenced?

7 A Yes. Although it may have -- that waB also the  
8 threhold limit value at the time.

9 Q And in your report, you said that silica was a  
10 toxic dust.

11 What did you mean by toxic dubt?

12 A That it would -- as far as the way that I phrased  
13 it in the report, I'm not sure. Let me take a look at it.

14 Q Okay.

15 A (Perusing document)

16 Q What do you mean?

17 A What I mean is that it's a dust that will have  
18 that cannot have some activity in a perbon who is exposed to  
19 it above and beyond the ability -- or above and -- or just  
20 taking up space in their lungs if they inhale the dust.

21 Q Well, it can cause permanent lung damage for one  
22 thing; right?

23 A It has the potential of causing permanent lung  
24 damage.

25 Q Now, some of the results of your tests in dry

1 weather conditions found that these track laborers were  
2 being exposed to levels in excess of the referenced standard  
3 that you relied on; correct?

4 A Yes.

5 Q Workers such as the worker that you evaluated  
6 here in 1982 continued to unload on certain occasions dry  
7 ballast from these rock hopper cars, continuing on for -- up  
8 until the present date, they still do that activity for the  
9 railroad; don't they?

10 A They still unload ballast and rock. And if the  
11 rock is dry, I guess they are unloading dry ballast.

12 Q And dust is generated in that process, as you  
13 described in your report?

14 A Yes.

15 Q In dry conditions?

16 A Yes. Although we have different cars now and the  
17 way they are dumped, there is some significant reduction in  
18 the amount of dust generated.

19 Q You made significant reductions. How did you do  
20 those? How did you accomplish it?

21 A The reduction that I have seen has been primarily  
22 on the type of car. They redesigned the ballast car, so  
23 they dump in a slightly different fashion.

24 Q Who redesigned? Through the engineering  
25 department or through new purchases of rock hopper cars or

1 what are you referring to?

2 A I don't know who did it. It was probably the  
3 engineering department. It may have been mechanical.

4 MR. RINGER: Can we fix this in time?

5 MR. SHAPIRO: Yes. Believe me, I was going  
6 to get to that.

7 BY MR. SHAPIRO:

8 Q You have made some strides, you are saying.  
9 when did these changes in the way that the rock  
10 hopper cars, I take it, its design changes, when did they  
11 first come into use on the railroad?

12 A I don't know.

13 Q Who would know that in the engineering  
14 department?

15 A I'm not sure who would know that in the  
16 engineering department. But they would be more likely to  
17 know than I would.

18 Q Well, how did you come about knowing the  
19 information, then?

20 A observation.

21 Q Okay. But you have had occasion to communicate  
22 and coordinate things with the engineering department to  
23 control health and safety concerns; right?

24 A I've communicated with the engineering department  
25 on safety and health issues, yes.

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1 Q And you have had communications with them about  
2 various controls to assist with the reduction of silica dust  
3 in the unloading process, haven't you, unloading of rock  
4 hopper cars?

5 A I don't know that I have had any specific  
6 regarding that, no.

7 Q Okay. Well --

8 A I -- there is a --

9 Q -- they are interested to reduce the dust just  
10 like you're attempting to control the hazard in general;  
11 correct?

12 A I believe they are, yes.

13 Q Well, what I am trying to get at is you have done  
14 a report here in 1982, we are trying to, you know, tie down  
15 a date when some of these changes were first made because  
16 there is 1982 to the present date, and we are trying to  
17 figure out when they happened.

18 So are you saying these happened after 1990?

19 A No. I'm saying that I don't know.

20 Q You don't know when they happened?

21 A I don't know when they happened.

22 Q But wouldn't it be one of your responsibilities  
23 to assist in administering any controls you can to make it  
24 safer for these trackmen to unload the rocks?

25 A Not necessarily, but I would -- would have

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1 assisted in evaluating what the effect of the design change  
2 would have been, as far as reducing the exposure. If they  
3 had asked. They didn't ask.

4 Q They being the engineering department?

5 A Yes.

6 Q Well, is this just happening in a vacuum or is  
7 the engineering department trying to reduce silica dust  
8 exposure to the trackmen?

9 A The engineering department is trying to reduce  
10 silica exposure to the trackmen.

11 Q And are you familiar with the fact that there are  
12 remote controls that can allow the operation or the opening  
13 of these ballast rock car shoots from a distance?

14 A I know that we have purchased within the last few  
15 years some remote control cars that have that capability.

16 Q Do you know if those were available in the 1980s?

17 A I don't know.

18 Q Out of all of your recommendations that you made  
19 regarding controlling silica dust, that is, for trackmen or  
20 ballast regulator operators, in 1981 or 1982, what controls  
21 were adopted within five years after the date of your  
22 report?

23 A The use of respirators.

24 Q That is the only control that was adopted in five  
25 years after the date of your report, or either report?

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1 A Yes.

2 Q And you recommended either a disposable  
3 respirator or an air powered supplied, I guess, hood unit;  
4 correct?

5 A Yes.

6 Q Was there a negative pressure fit on the personal  
7 protective gear of the air supplied hood? That is, did it  
8 provide a positive seal around the worker's face?

9 A It's a hood. It's not a -- it's not a tight  
10 fitting respirator. So there is no seal to the face, no.

11 Q It filters out an air supply? it provides a  
12 filter for the air supply?

13 A Yes, it does provide a filter for the air supply.

14 Q Disregarding costs, do you feel it was a better  
15 method of controlling the intake of possible silica dust to  
16 the worker than a disposable mask, like make an 8710 D/M  
17 mask?

18 A That unit has a higher protection factor, so it  
19 could be more effective if it is used properly. And that is  
20 a big if, because that particular piece of equipment --

21 Q You have to explain.

22 A You have to depend on the person using it  
23 properly.

24 Q Now, during the 1980s you, that is the medical  
25 department and yourself, particularly, were provided a

I

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1 number of material safety data sheets by the sellers or  
2 BUppliers of granite rock to the railroad; weren't you?

3 A I believe in the late 180s we were provided with  
4 material safety data sheets on granite rock, among other  
5 materials that I received safety data sheets on.

6 Q Now, the general material that was provided in  
7 most of these, I think I showed you one iri your prior  
8 testimony, let me show you another one.

9 This is entitled Martin Marietta Material Safety  
10 Data Sheet. Let me show you this and make sure that you can  
11 identify that (tenders to witness).

12 A This is a material safety data sheet from Martin  
13 Marietta.

14 Q You don't recall, per se, if you saw that  
15 particular one, but I wanted to ask you if that appears to  
16 be the type of material safety data sheet, generally, in the  
17 way it is presented, that the medical department began  
18 receiving sometime in the 1980s?

19 A In the late 1980s it appears to be the type of  
20 material safety data sheet that we received.

21 Q Do you have a record of every time you received a  
22 new material safety data sheet from the rock quarries?

23 A No.

24 Q will you look at the last page of that Martin  
25 Marietta Safety Data Sheet.

1 Does it have a date of preparation on the bottom?

2 A Yes.

3 Q What is dated there?

4 A October 23rd, 1985.

5 Q As we stand here today, do you have any baBiS to  
6 deny that the railroad medical received that in 1985?

7 A I don't have any date stamp that shows when we  
8 received it, so I'm not sure.

9 It is my best recollection that we started  
10 receiving these data sheets in the late 1980s.

11 Q Okay. But if someone from Martin Marietta  
12 testifies that they provided them to all of their customers  
13 at the date that they claim, would you have any baBiS to  
14 deny that?

15 A As far as when the medical department received  
16 it, the medical department could have received it, I  
17 believe, in the late 1980s. But as far as --

18 That is a general recollection.

19 You don't have any actual data that you can  
20 produce that would specifically show that for Martin  
21 Marietta that you never received this particular sheet in  
22 1985?

23 MR. RINGER: You mean do they keep a log  
24 today? April 1, 1985, we did not receive a  
25 material data sheet.

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1                   Tomorrow, we did not receive one --  
2                   MR. SHAPIRO: Wayne, state your objection,  
3                   okay.  
4                   There really isn't one.  
5                   Go ahead and answer the quebtion.  
6                   BY MR. SHAPIRO:  
7                   Q        What I'm saying is: Did you keep a log of  
8                   materials when you got safety data sheets?  
9                   A        No.  
10                  IQ       Anything that you can do that you can deny that  
11                  you got this in 185, or is this just going to be based on a  
12                  personal recollection?  
13                  MR. RINGER: Well, I'm going to object to  
14                  this line of questioning on the basis that a  
15                  foundation for it has not been established.  
16                  You may or may not establish one later, but  
17                  up to this moment, there hasn't been any proof that  
18                  this particular document he is looking at was ever  
19                  received here.  
20                  MR. SHAPIRO: I understand that. He said  
21                  that he couldn't remember ever a material safety  
22                  data sheet that he saw.  
23                  BY MR. SHAPIRO:  
  
24                  Q        I presume that is your tebtimony; right?  
  
25                  A        Yes.

1 Q But when they were received, as the industrial  
2 hygiene director, isn't there a policy that the material  
3 safety data sheets were reviewed by you?

4 A I looked -- I normally look at material safety  
5 data sheets, particularly for a product that I have not seen  
6 before.

7 Q So any new one that comes in, it is clearly to be  
8 directed to you through the medical department?

9 A If the material safety data sheet is forwarded to  
10 the medical department.

11 Q Well, I have seen correspondence where people in  
12 the engineering department or other departments specifically  
13 have sent it to the medical department saying, "This has  
14 come in. This is for your review."

15 That happens; doesn't it?

16 A That is possible and it probably did happen.

17 Q Isn't there a company policy that if one is  
18 received it is to be directed to the medical department for  
19 review?

20 A We have asked the -- the departments that receive  
21 materials that if they get a material safety data sheet on  
22 the product, particularly a new product, that they forward  
23 that safety sheet to us.

24 Q A new product or a new material safety data sheet  
25 that has not been previously received?

1           A     If they know that it's not been previously  
2 received.

3           Q     Okay. Now, in your prior testimony, I don't  
4 think I showed you this particular one, but I showed you  
5 I'm not going to go fishing around. I don't remember if it  
6 is Vulcan or one of the other ones.

7                     I showed you one of the material safety data  
8 sheets and I asked you to review the information. Here is  
9 one, for an example, from Vulcan.

10                    What I asked you is: Was there anything in this  
11 material safety data sheet in the way of information that it  
12 provided that you did not know in the mid 1980s already?

13                    I believe your answer was: There was nothing  
14 new.

15                    MR. RINGER: I'm going to object, again, to  
16 your asking about what he testified to in his  
17 earlier deposition.

18                    If you want to ask him a question of  
19 substance, let's do that.

20                    MR. SHAPIRO: Okay.

21                    BY MR. SHAPIRO:

22                    Q     Did this material safety data sheet and what it  
23 told you about exposure levels for silica dust, about the  
24 dangers or symptoms or signs of Silicosis, was there  
25 anything in here that you didn't know in the 1980s about the

1 disease or about silica dust?

2 MR. RINGER: Again, I have to object because  
3 there has not been any predicate laid that he  
4 received this particular one or that particular  
5 one.

6 BY MR. SHAPIRO:

7 Q Let's look at the Martin Marietta one

8 Specifically.

9 Take a glance through it and let me know if there  
10 is anything that it outlined about silicosis, dangers of  
11 silica dust, that you didn't know as the industrial hygiene  
12 director.

13 A The IARC designation, where the International  
14 Agency for Research on Cancer said that there is limited  
15 evidence that a possible, that causal relationship is  
16 possible. I didn't know that at that time.

17 Q Until when?

18 A I don't know the exact date of when I knew it.  
19 That is probably in the late '80s.

20 Q Well, it was included in some of the material  
21 safety data sheets that you saw from your rock suppliers;  
22 right? They started including it in their material safety  
23 data sheets specifically?

24 A I don't recall seeing those safety data sheets  
25 until the late 180s.

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1 Q I'm not asking you the specific date. You are  
2 getting tied up with that.

3 A You are asking me when, so I am telling you the  
4 late '80s is when I saw them.

5 Q I understand.

6 Now you have just testified that you don't think  
7 you knew about the cancer warnings until you got some of  
8 these first material safety data sheets; is that your  
9 testimony?

10 A Until I received -- the material safety data  
11 sheets that were received in the late 180s, some of those  
12 included the information from the International Agency  
13 Research on Cancer.

14 Q And the warning was that there is some evidence  
15 from the International Agency for Research on Cancer, IARC,  
16 as to the possibility that silica causes cancer?

17 A That was listed in the -- those material safety  
18 data sheets.

19 Q Now, what the material safety data sheet said  
20 about dangers of inhaling silica dust, symptoms of  
21 silicosis, was there anything in there in that particular  
22 Martin Marietta sheet that you didn't know?

23 I mean, that general information you were aware  
24 of; correct?

25 A Well, the way this data sheet states, it says

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1 that silicosis is progressive. So I don't know that I would  
2 say that I knew that it was -- you know, what the  
3 progressive means in this, because they didn't spell it out.

4 Q But what about the symptoms of silicosis? Take a  
5 look at that.

6 That didn't really add to your knowledge; did  
7 it?

8 I mean, you talked about that in your 1981 or 1982  
9 reports, didn't you, in general terms?

10 A I don't think I talked about all of these. I  
11 talked about shortness of breath, primarily.

12 Q Okay. But you knew about the disease silicosis,  
13 some of the general symptoms of the disease by the time you  
14 wrote your memorandum in 1981 or 1982?

15 A The symptomatology that I discussed in the  
16 report, I believe, was my extent of the knowledge at the  
17 time of the silicosis disease.

18 Q Sometime in the early 1980s you sent out some  
19 memoranda and began a program to make these disposable masks  
20 available to certain workers that worked with silica dust;  
21 right?

22 A I don't think that is what the report says. I  
23 think the report says that I recommend that they use the  
24 respirator.

25 Q All right. That was in 1981?

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1 A Yes. Although one of the reports is in 1981.

2 Q All right. But the actual memos to implement the  
3 use, I think, took place in 1982; didn't it? Implement the  
4 use of a mask?

5 A I would have to look at the dates of those memos  
6 to be sure. But I know there were some that were put on in  
7 1982.

8 Q okay. So at the point where you recommended the  
9 use of these masks, you were aware that silicosis could  
10 cause this permanent lung disease, but you provided the  
11 trackmen, any of these workers that worked in the silica  
12 dust, with absolutely no oral or written notice about the  
13 dangers of silicosis; did you?

14 A No.

15 Q As a matter of fact, you started getting these  
16 material safety data sheets in, in the late 1980s, by your  
17 testimony. They warned about cancer. They warned about all  
18 of these other symptoms and, again, you implemented no oral  
19 or written program to tell the workers about the dangers of  
20 Silicosis until after 1990; correct?

21 Before 1990, they got no oral or written notice  
22 about the danger of Silicosis; correct?

23 A Yes.

24 Q Now, you knew about it. You knew that it was a  
25 permanent disease. You were receiving the warnings. And it

ASSOCIATED STENOGRAPHY REPORTERS

1 was one of your job duties to look out for the health and  
2 safety of the workers.

3 You agree with that; right?

4 A I had already done that. I had earlier found the  
5 exposure to silica with ballast unloading and ballast  
6 regulating. And I recommended control measures and those  
7 control measures were satisfactory to reduce the exposure to  
8 prevent the development of silicosis.

9 So I think while I didn't inform them  
10 specifically of the -- regarding the health effects of  
11 exposure to silica, I did implement measures to help control  
12 their exposure to reduce the chance that they become  
13 develop any silicosis-related diseases.

14 Q Well, you recommended the use of a mask, but you  
15 never told the workers anything about the dangers of  
16 silicosis?

17 MR. RINGER: Is that a question?

18 MR. SHAPIRO: It is a question.

19 MR. RINGER: Well, I don't hear the question

20

21 MR. SHAPIRO: It has a question mark at the

22 end.

23 BY MR. SHAPIRO:

24 Q My question is: You provided them a mask but you  
25 never, during the entire 1980s, gave them any oral notice in

1 a safety meeting or written documentb that told them what  
2 the disease silicosis was?  
3 MR. RINGER: That haB been abked and answered  
4 twice.  
5 MR. SAAPIRO: I don't think so.  
6 BY MR. SHAPIRO:  
7 Q Go ahead.  
8 A Whether it was ever discussed in a safety --  
9 Q But --  
10 A I don't know if it was ever discussed in a safety  
11 meeting.  
12 I did not participate in a safety meeting where I  
13 discussed it with the employees.  
14 Q well, you never directed that it be discussed  
15 either?  
16 A No.  
17 -- I'm not going to go into what  
18 You participate in the Association of Ainerican  
19 Railroads as a member; don't you?  
20 A CSX Transportation is a member of the Association  
21 of American Railroads and I've attended some functions.  
22 Q By virtue of that, you have membership; right?  
23 A I have had some involvement with the Association  
24 of American Railroads.  
25

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1 MR. SRAPIRO: Off the record.

2 (Off the record)

3 (The instrument last above referred to was  
4 marked as Plaintiff's Exhibit No. 7 for  
Identification.)

5 BY MR. SRAPIRO:

6 And --

7 MR. RINGER: I object to No. 7 because you  
8 still haven't laid a foundation for it.

9 MR. SHAPIRO: I am having it marked because  
10 we talked about it. That is fine. I understand.

11 BY MR. SHAPIRO:

Q Are you aware as to whether CSX maintains any  
13 copies of proceedings of the medical or surgical section of  
14 the AAR?

A Since I don't participate at all in those  
16 sections myself, I don't know if they are being maintained  
17 or not.

Q You have heard about the medical and surgical  
19 section of the AAR; haven't you?

A Yes.

Q And the chief medical officer or the other  
22 medical officerb participate in that; don't they?

A A number of them do, yes.

Q Are you aware that that medical and surgical  
25 section, the doctors met as early as the 1930s to diSCUSB

1 current trends and medicine and occupational disease?  
2 A No. That waB a little before my time.  
3 Q Well  
4 MR. RINGER: Now are you going to ask him if  
5 he can deny that they met during that time  
6 MR. SHAPIRO: No, I am not going to ask him  
7 that.  
8 BY MR. SHAPIRO:  
9 Q Have you ever looked at any of the discussxons  
10 that the doctors had as early as the 1930s about controlling  
11 silica dust or the disease silicosis?  
12 MR. RINGER--@  
13 foundation.  
14 THE WITNESS: Not that I can recall.  
15 BY MR. SHAPIRO:  
16 Q Also, during the 1980s, switching gears here a  
17 second back, there was no implementation of any program to  
18 medically monitor any of the track laborers or machine  
19 operators as to their exposure to silica dust; was there?  
20 A No.  
21 Q You know Dave Tucker of Norfolk Southern?  
22 A Yes. OA@  
23 Q During the 1980s or up until, let'B say, the  
24 beginning of 1992 when silica dust became an issue that  
25 started to become discussed, did you ever talk to Mr. Tucker

ASSOCIATED STENOGRAPHY REPORTERS

1 about what Norfolk Southern was doing about controlling  
2 Bilica dust?

3 MR. RINGER: I'm going to have to insert here an  
4 objection.

5 BY MR. SHAPIRO:

6 Q Don't comment on anything that was discussed at  
7 the AAR Silica Hygiene Group.

8 I mean, I'm talking about telephone calls or  
9 something else where you-all just talked about what that  
10 railroad was doing to control silica dust.

11 MR. RINGER: You can answer the question with  
12 respect to anything that you don't regard as  
13 privileged.

14 THE WITNESS: Dave Tucker and I talk frequently  
15 so we may have discussed some of the actions that  
16 Norfolk Southern was investigating.

17 BY MR. SHAPIRO:

18 Q One of the things I wanted to specifically  
19 investigate with you is that Southern did some experiments  
20 to analyze the wetting of the ballast rock hopper cars, I  
21 believe, in 1992.

22 Did Mr. Tucker make those efforts known to you?

23 MR. RINGER: You may answer anything that you  
24 don't regard as being privileged.

25 BY MR. SHAPIRO:

ASSOCIATED STENOTYPE REPORTERS

1 Q ThOBc were in conjunction with, I think, Vulcan  
2 Materials Company, they did some studies.

3 A I've heard of the -- I know I have heard some  
4 discussion about it. However, I don't recall if I have  
5 heard it anywhere outside the areas of the meetings that we  
6 are talking about.

7 Q Okay. Did you at CSX do any testing of wetting  
8 down rock hopper cars at any time?

9 A Iio.

10 Q Are you aware whether the engineering department  
11 did any such teBts in conjunction with any rock  
12 quarrieB?

13 MR. RINGER: Before 1992?

14 BY MR. SHAPIRO:

15 Before or after. Any time, really.

16 A There has been some interaction between the  
17 engineering department, purchasing department, and our  
18 ballabt suppliers regarding the wetting of ballast to remove  
19 finds when it is being loaded, and I am aware that that has  
20 occurred.

21 Q In the last few years?

22 A Actually I seem to recall that it occurred back  
23 in the early 1980s when we -- especially with the ballast  
24 rock. That is what I recall.

25 MR. SHAPIRO: I still have not been provided

I

I

ASSOCIATED STENOGRAPHY REPORTERS

I anything in the way of a document.

2 MR. RINGER: It's my understanding that the  
3 documents have been discarded in the ordinary  
4 course of business, because there is no requirement  
5 to retain them and there are no documents that have  
6 been found.

7 If any are, they will be furnished to you,  
8 but this may be a matter of communication between  
9 the railroad and the suppliers of ballast that  
10 cannot presently be reflected in documents.

11 You can ask the witness whether he knows  
12 about them.

13 BY MR. SHAPIRO:

14 Q All right. During the 1980s, at the time that  
15 you prepared your first two reports in the early 180s, all  
16 the way through up till 1990, did the Federal Railroad  
17 Administration have any regulations on silica dust that you  
18 became aware of?

19 A No. No specific regulations regarding silica  
20 dust.

21 Q Were there any regulations regarding any dust  
22 whatsoever that may be generated on track maintenance or  
23 door track repair activities?

24 A I'm not aware of any.

25 Q Are you aware of any types of testing that Mr.

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1 Hardy in the research and Bstandards department or division  
2 has conducted, have anything to do with silica dust?

3 A No.

4 Q The hazard communication standards that have been  
5 promulgated by OSHA, when was it your understanding, just  
6 your personal understanding, aB to when those regulationb  
7 may have applied to any part of the railroad's operations?

Cleo

8 MR. RINGER: Object to the extent that this calls  
9 for a legal conclusion.

10 MR. SHAPIRO: I understand. I'm asking for  
11 his understanding of when those first applied to  
12 any railroad operations.

13 THE WITNESS: I think they were either late 1987  
14 or 1988.

15 BY MR. SHAPIRO:

16 Q And you began to give certain railroad workers  
17 training and information with respect to certain substanceb  
18 or conditions that qualified as hazardous after that date,  
19 didn't you, through your coordination with the various  
20 departments?

21 A I don't know that I would classify it as  
22 harzardous.

23 We provided information regarding material safety  
24 data sheets, what the safety data sheet contained, and  
25 general information about chemicals as classes, solvents,

1 and cleaners, and welding products.

2 Q You began doing that in 1988; didn't you?

3 A Yes.

4 Q However, you never did any of that, as far as  
5 these programs or written materials for track maintenance  
6 workers until 1993 or 1994?

7 A 1993.

8 Q So it was a full five years after you gave  
9 warningb to other classes of railroad workers that you  
10 actually gave these warnings to track laborers or machine  
11 operators for the first time?

12 A Yes.

13 Q what was the basib of your five-year delay?

14 A I have no reason why there was a five-year delay,  
15 other than that the track maintenance groups where not felt  
16 to fall under the hazardous communication standard.

17 Q But if silica is defined by OSHA aB a hazardOUB  
18 item, and they have broad definitions, you would agree that  
19 it should have been done five years before?

2-6 MR. RINGER: Are you asking for a legal  
21 conclusion?

22 MR. SHAPIRO: No. I'm asking his opinion.

23 MR. RINGER: Well, I object to the extent  
24 that it calls for a legal conclubion.

25 BY MR. SHAPIRO:

1 Q Go ahead.  
2 A As far as applicability of the hazard  
3 communication or any of the OSHA Regulations to track  
4 maintenance activities, there was no idea that that may  
5 apply to track workers until -- in early 1990s.  
6 Q Well, what was it that made it in your opinion  
7 not to apply to them but apply to other classes of the  
8 railroad workers?  
9 A It wasn't my opinion.  
10 Q Well, what was it that made you feel that five  
11 years later it would apply to them?  
12 MR. RINGER: If you are asking about any  
13 MR. SHAPIRO: I'm asking what came to his  
14 knowledge.  
15 MR. RINGER: And I'm going to say that if you  
16 are asking about any advice that he may have  
17 received from the law department or legal counsel,  
18 that is a matter of privilege.  
19 BY MR. SHAPIRO:  
20 Q I don't want you telling me what opinion someone  
21 gave you.  
22 I want to know what source the information came  
23 from that made you to decide to provide these warnings in  
24 1993?  
25 A The law department.

ASSOCIATED STENOGRAPHIC REPORTERS

1 MR. SHAPIRO: Let's take a break.  
2 (Off the record)  
3 BY MR. SHAPIRO:  
4 Q When did Dr. Thomasino, what year did he take  
5 over aB chief medical officer?  
6 A For what railroad?  
7 Q For what is now CSX, I suppose.  
8 A I believe he became chief medical officer in  
9 1986. Probably toward the end of 186.  
10 Q So he was in that position up until just a few  
11 months ago?  
12 A Yes.  
13 Q Is there a particular medical officer between the  
14 time of 186 and the present that you normally communicated  
15 with, with respect to any questions or issueb regarding  
16 silica dust?  
17 A Well, there was a chief medical officer that I  
18 reported to. And most of my discussions involving silica  
19 dust would have been with him, that was Charles Mead.  
20 Q Would have been with Charles Mead before  
21 Thomasino?  
22 A Yes.  
23 Q But as of 186, it would have been with Thomasino?  
24 A For a brief time in '86, Dr. Mead and Thomasino  
25 were both chief medical officers. So at that time, I would

ASSOCIATED STENOGRAPHY REPORTERS

1 have reported to both of them.

2 Q And then after that, Thomasino?

3 A Yes.

4 Q What about Dr. Cook? Isn't he the immediate  
5 person that you would report to in the chain of command?

6 A Earlier this year, I reported directly to Dr.  
7 Cook for a few months.

8 Q Okay. When you investigated silica dust or the  
9 disease silicosis any time after 1981 to the present, did  
10 anyone ever mention to you the claim of a Mr. Charles Young  
11 against Clinchfield Railroad?

12 A No.

13 Q Okay. Do you know that Clinchfield Railroad is  
14 one of the railroads that was eventually subsumed under CSX?

15 A I know that the Clinchfield Railroad is one of  
16 the predecessor railroads.

17 Q You never heard of anything about a silicosis  
18 claim against Clinchfield by Mr. Young?

19 A No.

20 Q Have you ever had any access to any of the  
21 Clinchfield Railroad files relating to prior occupational  
22 disease claims?

23 A No.

24 Q Do you know where any files of the predecessor  
25 railroads are maintained with respect to any prior

ASSOCIATED STENOGRAPHIC REPORTERS

1 occupation disease claimB or problems?  
2 A No.  
3 Q Do you know if they are maintained here at the  
4 headquarters, any prior, older records like that?  
5 A I don't know.  
6 Q Well, for workers that worked for a predecessor  
7 railroad that are now employed presently by CSX, where do  
8 you find their prior records if you wanted to look?  
9 MR. RINGER: What kind of records  
10 BY MR. SHAPIRO:  
11 Q Personnel or medical.  
12 A Their medical records are in the medical files.  
13 Q Right.  
14 What about their personnel files?  
15 A I don't normally look at personnel fileb.  
16 Q What about any prior claims involving an  
17 occupational disease?  
18 A I do not look at claim files at all.  
19 MR. SHAPIRO: That is all I have.  
20 Thank you, Mr. Badders. I appreciate your  
21 time.  
22 MR. RINGER: You have the right to rea an  
23 correct the transcript of the deposition, and I  
24 think I'm going to ask you to reserve your right to  
25 do that.

ASSOCIATED STENOTYPE REPORTERS

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THE WITNESS: Okay. I will read and sign.

(Witness excused)

(Thereupon, the deposition was concluded at  
approximately 11:11 o'clock a.m.)

- - -

C E R T I F I C A T E

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STATE OF FLORIDA  
COUNTY OF DUVAL

I, the undersigned authority, certify that  
MARK E. BADDERS personally appeared before me and  
was duly sworn.

WITNESS my hand and official seal this 23rd  
day of September, 1994.



## 1 C E R T I F I C A T E

2 STATE OF FLORIDA

3 COUNTY OF DUVAL

4 It S. Leigh Bryan certify that I was  
5 authorized to and did stenographically report the  
6 foregoing deposition; and that the transcript is a  
7 true record of the testimony given by the witness.

8 I further certify that I am not a relative,  
9 employee, attorney or counsel of any of the  
10 parties, nor am I a relative or employee of any of  
11 the parties' attorney or counsel connected with the  
12 action, nor am I financially interested in the  
13 action.

14 Dated this 23rd day of September, 1994.

15

16 S. Leigh Bryan

17

18 STATE OF FLORIDA

19 COUNTY OF DUVAL

20 The foregoing certificate was acknowledged  
21 before me this 23rd day of 1994, by  
22 S. Leigh Bryan who is personally known to me.

23

24

u

25



Mark E. Badders, CIE

Address: 1536 Townsend Blvd., Jacksonville, FL 32211 L

Education: Indiana State University  
- 1971 to 1975 B.S. with a Biology Major,  
- 1976 to 1978 B.S. with an Environmental Health Major  
and a Chemistry Minor

l@university of Minnesota  
-1978 to 1979 completed course of study for a  
M.S. in EnvirorLmental Health with an emphasis in  
Industrial Hygiene

Affiliation: American Industrial Hygiene Association  
American Academy of Industrial Hygiene

Certification: American Board of Industrial Hygiene in  
Comprehensive Practice, Cert. No.: 4592

Work @erience

Summer 1977: internship with the National Institute for  
Occupational Safety and Health (NIOSH); conducted air  
sampling, noise monitoring and literature reviews

Jan. 1980 -July 1981: staff industrial hygienist in the Hazardous  
MaterialB Control Department of Seaboard Coastline  
Industries, Inc., designed and implemented a training  
progralm for railroad employees responding to  
derailments and leaking containers. Primary  
administrator (i of 3) for contacting regulatory  
authorities and directing clean-up of chemicals  
released as a result of derailments or leaking  
rail cars and containers.

July 1981 -August 1987: industrial hygienist for the Medical  
Department of Seaboard System RR responsible for  
evaluation of work place exposure to chemicals and  
physical agents. Conducted air and noise monitoring  
and recommended control measures when appropriate.  
Administer the inhouse hearing conser-vation program  
with the Chief Medical Officer.

August 1987 - Present: Director, Industrial Hygiene for CSX  
Transportation Medical Department; administer the  
industrial hygiene program and hearing conser-vation  
program for CSXT. Developed and administer the  
Chemical Hazard Information Program and the SARA  
facility reporting system. Direct the activities of  
the audiometric testing and industrial hygiene  
contractors. Supervise industrial hygiene specialists  
in the implementation of occupational health programs  
and industrial hygiene recommendations.



PL FFS

EXHIBIT

POSITION DESCRIPTION

A. BACKGROUND

Hygiene

916/85

(Date)

Department: Risk H&nagement Job Title: Oirector Industrial

Sub-Department: Medical prepared By: H. E. Badders

Location: Jacksonville, FIA- Approved By:

Incumbent: H. E. Badders

results to be

health of

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hazards and

employee

diseases by

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benefit Is the

exposure

B. PUR.POSE (Summarize briefly the primary purpose &nd end accomplished by this job.)

The purpose of this position Is to protect the safety and CSXT employees by the &nticipatioa. evaluation &nd control occupational hazards, such as toxic chemicals, physical noise. Accomplishment of the above activity will protecti health &nd reduce the number of claims for occupational the timely recognition and control of excessive e)cposures documentation of correct d action. An additional development of a locatio:/operation specific database for control &nd defense of questionable claims.

C. DI)FENSIONS (Current Organization Chart Attached)

4nd

employees reporting

Title Grade

1. Reports to: Chief Medical Officer 20

2. Personnel Supervised (rndicate number of non-contract contract employees. Direct includes those directly to'this position. Indirect includes

subordinates under  
this position.)

position's jurisdiction not reporting directly to

	Direct	Indirect	
Total			
Non-Contract			
Contract			
Total	0	0	0

3 Quantitative Description of Job Responsibilities

(Numerical  
payroll, etc.  
miles of track

measure of position's level of control or responsibility.  
Express in dollars such as budget, sales volume,  
Could be expressed in other magnitudes, such as  
supervised.)

Total Department Operating Budget: \$6,000,000  
Total Payroll Supervised: \$  
Total Operating Budget Accountable For \$767,000  
Other: System-wide Responsibility

D. N TIVE

each sentence with  
the function  
appropriate, the  
prevent hearing

1. Accountabilities (List primary duties. Start  
an action verb, followed by a noun, indicating  
performed and result achieved, and where  
frequency with which it is performed.)

Hazard Information  
use chemicals  
chemical

- a. Manage CSXT Hearing Conservation Program to  
loss from excessive exposure to noise.
- b. Manage &nd maintain the CSXT Chemical  
Program to inform our employees how to safely  
in the workplace and the possible effects of
- e) cposurs.
- c. Develop site/operation specific  
profiles for CSXT workplaces.
- d. Design new occupational health programs to  
regulatory requirements and minimally disrupt  
operations.
- e. Direct the activities of various Tndustrial  
Hearing Conservation Program consultants.
- f. Provide technical support fo'r General  
&nd Operating Departments. e

occupational exposure  
comply with  
CSXT

Hygiene and  
Claims, Safety, Law

in experie@ce,  
position and  
the

2. Job Knowledge (State necessary background  
training, and education equivalency for thi3  
explain why. Do not state the qualifications of  
Incumbent.

In biology,

a. Advanced scientific training with an emphasis

because all of  
Interpretation  
design/evaluation &nd  
Information  
  
sampling methods  
properly  
and physical

chemistry, physics and toxicology is required  
the primary duties of this position Involve  
of technical Information for program  
explanation of Industrial hygiene/toxicological  
to fellow employees in various departments.  
b. Specialized training in industrial hygiene  
&nd interpretation of the data is needed to  
identify and control exposure to chemicals  
hazards.



beneficial  
occupational  
significant  
inside aAd  
frequency of  
Provide  
employee  
Informal  
assist&nce  
claims of  
activity due to  
Departments:  
appropriate  
to  
difficulty of  
the  
Give example  
technically  
of  
information to  
position has a  
problems;  
fulfill the

An understanding of the corporate onvirorlment i3  
for designing and Implementing effective  
health programs.

3. Human Relations Skills (Explain the most  
primary contacts that this position has. both  
outside the company. Sumarize the nature and  
these contacts.)

Chief and Associate Chief Medical Officers;  
Information regarding CSXT workplace conditions,  
S)cposures &nd occupatlonal health program design.  
meetings are frequently hold.

General Claims Department, Provide technical  
&nd information for the evaluation of employee  
occupational illnesses. This is a frequent  
the growing number of occupational disease olaims.

Motive Power, Envirorinental & Equipment Group  
Evaluate employee exposure and retommend  
measures to control possible employee overexposure  
chemical and physical hazards.

4. Problem Solving (.Tndicate the degree of  
problems faced on this position and the latitude  
position has toward resolving these problems.  
if applicable.)

The problems encountered by this position are  
difficuilt requiring integration of various kinds  
toxicological, envirorlmental and operational  
develop appropriate controii strategies. This  
large degree of latitude in resolving these  
however, the appropriate control measures must  
needs of corporate officers, local supervision,

and

Example:

comparative

involved

the

reviewing the

control measures

positions

decisions made.

subject to

employees who must utilize the control measures.

recently this position was asked to evaluate the

hazards of two locomotive paint systems. Testing

collecting 227 environmental samples, evaluating

significance of 35 chemical analyses and

toxicology of 23 separate chemicals. The

required different controls for various employee

due to variable degrees of risk and still meet the  
production requirements of the job.

S. Decision Making (Describe the nature of

Explain to what extent decision making freedom is

policies and procedures and/or review by others.)

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noise) for  
appropriate  
wide  
measures that  
review by the  
This  
activities of  
data &nd  
with

may occur  
be found

may result  
physical hazards  
control  
physical  
when not  
chemical and  
may  
developing  
&nd  
CSXT  
years to  
control  
occupational

This position decides what are acceptable exposures  
chemical substances and physical agents (such as  
CSXT employees. This position determines the  
methods for controlling site specific &nd company  
potential employee health hazards. Control  
Involve defining company policy are subject to  
Chief Medical Officer and top management officials.  
position decides where and when to direct the  
outside consultants collecting employee exposure  
conducting audiometric testing of CSXT employees  
concurrence of the Chief Medical Officer.

6. Result of Error (Describe the types of errors that  
and their results. Explain how these errors would  
&nd corrected.)

Errors of omission and judgment can occur, which  
In having employees exposed to chemical and  
above acceptable exposure limits or unnecessary  
measures may be started. Controlling chemical and  
hazards requires capital and labor expenditures  
needed this expense is wasteful. Exposure to  
physical hazards above acceptable exposure limits  
increase the possibility of CSXT employees  
occupational diseases. These errors would be found  
corrected as a result of periodic monitoring of  
workplaces. Occupational diseases often require  
develop &nd the remonitoring with appropriate  
measures would reduce the possibility of  
disease development.

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Dr. C. A. Mead, M. D.  
Chief Medical Officer

SUBJECT: Ballast Regulator Operator Exposure to  
Free Silica

Personal air samples were collected from the breathing zone of a ballast regulator operator. The ballast was being regulated at Hooker's Point in Tampa, Florida, on September 30, 1981. According to the operator, all functions normally associated with ballast regulating were done during the sampling period.

#### Materials and Methods

All air samples were collected according to the NIOSH procedure P&CAM 106. The sampling chain consisted of a cyclone, filter, tygon tubing, and a personal sampling pump. The non-respirable dust was separated by the use of a cyclone utilizing an airflow of 1.7 liters per minute as recommended by the manufacturer. The respirable dust fraction was collected on 5 um pore size PVC membrane filters. The samples and a suitable blank were sent to a certified industrial hygiene lab for analysis.

#### Results

The sample results indicated that the ballast regulator was overexposed to silica during the sampling period. The sample results indicated an exposure of 69 and 456 percent greater than the calculated TWA (time-weighted average) for silica. The percents free silica for the samples were 15 and 14. The time weighted averages were calculated according to the following formula:

$$\frac{10}{\%SiO_2 + 2} \text{ T.W.A.}$$

#### Discussion

Silica is known to produce the occupational disease of silicosis. Depending on the concentration of the free silica in the air, the disease has a latency period of 3 to 30 years

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to Free Silica  
November 10, 1981

before the disease becomes evident. Once silicosis has developed, the lung damage is permanent.

The silica comes from the granite rock used as ballast. The agitation of the rock during transport and regulating action results in the erosion of the rock freeing the silica. Also, train movements and the elements will break down the granite freeing the silica dust. The regulating action agitates the dust making it become airborne.

The Kershaw Ballast Regulator used at Hooker's Point was not air tight. The doors could not be sealed properly which allow dust into the cab, and dust was observed coming up between the control levers of the regulator. Due to the need of movement, the control levers would require a cover at the base of the controls in the cab, which would allow free movement, possibly similar to that used by automobile gear shifts.

The visible dust generation was the greatest during its sweeping operations." Before sweeping, the operator closed the doors to reduce the amount of dust entering the cab. The dust generation was enough to completely hide the ballast regulator from an outside observer.

#### Summary and Recommendations.

Personal air samples taken in the breathing zone of the ballast regulator operator indicated an excessive exposure to free silica of 69% and 456%. If these values are indicative of ballast regulator operator exposures, control measures should be implemented to reduce the exposure to an acceptable level.

Engineering controls would include total enclosure of the cab and a dust barrier on the regulator controls. Rapid heat generation in the cab from the engine and the ambient conditions would require that air conditioning be installed in the ballast regulator. Another control measure would involve the use of personal protective devices, primarily respirators. Disposable respirators such as the 3M8710 would provide adequate protection at an annual cost of \$275 at today's prices. Another option would be the use of an air-powered hood at a

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cost of \$350. This respirator has a Ni-Cd rechargeable battery, which supplies power for the air pump. The annual filter replacement cost would be \$150 at today's prices. This respirator also provides eye protection from the dust.

If respiratory protection is used, the users must be medically certified for respirator use and included in the Company respirator program. Pulmonary function testing initially and on a periodic basis would be needed to insure that lung damage was not occurring.

Mark E. Badders  
Industrial Hygienist

CC:

L. K. Elson

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Brand 9910

All the benefits of the 9910

Dust/Mist Respirator

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Plus an exhalation valve for even greater worker comfort

OSHA/MSHA approved

for lead and

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Jacksonville, rL, rebruary 10, 1982 MEB:pad  
Subject: Silica Exposures Relative to Ballast Unloading  
PERSONAL CONFIDENTIAL  
Dr. C. A. Mead  
Chief Medical Officer

Introduction;

Personal air samples were collected in the breathing zone of trackmen unloading granite ballast. Two of the surveys were completed by myself and the other was done by Stauffer Chemical Company when comparing calcium silicate slag and granite ballast. Two of the surveys reflected dry, dusty conditions while unloading the granite ballast. The other survey reflected conditions when wet granite ballast was unloaded.

Assistance in conducting the surveys was given by Mr. R. R. Pregnall, Jr., Mr. W. A. Freeman, and Mr. J. D. Lamb. Exposure data was collected at Louisville, Kentucky; Baldwin, Florida; and Loughman, Florida.

Materials and Methods:

All air samples were collected according to the NIOSH procedure P&CAM 106. The sampling chain consisted of a cyclone, filter, tygon tubing, and a personal sampling pump. Non-respirable dust was separated by the use of a cyclone utilizing an airflow of 1.7 liters per minute. The respirable dust fraction was collected on a 5 um pore size PVC membrane filter.

The samples and suitable blanks were sent to a certified industrial hygiene laboratory for analysis.

Results:

The sampling results are indicated in Table 1. The wet ballast had very little dust generation and was well within current OSHA limits. Two-thirds of the dry ballast dust exposures exceeded current OSHA limits. The highest exposure was 1.4 times greater than the calculated PEL. The permissible exposure limits (PEL) were calculated according to the following formula:

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EXHIBRF



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 PEL  
 sio 2 + 2

TABLE 1

SILICA EXPOSURES WHILE UNLOADING GRANITE BALLAST

Condition	Location	%sio	OSHA ,	Exposqre	
		2	/Mi	mg/ma	Of
Rock	Louisville	14	0.50	3.80	Dry
	Louisville	20	0.45	1.40	
6r'y	Baldwin	ND	5.00	0.68	Wet
	Baldwin	ND	5.00	0.12	Wet
	Baldwin	ND	5.00	0.10	Wet
	Baldwin	ND	5.00	0.13	Wet
	@ughman	1.3	3.00	0.78	Dry
	Loughman	14	0.63	0.86	Dry
	Loughman	18	0.50	5.20	Dry
	Loughman	3.0	2.0. 0	1.20	Dry

Discussion:

Silica is atoxic dust which has been shown to produce the occupational disease lisilicosism in sensitive individuals. Normally, this disease occurs only in Persons exposed to high concentrations of silica for a number of Years. To prevent the development of silicosis, OSHA uses the formula described in the precedihg section to calculate the Permissible exposure limit (PELY for the exposure. The PEL will vary according to the percentage of free silica found in the respirable air sample.

Two-thirds of the air samples collected when dry ballast was being unloaded exceeded their calculated PEL. The two samples, which did not exceed their PELs were taken on a person who was on the upwind side of the car. The downwind side employee was often walking in a cloud of dust and his clothes were dusty at the end of the day. The sample results indicated that he was over-exposed to silica.

None of the air samples collected when wet ballast was being unloaded indicated'an overexposure to silica. The section

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foreman and trackman felt that conditions were much better than normal due to the ballast being wet. Experienced employees indicated that very small amounts of dust were generated when unloading wet ballast.

Normally ballast is unloaded only when a section of track will be serviced by a system T&S crew or a division surfacing crew. According to several roadmasters, this kind of activity is done about every five to ten years, depending on local conditions.

Summary and Recommendations:

Personal air samples collected in the breathing zone of employees unloading dry ballast indicated an excessive exposure to free silica. If these values are indicative of employee exposures while unloading dry ballast, control measures should be implemented to reduce the exposure to an acceptable level.

An administrative control would involve thoroughly wetting the ballast prior to unloading. Air sample results and conversations with experienced employees indicated that wet ballast would not produce excessive dust generation. This procedure should effectively reduce the exposure.

Another control measure would involve the use of personal protective devices, primarily respirators and protective clothing. Disposable dust respirators such as the 3M 8710 would provide adequate respiratory protection. Disposable coveralls would prevent employees from carrying the silica dust home and potentially exposing members of their families to silica dust.

M. E. Badders  
Industrial Hygienist

cc:

Mr. H. L. Endicott  
Mr. R. E. Frame

## SILICA TRAINING PROGRAM

Geologists tell us that the EARTH consists of air, water and exposed ground which rests on top of molten rock. The surface of the planet is always changing, often the changes go without notice, sometimes they are spectacular.

In this process mineral deposits are created. The most common minerals found on the earth's crust are silicates; which are minerals that contain the elements silicon and oxygen. Silica is the common term for minerals that have one silicon atom for two oxygen atoms; the simpler form is called amorphous silica and when these structures are combined to form crystals it is called crystalline silica.

Crystalline silica comes in several natural forms with quartz being by far the most common followed by cristobalite, tridymite and tripoli, the last two being rarely found. Quartz and to a lesser extent cristobalite are found in nearly all mineral deposits, metallic ores and other mined materials.

You don't have to look far to find crystalline silica. I'm sure that all of you have seen polished quartz stones or have walked on a sandy beach; these are examples of silica crystals found in nature.

Silica is used in a number of products including glass, cleaning products, building materials, ceramics, concrete, electronic parts, insulation, plastics, and pharmaceuticals to name a few.

The large crystals are not a problem, but if you reduce them to microscopic size and inhale these small crystals, often enough and in sufficient amounts you may be at risk of developing a lung abnormality or disease related to silica exposure.

"Respirable Dust" is between 1 and 10 microns aerodynamic diameter in size and is more likely to reach the deep lung where removal is slow. One micron is four ten thousandths of an inch. For dust to be visible it must be 50 microns in diameter.

Your most common route of exposure to silica dust is by inhalation. The large particles are typically trapped in your nasal passages and upper respiratory system. Small, microscopic size particles can reach the deep lung area.

The large particles are captured in a thick fluid your body produces for the upper respiratory passages. This fluid is moved to an area where it can be expelled from the body. Because the large particles do not enter the deep lung area,

they are not felt to be the major cause of lung disease.

Respirable size silica dust that is able to get to the deep lung area can initiate a reaction that results in the formation of discrete nodules that combine to cause "simple silicosis".

The symptoms of this disease may include shortness of breath, a dry cough, fatigue and reduced lung capacity. In severe cases this disease may cause high blood pressure in the pulmonary artery and cardiac failure. Tuberculosis can be a complication associated with the presence of silicosis.

In rare cases the nodules formed as a result of silica dust exposure may combine into a large mass of fibrogenic tissue to cause "complex silicosis". The previously mentioned symptoms will be more severe and pronounced.

"Acute Silicosis" may develop if a person is exposed to very high concentrations of silica dust. This is a serious condition that may develop in less than a year and result in death. This disease has been seen in sand blasters who blast using silica sand without the use of respiratory protection.

"Silicosis" is a disease recognized as having a "DOSE/RESPONSE" relationship. Which means that your likelihood of developing the disease or the severity of disease that develops can be reduced by lowering the amount of silica dust you inhale.

The International Agency For Research on Cancer (IARC) has identified crystalline silica as being  
A possible human carcinogen based on limited human evidence and experimental evidence of carcinogenicity in laboratory animals."  
The National Institute for Occupational Safety and Health (NIOSH) has listed crystalline silica as a carcinogen without explanation.

The Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists have not identified crystalline silica as a carcinogen.

As you can see the experts disagree about whether crystalline silica can cause or promote cancer in people or not. Regardless of the result of this scientific discussion, the best thing to do is avoid exposure to crystalline silica when possible and use respirators when significant exposures are likely.

Where are you likely to come in contact with respirable size silica particles? On the railroad most silica exposure occurs to trackmen and machine operators when unloading or

disturbing ballast. Ballast regulator and ballast broom operator5 typically have exposures high enough to require respirator usage during operation of their equipment. If the operation that you are doing produces a visible dust cloud, the use of a dust/mist respirator is recommended.

Since crystalline silica is a natural component of most minerals present in soil, bulldozer and backhoe operators 5 should wear a dust/mist respirator when producing a visible dust cloud during operat4-on.

Manual digging of ballast or soil does not put enough crystalline free silica in the air to require the use of respirators.

In the Mechanical O-,erations and Engineering Department Shops, employees doing abrasive blasting are required to use a supplied air respirator abrasive blasting hood. Occasionally silica exposures high enough to require the U5e of re--pirator5 have been reported for employees sanding locomotives. Employees sanding locomotives or cleaning "locomotive sanding systems" are required to wear dust/mist respirators.

The small blasting hoods for parts cleaning in the shops use glass beads which do not contain crystalline silica.

What is a "safe concentration"? The Occupational Safety and Health Administration (OSHA) has establi5hed exposure limits called Permi5sible Exposure Limits or PEL's for short, that the agency believes that nearly all persons may be eXP05ed to during their work;-ng lifetime without developing disease or impairment.

The Occupational Safety and Health Administration has e5tabli5hed PEL's for the vam-4.ous fo--.ns of cry5tallin6 silica. The standard for QUARTZ is 0.1 milligram of respirable quartz particles per cubic meter of air. For CRISTOBALITE the standard is 0.05 milligrams of respirable cristo,balite particles per c-cbic meter of a4@r. Boti of these exposure measurements are an expression of the average exposure over an 8 hour workday.

If the average exposures exceed the limits prescribed by OSHA, control measures must be taken to reduce your exposure. These control measure5 may include limiting the amount-of time that you are exposed to silica and the use of personal protective equipment.

Respirator5 are designed to provide clean, filtered air to the wearer's lungs. With a supplied air respirator, a remote, clean air source provides air to the respirator wearer. This is accompl---5hed using an ai-- compressor, carbon monoxide monitor, filtering units, and respirator facepiece

or hood.

The most common respirator is a negative pressure dust/mist respirator. This respirator requires a good face seal because it works by filtering air that passes through the filter before going to your lungs. If you have a "leaky" face seal the air will take the path of least resistance and bypass the filtering element, which means it is entering into lungs without removing the silica containing dust.

How can you tell if you have a good fit? Place your hands around the facepiece and exhale hard. You should not feel any leakage around the edge of the respirator facepiece.

If you are wearing a replaceable cartridge/filter facepiece perform a negative or positive pressure fit check. The negative pressure fit check is performed by placing your hands or an object over the filters creating an air tight seal and inhaling until you feel the facepiece begin to collapse. Hold your breath for 10 seconds and the facepiece will remain collapsed until you release your hands.

The positive pressure fit check is performed by blocking the exhalation valve with your hand using a little pressure on the cover and exhaling until you start to feel the respirator facepiece bulge. Hold your breath for 10 seconds and the facepiece will remain bulged until you release the exhalation valve.

A respirator fit check must be performed each time you put on a negative pressure respirator, so get in the habit!

You may be asked to participate in the medical surveillance program, if you are routinely exposed to silica. This program may include chest x-rays, pulmonary function tests, and a medical history depending on your exposure. Your supervisor will be informed by the Medical Department if you will be included in the medical surveillance program for silica.

The health care provider will be told by the Medical Department what to include in your examination. An interpretation of the results will be sent to you with the actual medical test results available upon written request to the Medical Department.

Crystalline silica is present throughout the environment and unless you live in a bubble you can't avoid coming in contact with it, but you can do something about your exposure.

Silicosis is a "dose dependent" disease, so you can play a role in reducing your risk of developing silicosis by the use of respiratory protection when doing an operation that

produces a visible dU5t cloud from sand, ballast or soil.