SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN FRANCISCO

DEWAYNE JOHNSON,

Plaintiff,

vs. Case No. CGC-16-550128

MONSANTO COMPANY, et al.,

Defendants.

_____/

Proceedings held on Thursday, July 26, 2018, Volume 17, Afternoon Session, before the Honorable Suzanne R. Bolanos, at 1:31 p.m.

REPORTED BY:

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INDEX OF PROCEEDINGS

| WITNESS | DIRECT | CROSS | REDIRECT | RECROSS |
|---|---|---|---|---|
| WILLIAM ROBERT SAWYER | 3671 | 3679 | 3777 | 3794 |

EXHIBITS ADMITTED

(None.)

Thursday, July 26, 2018

1:31 p.m.

Volume 17

Afternoon Session

San Francisco, California

Department 504

Judge Suzanne Ramos Bolanos

PROCEEDINGS

12:54:53

THE COURT: Welcome back, Ladies and Gentlemen. Good afternoon, Counsel.

MR. DICKENS: Thank you.

THE COURT: Do you wish to recall Dr. Sawyer?

13:31:15 MR. DICKENS: I do, your Honor. We will recall Dr. William Sawyer.

THE COURT: Good afternoon, Dr. Sawyer.

THE WITNESS: Thank you.

THE COURT: Ladies and gentlemen, Dr. Sawyer

13:32:42 remains under oath, and, Mr. Dickens, you may proceed.

DIRECT EXAMINATION (Continued)

BY MR. DICKENS:

Q. Good afternoon, Doctor.

13:32:50 A. Good afternoon.

Q. I want to go back to the Tyvek for a second. Would the drift from Mr. Johnson's truck sprayer have passed through his Tyvek suit?

A. The size of the aerosol droplets would have been greater than 1 micron, so no, not the droplets. However, the moisture film that accumulates on the fabric will go through, because that's at the molecular level. It's simply the glyphosate liquid and the other liquids that are in the chemical would definitely pass through the pores. However, the actual droplets would not fit through the pore. In other words, it has to become a moist surface, a wet surface, to penetrate --

Q. And would that moist surface -- based on his description of the spray, would a moist surface have developed on the Tyvek suit?

A. Yes.

Q. And --

A. The same way it did on his face and other areas, yes.

Q. And based on kind of the description you gave us with respect to the dermal absorption, that same absorption would apply to the Tyvek suit? Once that mist is on there, it would start to seep through?

A. Actually, it's worse. Mr. Johnson testified -- and I can tell you from wearing the darn things -- that

you sweat, sometimes sweat profusely.

Q. How does sweat affect --

A. It means that the undergarments, the shirt, pants and so on, are moist. So when that glyphosate and surfactants, adjuvants, contact the moist clothing, it has an immediate diffusion pathway to the skin. Because you have damp skin against damp clothes against a damp Tyvek suit, so you have an immediate pathway. So it actually enhances the sweating, enhance -- plus it opens the pores, plus there's vasodilation when a person is hot and sweaty.

13:34:19
13:34:38

Q. Do you have an understanding as to whether or not Mr. Johnson was able to shower immediately after he got it on himself? "It," Ranger Pro?

A. Based on my review of his depositions, in most cases, he did not immediately shower. Rather, he would go back to work and finish his functions, and then shower at home.

13:34:54

Q. And do you have an understanding -- did he do anything to try to wash it off after being exposed to the Ranger Pro?

13:35:17

A. Well, I know he talked about washing his hands and arms and forearms, and I believe he even wiped himself at times.

Q. Would that have gotten all the Ranger Pro off of

13:35:32

him so that there wouldn't be any more absorption?

A. No. And the other thing to remember is that the studies have shown that the first hour of exposure shows the greatest degree of absorption, and then it falls off each hour -- less absorbed, less absorbed, and so on -- so that the first couple hours are critical.

13:35:52

Q. What facts did you consider in determining the total amount of Mr. Johnson's exposure?

A. Well, as I said, I compared him to what's in the literature, in terms of workers who were wearing patches that were measured. But I also compared him in terms of his gallon per hour. You know, he's testified that he's used up to 150 gallons a day, and even 50 gallons in an hour, which is 3 times above the rate. Even if he used the backpack sprayer and held it on non-stop, it would only be about 16 or 15 gallons per hour, and he was running 50 gallons per hour with a spray head that produces a horrible aerosol.

13:36:08

13:36:30

So based on his testimony description in terms of the drift, the fact that his face actually was wet, based on the quantity used, he is an outlier. He's -- beyond the worst case that I've found in the literature which I used as my basis of calculations. So my dose calculation's actually another underestimate.

13:36:47

Q. Based on his exposure and the 10-percent dermal

13:37:04

absorption rate that you testified to, is that enough to cause a carcinogenic response?

A. Yes, absolutely. He is -- I can say that emphatically, and base it on the peer-reviewed literature, in that his exposure -- his levels of exposure were far higher than that in the literature, but its duration of 2.25 years of exposure, or three seasons of exposure, was less than the average in the peer-reviewed epidemiologic studies who developed T-cell lymphoma. So it puts him approximately in the middle of the human epidemiologic studies that show human cancer. He falls in the middle of the exposure categories, not at the extreme low end, not at the extreme high end. And I say it again, because his exposure days were far less than that in the human literature. However, his intensity of exposure was actually higher.

Q. So did you consider the total number of days that he sprayed in consideration of your opinions in this case?

A. I did. I calculated ninety, based on his testimony. Ninety days of spraying.

Q. And that was based on 20 to 30 times of spraying per each year?

A. Twenty to thirty, although he did testify that perhaps it was more. It could have been as high as

forty.

Q. And you mentioned three spraying seasons. That's from the date of his first use until the date of when? Was that date of diagnosis?

13:38:44 A. August of 2014. The date of diagnosis was when the pathology was taken and he was diagnosed with lymphoma.

Q. Did you consider whether or not 2.25 years, as you state, was long enough for non-Hodgkin's lymphoma to

13:39:02 form?

A. Yeah. I have -- for many years, have searched the literature and have kept track of latencies for different cancers. Different cancers have different -- very different latencies. You know, mesothelioma has the

13:39:18 longest latency of any. Lymphoma has the shortest latency period of any known human cancer, as short as eight weeks. When a drug called Cyclosporin A -- some of you may have heard of it. That's a drug used for tissue transplant recipients. For example, if I were to have a

13:39:43 kidney transplant, I would have to have Cyclosporin A to suppress the immune system to not reject that organ. In that case, that particular drug has a side effect of non-Hodgkin's lymphoma developing in as short as eight weeks.

13:39:56 Now, that's not the case here. We're not

dealing with Cyclosporin A. We're dealing with another chemical, and, therefore, I've used other literature studies to determine the shortest latency period.

Q. In studies, how is latency looked at? How is it considered?

13:40:13

A. Very specifically. The rule is -- it's a standard worldwide international rule: It's from the time of first exposure until the time of diagnosis. When that pathology sample is collected, that person is diagnosed. That is how all the studies in the epidemiologic literature work. It's from time of first exposure to time of diagnosis.

13:40:28

Q. So if Mr. Johnson was considered in that study, his latency would have been that 2.25 years that you mentioned previously?

13:40:44

A. That's correct.

Q. I want to turn your attention to one exhibit.

MR. DICKENS: Permission to publish Plaintiff's Exhibit 880?

13:40:52

THE COURT: Any objection?

MR. LOMBARDI: No objection, your Honor.

THE COURT: Very well. You may proceed.

Q. BY MR. DICKENS: Doctor, I'll point this out: This is an article by Dennis Weisenburger, "Pathological Classification of Non-Hodgkin's Lymphoma For

13:41:05

Epidemiologic Studies."

Have you reviewed this previously, Dr. Sawyer?

A. Yes.

Q. And I want to turn your attention to a chart on page 6 of this study. Do you see that there?

13:41:20

A. Yes.

Q. And this has -- it says "latency curve." Can you explain what a latency curve is?

A. Yes. Latency is generally found to exhibit what we call a bell-shaped curve. We'll have some individuals who develop it very early, and then a mean peak value, which typically, for lymphomas, is about a ten-year mean, and then some people that don't develop it for 20 or 25 years, and they're at the other end, at what we call the tail. So this diagram, Figure 4, shows two latency curves for non-Hodgkin's lymphoma, based upon a high acute exposure versus a steady, long-term, low exposure, and it makes a difference on the latency curve.

13:41:39

13:42:00

Q. And so the A, the first one we see there, that is the short-term high dose; is that right?

13:42:21

A. That's correct.

Q. And what's your reading of this particular latency curve with respect to short-term high dose versus the long-term low dose?

A. Well, this is typical for most chemicals with

13:42:35

respect to chemical carcinogenesis, that if the person is receiving the sustained high dose, the latency is generally much shorter. And that's what we have in this case. We have a person who received very high dosage but for a shorter period of time, only 2.25 years, prior to the diagnosis.

13:42:53

MR. DICKENS: Thank you, Doctor. I have no further questions. If I may pass the witness.

THE COURT: Thank you.

13:43:04

MR. DICKENS: Can I approach? Dr. Sawyer left his binder behind.

THE COURT: Yes, of course.

THE WITNESS: Thank you very much.

THE COURT: Counsel, Mr. Dickens, would you mind

13:43:31

getting some water for Dr. Sawyer?

MR. DICKENS: Not a problem.

MR. LOMBARDI: May I approach?

THE COURT: Yes.

CROSS-EXAMINATION

BY MR. LOMBARDI:

Q. Good afternoon, Doctor. I'm going to try to moderate my voice to fit the room and move the podium also. If you have any trouble understanding me or

13:44:18

hearing me, you'll let me know; right?

A. I will. I don't hear real well, so it's possible I may have to.

Q. All right. Well, you just go like this if you need me to (indicating), and I'll know what you mean.

13:44:29 A. Thank you.

Q. Can you hear me right now? Is that working?

A. Very good. Thank you.

Q. Okay.

We haven't met. My name is George Lombardi. I

13:44:35 represent Monsanto in this matter.

A. Very good.

Q. All right. So, Doctor, you -- I think you testified on your direct that you -- I think -- would you characterize your full-time job now as your toxicology

13:44:51 consulting; is that right?

A. Yes, since approximately 1993.

Q. Okay. And in that job, primarily what you do is get retained in lawsuits; is that right?

A. Not always. There's criminal matters which are

13:45:13 fairly common, probably about -- this year, probably 15 or 20 percent of my work is criminal-related --

Q. And I -- go ahead and finish. I didn't mean to interrupt you.

A. -- and the remainder are governmental agencies

13:45:26 and civil litigation.

Q. Okay. So 85 percent or so has to do with civil litigation of some sort or another; is that right?

A. Yeah. That's reasonable.

Q. Okay. And in the last three years or so, you've testified in excess of 40 times in depositions or hearings or trials or so forth; is that right?

13:45:40

A. In depositions. But as far as trials, only probably -- maybe 20 times in the past 4 years at the most.

Q. Okay. So you're not nervous sitting there. You're very experienced at this; is that right?

13:45:55

A. Well --

Q. I'll withdraw the question. I'll make sure it's clear. You're very experienced at what we're doing here today; is that right?

13:46:12

A. Yes.

Q. Okay. And you're experienced enough that you have actually spoken to others -- other toxicologists -- who want to get into the business of testifying in litigation; is that right?

13:46:26

A. I don't know about that. I've spoken to other forensic toxicologists in a couple of national meetings that I've presented a couple of papers.

Q. And you've presented on how best to act or to present yourself as a toxicologist in an expert situation

13:46:42

at a trial; right?

A. In terms of gathering and obtaining studies and evidence, yes.

Q. Okay. And one of the things that you have talked about is the interaction between epidemiology and toxicology; is that right?

13:46:59

A. Yes.

Q. Now, in this particular case, you made very clear in your report that you're deferring on the epidemiology to users on plaintiff's side of the case; is that right?

13:47:14

A. That's correct. Dr. Portier and others have handled the epidemiological aspects of this case. It would be --

Q. And is your -- oh, I'm sorry. I didn't mean to interrupt you. Go ahead.

A. It would be overburdensome for me to try and handle everything in this case.

Q. Understood. Understood. But just so it's clear to the jury, the epidemiologist on your list that they have already heard from was Dr. Neugut. At least you know who Dr. Neugut is; is that right?

13:47:35

A. Certainly.

Q. And that's one of the people that you're deferring to for epidemiological analysis; is that right?

13:47:47

A. That's correct.

Q. But you do know -- you do have some knowledge of epidemiology generally; is that right?

A. Yes.

13:48:04 Q. And you understand, for instance, that -- and you agree that association between, say, a chemical agent and a disease alone does not constitute causation; correct?

A. That is correct. One has to look at the

13:48:18 mechanism, the animal studies and other plausible factors and differential diagnosis and rule out other possibilities.

Q. And you would never -- well, you advise others to never rely solely on animal study data without human

13:48:38 epidemiological data in support of your opinion as well?

A. With respect to cancer causation, that's correct.

Q. Okay.

A. I do not rely just on animal data.

13:48:48 Q. And in order for you to conclude, and this is what you advise others, that something has been proven to be a carcinogen, there would have to be a human epidemiological -- there has to be human epidemiological data to support that; is that right?

13:49:04 A. Yes, as in this case. Correct.

Q. And it's critical when you consider the epidemiological data -- well, one of the reasons why it's critical to consider the epidemiological data is that that's data that actually deals with humans; correct?

13:49:23 A. Yes.

Q. And it deals with humans who are exposed to whatever the chemical might be you're studying as it's used out there in the real world; right?

A. Yes.

13:49:35 Q. So when we talk about epidemiological data in this case, relating to Roundup, we're not talking about epidemiological data that studies glyphosate in isolation; is that right?

A. For the most part, correct.

13:49:50 Q. And so when we're talking about the epidemiological data here, we're talking about data that includes -- it considers exposure to Roundup or other products that are actually on the market; is that right?

A. Yes.

13:50:09 Q. Now, one of the critical things in epidemiology to keep in mind is that you have to deal with all potential confounding factors; isn't that right?

A. Yes.

Q. And confounding factors -- one of the ways or

13:50:27 one of the terms that epidemiologists use to refer to

dealing with confounding factors is "adjustment"; is that right? You've seen that phrase -- that term before; is that right?

A. Of course.

13:50:39 Q. And we're not -- I'm not going to get into the details here, sir, but in the literature relevant to this case, you've seen reference to the phrase "adjustment for other pesticides"; is that right?

A. Yes.

13:50:51 Q. Okay. Now, let me turn to some of your other opinions, if I could. I wanted to talk to you a little bit about Mr. Johnson's exposure. You did testify about that this morning and even a little bit after lunch; right?

13:51:32 A. Of course.

Q. Now, in your expert report, you refer to, Doctor, the steps that Mr. Johnson took to protect himself as "limited"; is that right?

A. Yes.

13:51:43 Q. Okay. But actually, Mr. Johnson took more steps than most to protect himself from Roundup or Ranger Pro, whichever it was he was using; isn't that right?

A. I'm not sure I understand the term "most."

Q. Most people. Most people who use it.

13:52:05 A. No. The people in the Monsanto study were

afforded waterproof clothing, jackets, face shield, et cetera.

Q. Okay.

A. If you're a Monsanto person, you get better protection.

Q. Well, it wasn't -- certainly, you'd agree that based on the steps he took, Mr. Johnson was concerned about protecting himself from Roundup or Ranger Pro, whichever one it was he would be using?

A. Absolutely.

Q. And he took a number of steps that you would consider effective steps; correct?

A. He did.

Q. And he took -- for instance, one of the things that he did was he wore chemically-resistant gloves; is that right?

A. Yes. And rubber boots as well.

Q. I'm going to get to that. But the gloves, as you understand it, came up his forearm; is that right?

A. Yes.

Q. And when we say "chemically resistant," those are the kinds of gloves that people who work with hazardous chemicals would wear because the -- what is it, a rubberized glove that prevents that?

A. Yes, I use those. It's a neoprene mixture which

is solvent-resistant.

Q. And actually, you know from your studies and your review of the literature that the hands are particularly important to protect; right?

13:53:23 A. Absolutely.

Q. Because the hands, when you're talking about dermal absorption, are, what the studies show, the location where, if there's going to be dermal absorption, most of it happens; right?

13:53:36 A. Yes.

Q. So it was a good thing for Mr. Johnson to wear the chemically-resistant gloves; is that right?

A. I'm sorry. I made a slight error.

Q. Okay. Correct your error, please.

13:53:48 A. The studies show that the back, just below the neck area, is 3 to 33 times more impacted than anywhere else on the body when wearing a backpack sprayer. Now, if a person is not wearing a backpack sprayer, the second -- then the most effected area are the hands, but

13:54:11 if you're wearing a backpack, it's this area --

Q. What study is it you're referring to for the backpack sprayer, sir?

A. Monsanto's own study.

Q. Okay. Now, the gloves, they were the gloves

13:54:20 that were chemically resistant, and then he had boots

that were also chemically resistant; is that right?

A. That's what I said, yeah.

Q. Yeah. Okay. And so -- actually, when you do your spraying, you don't wear chemically-resistant boots, do you?

13:54:34

A. No, but I don't have any weeds or anything to walk through. I have mulch.

Q. Right. But you wear, what did you say, leather, kind of, work boots when you do that?

13:54:45

A. Yes, yes.

Q. And that's not as good to repel something like a chemical as a chemically-resident boot; right?

A. Correct. But I'm not walking through grass, wet weeds. I have no drift, so it's --

13:55:00

Q. Well, it concerns you enough that as soon as you take off your boots, you wash your hands and your feet; right?

A. I do as a precaution.

Q. Yeah. And you actually are of the opinion, Doctor, with all your study of glyphosate and so forth and Roundup and Ranger Pro, that washing off an exposed area is a very effective way of preventing dermal absorption from happening; isn't that right?

13:55:13

A. Only if conducted very rapidly after exposure, because that first hour or two, nearly 50 percent of the

13:55:37

dermal absorption takes place, so the washing has to be rather immediate.

Q. Okay. But if you -- assuming you do an immediate washing, that's an effective way of preventing dermal absorption of Roundup or Ranger Pro?

A. Well, it's not going to prevent it, but it's certainly going to reduce it.

Q. Okay. Substantially; is that correct?

A. Yes.

Q. And that's why you do it?

A. Well, I have.

Q. Yeah.

A. You know, I -- there was one exception where I had to scrub my legs, the first time I ever used the darn stuff.

Q. Yeah. And you scrubbed your legs, I assume, with soap and water; is that right?

A. That's correct.

Q. All right. Now, you did not yourself, Doctor, perform any calculation of the amount of glyphosate that penetrated Mr. Johnson's clothing; is that right?

A. I relied on the Monsanto official studies that show how much the impact is on an average worker.

Q. Yep. And --

A. And realizing that that underestimates his

exposure.

Now, I had no way to go back and re-spray Mr. Johnson with pads on his body that I could send to the laboratory. That couldn't be done. It would be unethical anyway.

13:56:50

Q. Yeah. Understood. Understood. And nobody's suggesting you should have done that. I'm just asking, I hope, a simple question.

You didn't perform any calculation of the amount of glyphosate that actually penetrated Mr. Johnson's clothing?

13:57:00

A. No. I used the 40-percent level, which is the Monsanto figure.

Q. Okay. You didn't perform any calculation of the amount that penetrated his gloves?

13:57:11

A. I used the Monsanto figure of 0 percent.

Q. Sir, I --

MR. LOMBARDI: Your Honor, I just asked him a very straightforward question.

Q. You didn't perform yourself a calculation of the amount that penetrated Mr. Johnson's gloves; is that right, sir?

13:57:23

A. Same answer as before. I couldn't re-spray the guy.

Q. Okay. So you did not; is that right?

13:57:33

A. Of course not.

Q. Okay. Thank you. You didn't do any calculation of the amount that penetrated Mr. Johnson's chemically-resistant boots; is that correct, sir?

13:57:47 A. No. I used the Monsanto figure for boots --

Q. You didn't --

A. -- rubber boots, which is 0.

Q. I apologize. Did you finish your answer?

A. Yes, sir.

13:57:55 Q. You didn't calculate the amount that penetrated Mr. Johnson's mask; is that correct? You know he wore a mask; right?

A. Yeah, I -- I actually did, in terms of I used the 100 percent value. I did not -- I did it two ways,

13:58:17 actually, in our report. I did one with a zero inhalation, assuming 100 percent was captured by the mask, and I did it a second measure using the Monsanto figure of inhalation. So I did it two different ways, and it had hardly any impact on the dose level at all.

Q. Okay.

A. And per page -- Table 26, 27 of my report.

Q. But my question, again, sir, is: Did you do any calculation of the penetration of Mr. Johnson himself of his mask by glyphosate?

13:58:44 A. Of course not. That could not be replicated for

Mr. Johnson.

Q. Thank you.

And you didn't do any calculation yourself of the amount of drift that Mr. Johnson was exposed to; correct?

13:58:56

A. Of course not. There was no way to go back in time and measure that.

Q. Okay. Thank you.

Now, you have said, Doctor, that it's important also -- in addition to protect equipment, exposure is also determined in part by the way you spray; correct?

13:59:11

A. Yes.

Q. All right. And you told us about the way you spray at home, and you've studied Mr. Johnson's testimony and the records about the way Mr. Johnson sprayed; correct?

13:59:26

A. Yes.

Q. And Mr. Johnson indicated that he was very aware of the problem of drift; is that right?

13:59:36

A. Yes.

Q. And you don't want -- he indicated you don't want to spray when the wind is too great; correct?

A. Are you asking me about his testimony?

Q. Yes.

13:59:48

A. He testified that it was unpredictable on any

given day.

Q. Right. But he made an effort not to spray if the wind was too great, didn't he say that?

A. Yes.

13:59:59 Q. Okay. And that's -- and you agree with that, you shouldn't try to spray when the wind is too great?

A. Correct.

Q. And one of the things you should do when you spray, is you should, for instance, not spray into the

14:00:11 wind; right?

A. Of course.

Q. Because that would just bring the spray right back at you?

A. Correct.

14:00:19 Q. And Mr. Johnson understood that as well?

A. I don't remember his exact testimony, so I'd rather not --

Q. Okay. That's fine. And if you have that situation, please just tell me, and we'll move on. But I

14:00:36 understand you don't remember that specifically; is that right?

A. Not exactly.

Q. Okay. Thank you.

And do you recall that Mr. Johnson knew that

14:00:43 it's better to spray in a way that the wind was going to

blow the aerosol away from you?

A. I believe so. But I know he also testified that it was very unpredictable. The wind could be moving one way and then switch to the other, depending on what buildings were, you know, in the area.

Q. Sure. Okay. Sir, and you understand that Mr. Johnson used a wand when he sprayed; correct?

A. Yes.

Q. Whether it was with the backpack or the -- I'm not sure what we call it -- the pump or -- the pump that he had on the back of the truck, both -- in both instances, he would use a wand; is that right?

A. Yeah, it's got -- termed a hydraulic nozzle, yes.

Q. Okay. And the wand -- or I should call it a hydraulic nozzle; is that --

A. Correct.

Q. Okay. The hydraulic nozzle, that's a good idea to help control your exposure; is that right?

A. No. It's a terrible idea. I drilled a hole in mine. I wouldn't use it again. That creates a dangerous aerosol.

Q. Okay. So -- and -- so by using a wand, he actually was doing the wrong thing, as far as you're concerned?

A. Well, he didn't know any better.

Q. I'm not blaming Mr. Johnson. I'm just -- it was not helpful, I guess, to avoiding exposure?

A. Certainly not.

14:02:06 Q. Okay. So -- but the wand at least -- it helps extend the spray away from your body? That's the idea of using a wand; correct?

A. Yeah, it moves it approximately 30 inches.

Q. Okay. And is that the length of your wand.

14:02:23 A. I have several wands. I have pressure washer wands, which I use with water only, of course, and I have my backpack wand, which measures about 30 inches.

Q. Okay. So the wand that you use for -- you use Roundup when you use a herbicide, not Ranger Pro; is that

14:02:44 right?

A. That's right.

Q. So when you use Roundup, you use about the same wand that Mr. Johnson was using; is that right?

A. Yes, except mine has a hole drilled in it, and

14:02:53 it shoots out like a squirt gun, not an aerosol.

Q. Okay. Yeah. Understood.

Now, the other thing that Mr. Johnson wore -- we've talked about the boots and the gloves and the mask. I forgot -- he also wore goggles; is that right?

14:03:10 A. Yes -- well, not --

Q. Okay.

A. -- I don't want to say he always wore them, but yes.

Q. Okay. At least as you recall it, he at least from time to time wore goggles. You don't remember how often; is that fair?

14:03:17

A. That's correct.

Q. Now, the -- and did you know that at some point he changed from, kind of, the soft paper mask to a mask with cannisters on it?

14:03:32

A. Yes, that's correct.

Q. All right. And do you believe that the mask with cannisters, as you understand it, that does help to protect you from exposure?

A. Well, both, the dust mask will catch much of the aerosol as well.

14:03:45

Q. Okay.

A. That's why I said I did not opine in this case that his inhalation exposure was very significant at all. It was primarily dermal.

14:04:00

Q. Okay. Now, one of the things that you -- then, again, I guess the last thing we haven't talked about yet is the Tyvek suit. Do you remember that?

A. Yes.

Q. And he did wear a Tyvek suit?

14:04:11

A. Yes.

Q. And you told us your opinions about the Tyvek suit that he wore; correct?

A. That's correct.

14:04:17 MR. LOMBARDI: All right. So let's put up on the screen Plaintiff's Exhibit 118, which is just the website.

THE COURT: Any objection?

MR. DICKENS: No objection.

14:04:28 THE COURT: Very well. You may proceed.

Q. BY MR. LOMBARDI: This is what was on the screen before, Doctor. And we'll look at it a little more closely. I just want to get you oriented. You can look -- it should be on your screen, if that works for

14:04:37 you, or you're welcome to look in your notebook, whichever works better for you.

Are you okay there, Doctor?

A. Very good.

Q. All right. So this is the Tyvek 400. That's

14:04:48 the brand name, I guess, and you understand this is the one that Mr. Johnson actually used; is that right?

A. Yes.

Q. All right. And so you read us some from the features and benefits section. Let's go down to where it

14:05:05 says, "Applications include."

MR. LOMBARDI: And if we could highlight that. Let me show you where that is.

Q. Do you see that, Doctor, "The applications include"?

14:05:25 A. Yes.

Q. And so this is -- as you understand it, this is what DuPont is telling us about what you can use the Tyvek suit with, what kind of materials you might be handling that would be appropriate to use this particular

14:05:42 Tyvek suit; is that right?

A. That's right.

Q. All right. And it says, "Lead and asbestos abatement remediation."

Do you see that?

14:05:50 A. Yes.

Q. "General maintenance operations."

Do you see that?

A. Yes.

Q. "Spray painting."

14:05:54 A. Correct.

Q. "And general clean up."

Do you see that?

A. Yes.

Q. Okay. Now is -- spray painting, does that have

14:06:02 some aerosol?

A. It does. In fact, I -- when I restored my '57 Buick, I wore a Tyvek 400 --

Q. Okay.

A. -- to keep the paint off me.

14:06:13 Q. All right. So let's go to the next page. And I want to go to -- there was a table -- actually, I think it's the third page. Is it -- the third page where -- the table that you -- you showed us some examples from, I believe.

14:06:25 A. That's right.

Q. Does that look right to you, Doctor?

A. It does.

Q. All right. So I just want to go through some of the things that they say might be suitable for use, but

14:06:35 there are a lot of liquids on this list, aren't there, Doctor?

A. Yes.

Q. Okay. All right. And so if we go down to the fourth one, it says, "Biological fluids with potentially

14:06:48 infectious diseases."

Do you see that?

A. Yes.

Q. That's one of the things they say it's suitable for use with; right? Correct?

14:06:56 A. It does.

Q. And then it says, "Blood"; right?

A. Yes.

Q. "Blood with potentially infectious diseases."

A. Yes.

14:07:10 Q. "Bodily fluids."

A. Yes.

Q. "Bodily fluids with infectious diseases." And let's just skip down to the bottom here. I'll show you one other thing.

14:07:27 "Radioactive particles, sewage"; right?

A. Yes.

Q. Okay. Now, Doctor, this you just -- you got from the DuPont website, I assume; right?

A. I don't remember. I'd have to check my report

14:07:46 and look at the footnotes.

MR. LOMBARDI: Well, if you could just go to the front page, and we can just show the doctor.

Q. Does that look like the DuPont website to you, Doctor?

14:08:01 Well, let me just ask you: Did you find this information yourself?

A. Yes.

Q. Okay. So did you go to the DuPont website to find it?

14:08:08 A. I went to a number of different searches through

Medline and the DuPont website and others.

Q. Okay. Well, do you see the -- you see the DuPont logo; right?

A. I do.

14:08:20 Q. So does that refresh your recollection it was the DuPont website that you went to look at; right?

A. Well, let me check my report and I'll tell you for sure.

Q. Okay.

14:08:35 (Interruption in proceedings.)

THE COURT: Let's take, Ladies and Gentlemen, just a five-minute recess. We'll resume again in five minutes, at 2:15.

(Recess.)

14:13:29 MR. DICKENS: He seems to wander off, your Honor, I apologize.

MR. WISNER: We really are looking for him. I think he went to the restroom.

THE COURT: We'll just remain seated until we

14:14:22 can find Dr. Sawyer.

Welcome back, Dr. Sawyer.

THE WITNESS: I went to the bathroom.

THE COURT: Ladies and Gentlemen, Dr. Sawyer remains under oath, and, Mr. Lombardi, when you're ready,

14:15:32 you may proceed.

MR. LOMBARDI: Thank you, your Honor.

Q. I think all I wanted to confirm, Doctor, was the document that you put up was from the DuPont website?

A. Yes.

14:15:42 Q. The one about the Tyvek 400?

A. Yes, sir. Thank you. It is.

Q. Okay. Thank you.

And there was other information about the Tyvek 400 elsewhere on this same website; is that right?

14:15:56 A. Yes. I have two different references to the DuPont website in my report.

Q. Okay. Let me ask you to look at Defendant's Exhibit 3140, and it should be in that huge binder that we'll never go all the way through, Doctor. But you can

14:16:18 take a look there.

A. Okay.

Q. I'll wait until you've had a chance to wrestle that into submission. There you go.

Do you have that -- do you have Defendant's

14:16:44 Exhibit 3140, Doctor?

A. I do.

Q. Okay.

A. I think I need a bigger binder.

Q. And do you see -- I think that's about as big as

14:16:52 we can get them, Doctor.

But do you see the reference there -- there's a DuPont emblem in the upper-left, same place as we saw in the other excerpt from the website?

A. Yes.

14:17:08 Q. And do you see that this is a page relating to the Tyvek 400 suit as well?

A. Yes.

Q. Okay. And -- and this is the type of information that you consider reliable in evaluating the

14:17:28 Tyvek 400 and how it performed in this case; is that right?

A. Correct.

MR. LOMBARDI: Okay. Your Honor, I'd ask to publish it?

14:17:36 THE COURT: Any objection?

MR. DICKENS: Objection. Foundation, your Honor.

MR. LOMBARDI: Your Honor, he just said that it's the type --

14:17:46 THE COURT: Overruled. It may be published.

MR. DICKENS: Your Honor, he's never seen it before.

THE COURT: All right. Counsel, approach.

(Sidebar.)

14:18:13 [redacted] [redacted]

[redacted]

(End sidebar.)

THE COURT: All right. Mr. Lombardi, you may proceed.

14:19:16 Q. BY MR. LOMBARDI: Okay. Doctor, back to the same place.

Do you see that?

A. Yes.

Q. It's -- for the record, we're at Defendant's

14:19:22 Exhibit 3140; right? It will be in the bottom right-hand

corner of the page there.

A. Yep, yep. That's what we have.

MR. LOMBARDI: And, your Honor, permission to publish?

14:19:34 THE WITNESS: Yes.

MR. WISNER: Your Honor, I believe they can ask him about it, but publishing is a different -- the Code doesn't allow that.

MR. LOMBARDI: And for the record, I'm not

14:19:42 asking to admit it. I'm just asking to publish it because it's deemed a reliable source.

THE COURT: That's fine. The objection's overruled.

Q. BY MR. LOMBARDI: Doctor, just so that everybody

14:19:53 knows what we're looking at here, up in the upper-left, do you see it says "DuPont" again?

A. Yes.

Q. And you recognize that as the same DuPont emblem, logo, whatever, that was on the other part of the

14:20:09 website that you displayed; correct?

A. Yes.

Q. All right. And if we go down a little bit, it says, "The DuPont Tyvek 400 engineered with safety in mind."

14:20:21 Do you see that?

A. Yes.

Q. All right. And then it provides some information down below. Down around here (indicating), some information about its use.

14:20:34 Do you see that?

A. Yes.

Q. And the first one says that it provides lightweight inherent barrier protection against hazardous dry particles and aerosols; correct, Doctor?

14:20:48 A. Yes.

Q. Thank you, Doctor.

A. And I'd state to the jury that aerosols would be blocked. It's the liquid containing the glyphosate that is able to go through the pores, not the particles.

14:21:09 Q. Okay. Doctor, let me ask you a little bit about surfactants.

A. Should I put this --

Q. You can or you -- whatever is easiest for you.

A. I'll move it to the edge over here. There we go.

Q. That's fine.

You talked about surfactants for a fair amount of time during your direct examination; correct?

A. Yes.

14:21:36 Q. And surfactants are -- it's something that plays

a role in Roundup or Ranger Pro; correct?

A. Definitely.

Q. Yeah. And it plays a role that helps make it more efficacious overall; is that -- that's what you said, I think, this morning; isn't that right?

14:21:53

A. Yeah, I even used the word "clever." It's a very --

Q. I'm sorry?

A. Clever. It's a very well-thought-out methodology to enhance the permeability into the plant.

14:22:03

Q. Okay. Now, you talked a little bit about surfactants and testing the surfactants. Now, surfactants are inherently studied when you study epidemiology; isn't that right?

A. Yes.

14:22:21

Q. Because when you study epidemiology, any of those studies that studies Roundup or Ranger Pro or a glyphosate-based product, you're studying the product as it's actually sold on the market; is that right?

A. In the epidemiologic literature, yes.

14:22:39

Q. Okay. And that's what I'm talking about right now, is the epidemiologic literature, so when you have an epidemiology study of glyphosate-based products, you have a study that is looking at the effect of glyphosate as it's formulated and sold to the public; is that right?

14:22:55

A. Yes. That's fairly clear.

Q. And it's very clear that, therefore, the epidemiology studies and their calculation of risk takes into account the presence of surfactants, for instance?

14:23:16 A. Yes.

Q. And anything else that's included in the formulation; correct?

A. Right. The things such as ethylene oxide and other trace-level carcinogens, yes.

14:23:28 Q. It considers all of those things together as the product, as it's actually formulated to determine whether there is an increase in risk; correct?

A. Yes.

Q. Now, we know, Doctor, that surfactants are

14:23:44 actually tested and approved by the regulators; is that right?

A. No. The surfactant POEA -- the only testing that's ever been done is *in vitro* work by Monsanto. There's been no animal carcinogenic studies ever run on

14:24:08 it anywhere, by Monsanto or the government?

Q. And you know the government requires -- has specific requirements for animal studies; right?

A. Yes. Long-term assays, yes. They're very specific.

14:24:23 Q. And they're very specific that they want you to

test glyphosate in those studies; correct?

A. Yes.

Q. And you're aware that Monsanto did some of the animal studies that exist on glyphosate, but not all of them; is that right?

14:24:39

A. Correct.

Q. And when we're talking about this, I've said animal. It's really rodent studies; is that fair, Doctor?

A. Yes.

14:24:48

Q. And most of those studies were done by people other than Monsanto; correct?

A. In some cases universities. In some cases Monsanto or Monsanto contractors.

Q. Correct. Or other manufacturers as well; correct?

14:25:01

A. True.

Q. Other -- and when I say "other manufacturers," I mean other manufacturers of glyphosate-based products; correct?

14:25:10

A. Correct.

Q. And all of those studies are done just of glyphosate with the animals; correct?

A. That's right.

Q. That's the way the regulators want it done;

14:25:17

correct?

A. Yes.

Q. All right. So when we talk about testing that's done of surfactants -- let me just get a basic point here. There's -- we've talked a lot in this case about carcinogenicity. And you did as well; correct, Doctor?

A. Yes.

Q. And carcinogenicity talks about cancer causing -- it means cancer causing; is that right?

A. Yes.

Q. Or you're at least measuring the extent to which something is cancer causing; is that right, when you measure carcinogenicity?

A. Yes.

Q. And toxicity is actually something different than carcinogenicity; right?

A. Yes.

Q. What is toxicity, Doctor?

A. Well, toxicity in the -- let's talk about animal studies. Used in bioassays for cancer, toxicity is a point where adverse effects from the treatment are evident.

For example, if the animals are dosed at 1,000 milligrams per kilogram valuate, and they start wasting away, losing weight, that's considered a treatment

related to toxicity.

Q. I apologize. I had to clear my throat. Did I interrupt you?

A. Not at all.

14:26:35 Q. Okay. All right. So toxicity is different than carcinogenicity; is that right?

A. Yes.

Q. And there are lots of toxicity tests that are done on the ingredients of every herbicide that's sold;

14:26:48 is that right?

A. Yes.

Q. And I think you mentioned this morning, but just to refresh your recollection here, when you talk about glyphosate, that is called the active ingredient; is that

14:27:02 right?

A. Yes.

Q. And that's because it's the ingredient that is active to kill the weed; is that right?

A. Exactly.

14:27:10 Q. All right. And then inert ingredients mean ingredients that essentially aren't active; is that right?

A. For that purpose.

Q. Right.

14:27:21 A. Now -- and, again, I gave the scientific

definition, which is different. Inert means has the capacity to cause no harm.

I gave some examples. It would be like nitrogen in the air. It's -- inert means an ingredient that --

14:27:40 from a scientific standpoint, means an ingredient that has no harmful adverse effects associated with it.

In the definition used in the product manufacturing arena, the word "inert" means that it's not designed in itself to kill the weed.

14:28:00 Q. Okay. Fine fair enough, Doctor.

And obviously we know the regulators require testing on the active ingredient; correct?

A. Yes.

Q. And they also require testing on the inert

14:28:11 ingredients; is that right?

A. Yes.

Q. And, actually, anything that is included in an herbicide formulation has to be approved by the EPA; is that right?

14:28:34 A. Yes.

Q. Okay. So the EPA will look at and consider all of the ingredients in Ranger Pro or Roundup; isn't that right, Doctor?

A. Yes. And I spoke on that this morning, that

14:28:51 that was actually done using the computerized system to,

sort of, screen -- you might say screen or do a preliminary test to see if tallow amine, for example, had a structural chemical predictable relationship to cause cancer. And the EPA said it did not.

14:29:23 Q. Okay. Sir, but I'm going to get to carcinogenicity in just a minute. I want to focus on toxicity for a few minutes. Okay? Is that all right? Do you know where I am?

A. Certainly.

14:29:33 Q. Okay. So what -- the jury has heard testimony from witnesses, and I just want to see if you agree. Do you agree that the EPA looks for acute toxicity in ingredients?

A. That's number one, yes.

14:29:46 Q. Okay. And acute toxicity -- would you tell the jury what acute toxicity means?

A. Well, it's simply a bioassay, usually mice or rats, in which an LD50 is determined, a lethal dose, in 50 percent of the animals.

14:30:03 So the animals are grouped, and each group of animals gets an increasingly higher dose. And -- and then the LD50 is measured. Or LC50, also a lethal concentration 50.

Q. The EPA -- again, just to ask you if you agree

14:30:23 with some things the jury has heard about. They look

for -- they look at subchronic studies.

A. Yes.

Q. The EPA looks at genotoxicity studies of these other ingredients?

14:30:35 A. Yeah. Primarily *in vitro*.

Q. Okay. But genotoxicity studies?

A. Yes.

Q. And the EPA looks at the environmental fate of the other ingredients; isn't that true?

14:30:47 A. Yes.

Q. And environmental fate means that the EPA is looking at what happens to these other ingredients after the product is used; correct?

A. Yes.

14:30:59 Q. All right. So the EPA requires those kinds of testing. They also require something called -- have you ever heard of the term "six pack"? Not in the context of beer. Six pack in this context, Doctor.

A. I've heard the term, but I actually don't recall

14:31:18 what it stands for.

Q. Does six pack stand for a group of tests that the EPA requires be done on the entire product?

A. I believe so.

Q. Okay. And among the tests that the EPA requires

14:31:33 to be done on the entire product are toxicity tests

studying acute oral toxicity; right?

A. Yes.

Q. And acute dermal toxicity; correct?

A. Yes.

14:31:44 Q. And acute inhalation toxicity; correct?

A. Correct.

Q. Skin irritation; correct?

A. Yes.

Q. Eye irritation; correct?

14:31:53 A. Yes.

Q. And skin sensitization; correct?

A. Yes.

Q. Does that refresh your recollection that's the six pack?

14:32:02 A. Yeah.

Q. Okay. That's the six pack of testing on toxicity that the EPA requires; right?

A. Correct.

Q. And are you aware that that six pack of testing

14:32:12 shows that Roundup is of low acute toxicity?

A. That's true --

Q. And Roundup --

A. But that doesn't include long-term bioassay.

Q. I'm just taking it a step at a time, Doctor.

14:32:28 But that's fine.

Roundup has low dermal toxicity?

A. That's correct. It's a skin irritant, but it's not a high rated -- for example, it's not a sensitizer.

Q. Roundup has low inhalation toxicity?

14:32:42 A. That's correct. Because of its very low vapor pressure, it's sort of like pouring -- unlike pouring gasoline on the floor and smelling that vapor in the air, it would be more like pouring lamp oil on the floor. You know, you're -- it just has very little volatility. So

14:33:02 it doesn't vaporize. And thus it's very difficult to inhale glyphosate vapor.

Q. Okay. And Roundup has low eye irritation?

A. Correct. It's an irritant, but it's not -- not a high rating.

14:33:18 Q. And Roundup has low skin irritation?

A. That's correct.

Q. And, actually, there are published articles about the toxicity of Roundup, Ranger Pro, glyphosate-based products, aren't there?

14:33:32 A. Yes.

Q. And in those tests; correct?

A. Yes.

Q. Out there for the public to see; correct?

A. That's correct.

14:33:39 Q. And there actually have been genotoxicity

studies done on the whole product; isn't that right?

A. Yes. Both on animals and humans. And there are a number of possible genotoxic studies.

Q. Okay. And do you know how many genotoxicity studies the EPA has seen?

14:33:58

A. No. But I know how many I've presented in my report and at deposition.

Q. Okay. Let me ask you, Doctor, a little bit about -- I think you mentioned something called ADME; right?

14:34:17

A. Yes.

Q. Which is an acronym. And remind the jury of what ADME is, as you used it.

A. Distribution, metabolism and excretion --

14:34:35

absorption, distribution, metabolism and excretion.

Q. It's generally studying all of those characteristics of an ingredient or a product or what have you; is that right?

A. Yeah. This is what toxicologists routinely look

14:34:52

at.

Q. Okay. So if you said ADME in a room full of toxicologists, there would be no doubt what you meant; correct?

A. Correct.

14:34:59

Q. All right. Now, you talked a lot about the

dermal absorption of pesticides -- or of Roundup in humans; is that right?

A. Yes.

Q. You have no -- you have done no original research on dermal absorption of pesticides in humans; correct?

14:35:11

A. No. But I have reviewed, I believe, just about everything that's ever been published. Including all of the inhouse Monsanto documents, syngernsita, S-Y-N-G-E-R-N-S-I-T-A, corporation documents and other manufacturer documents.

14:35:32

Q. Sir, you have done no original studies regarding the translatability of dermal findings that are made in rodents to humans; correct?

A. I'm sorry, I didn't quite hear all of that.

14:35:45

Q. Okay. That's fine.

You have done no original studies regarding the translatability of dermal findings in rodents to humans; is that right?

A. No. But I've looked at the studies on rat skin permeability and monkey versus human. I've reviewed all of the different animals and primate studies and human cadaver studies.

14:35:58

Q. Now, there's a phrase -- I'm not going to use the Latin. I bet you can. But a phrase in toxicology

14:36:18

that essentially means the dose makes the poison?

A. Yes.

Q. Okay. And what that means is that it's the amount of the substance that, say, a person gets that will determine whether it's toxic, poisonous or whatever; is that right?

A. Exactly. And I explained that to the jury this morning, the difference between exposure versus dose. What makes it to the target organ and what is systemically absorbed.

Q. And you said -- I think you said at one point early in your career, you worked on a murder case where the weapon was table salt; is that right?

A. That's correct.

Q. And water can also be something that, at excessive amounts, is harmful; is that right?

A. It can.

Q. But that's the basic idea of the dose makes the poison. Otherwise, things that are otherwise safe can be unsafe depending on the amounts that their -- the person's exposed to; correct?

A. Yes.

Q. Now -- and I think you just said this, but just to make sure it's perfectly clear, when you say "dose," it's the amount that actually gets to the organ of

interest that is the dose; right?

A. Yes.

Q. The dose is not the amount that you, say, get on your skin. It's the amount that actually gets to the organ of interest; is that right?

14:37:52

A. Yeah. For example, lymphatic stem cells.

Q. And so when you talk about dose, that's what you mean; right?

A. Yes.

14:38:03

Q. Now, one thing you know from your study of glyphosate is that when it's absorbed by the body, it's excreted quickly; isn't that right?

A. Depends on the mode of administration. Whether it's dermally absorbed and excreted slower through

14:38:29

lymphatic metabolism into the feces through the bile duct or whether it's injected as a high-level bolus through the syringe and needle, which then is excreted rather quickly out the urine.

Q. Well, sir, if it's excreted out the urine,

14:38:44

that's an indication it's being excreted quickly; is that fair?

A. In -- with respect to glyphosate, it -- it depends on the mode of administration. It's been well proven.

14:38:56

Q. Well, that's what I was just asking.

But if -- if you assume that the glyphosate is excreted through the urine, that means that it's been excreted quickly; isn't that right?

A. No. Because you could also have five times that level going out at a slower rate, out of the hepatic metabolism system into the bio and feces.

Q. And I'm trying to focus on excretion through urine right now, Doctor, but -- so if you just focus on what's excreted through the urine, that glyphosate is excreted quickly; isn't that right?

A. If injected IV, yes.

Q. Okay. And, Doctor, one other thing that you consider as a toxicologist when evaluating something, a chemical, an agent, is whether the agent bioaccumulates in the body; right?

A. Yes.

Q. And that means basically it accumulates somewhere in the body; right?

A. Correct.

Q. And if it accumulates in the body, that's not a good thing; right?

A. Not at all.

Q. Okay. Glyphosate does not bioaccumulate; correct, Doctor?

A. With one exception it does bioaccumulate. As

proven in the Monsanto studies, it accumulates as a, quote, "tissue reservoir in the skin."

Q. I'm sorry. I didn't quite -- are you -- does -- does glyphosate bioaccumulate in the body, Doctor?

14:40:30 A. Yes. In the skin as a, quote, "tissue reservoir," end quote, as per Monsanto.

Q. Okay. Let's look at your deposition at page 426. It should be in your binder. Or I think I may have to get you another binder, Doctor.

14:40:57 MR. LOMBARDI: May I approach the witness?

THE COURT: Yes.

THE WITNESS: Ah, a little one. Thank you.

Q. BY MR. LOMBARDI: Tell me when you've got to page 426, which is the number that is associated with the

14:41:26 four pages. Not the one at the bottom.

A. Okay. I have it.

Q. All right. 426, line 5. Doctor, you were asked the same question at your deposition, and you gave an answer under oath; isn't that right?

14:41:41 A. I'm sorry?

Q. You were asked the same question I just asked you under oath at your deposition?

A. Yes.

Q. And you gave a different answer; right?

14:41:50 A. That's right.

MR. LOMBARDI: Let's publish the deposition, please.

THE COURT: Yes. Those lines.

MR. LOMBARDI: 426, lines 5 to 9.

14:42:00 Q. "Does glyphosate bioaccumulate?

"No. I already said it does not accumulate. It does not bioaccumulate. No. At least in the body. In the environment, I'm not prepared to opine on."

Did you give that answer to that question at 14:42:16 your deposition under oath, Doctor?

A. I did.

Q. Thank you.

Now, Doctor, when you talk about dermal exposure, that means cutaneous absorption of a chemical 14:42:31 through the skin; isn't that right?

A. Yes.

Q. Generally speaking, to be absorbed -- well, let's step back a second.

When we get to the absorption that Mr. Johnson 14:42:42 experienced, we have to consider several steps; isn't take right?

A. Yes.

Q. First we have to consider what he was wearing; is that right?

14:42:51 A. Yes.

Q. And you have to consider the extent to which that protected him; is that right?

A. Yes.

Q. And then you have to consider what happens when the skin and the formulation interact; is that right?

A. Yes.

Q. And the skin is actually -- is this -- the skin is actually a protective barrier; right?

A. Yes, it is.

Q. And the skin is -- is designed, really, to help protect us from absorbing things that we shouldn't be absorbing; right?

A. Yes.

Q. So the skin is a protective barrier. Some chemicals are more easily absorbed across the skin than others; is that right?

A. Yes.

Q. And you -- I think you used this phrase this morning, hydrophilic?

A. Yes.

Q. What does hydrophilic mean?

A. Water soluble, water loving.

Q. Okay. And what's the significance of something being hydrophilic or water soluble, water loving in terms of skin absorption?

A. That under a normal condition with a normal epidermis containing cholesterol, fatty acids, the keratin of the skin is hydrophobic and would tend to repel the absorption of the hydrophilic glyphosate. However, a certain amount can still get through because the brick and mortar area layer, I showed you on the exhibit, has passages. And there are cytokines and proteins in those passages that are hydrophilic.

And so there is still room for hydrophilic substances to travel. And unlike, as I said this morning, trichloroethylene or benzene or some other organic solvents that have a very high ability to dissolve that barrier and zip right through, glyphosate has a harder time getting through.

Q. That's what I was -- I apologize, Doctor. That's what I was getting to.

If you're hydrophilic, it's harder for the substance to get through the skin; correct?

A. That's -- that's exactly right.

Q. All right. And so then the -- kind of the opposite, at least in this realm, is something called lipophilic; correct?

A. Yes.

Q. What does lipophilic mean?

A. That would be the benzene or trichloroethylene,

organic solvents that are very soluble in organic material and -- and solvents and has the capacity to go through the lipid bilayer of the skin.

Q. Okay. And so it's -- something that's lipophilic would be expected to have an easier time penetrating the protective layers of the skin; is that right?

A. Yes.

Q. Whereas something that is hydrophilic, like glyphosate, would be expected to have a low ability to penetrate the skin; is that right?

A. Yes. However, that can be tremendously increased with the use of various surfactants. Especially tallow amine.

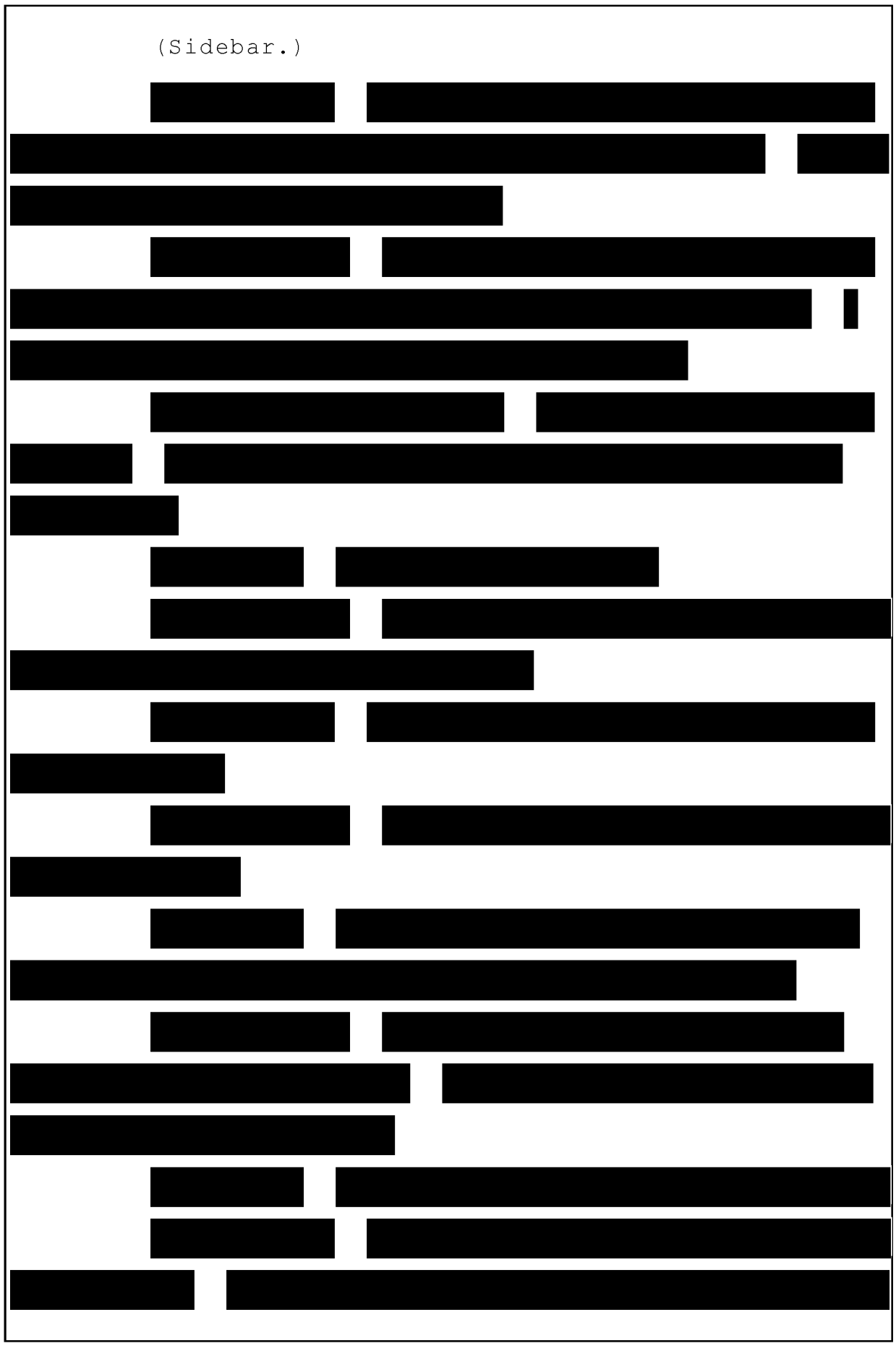
Q. Now, Doctor, surfactants, I think you referenced, have been studied by the EPA; is that right?

A. As I said, they've never run any long-term animal cancer assays or carried out other studies. The only thing I'm aware of that's been done at all is some very rudimentary testing by Monsanto.

Q. Well, sir, let's look at Exhibit 2436. It should be in the big -- big binder.

MR. DICKENS: Your Honor, can we have a sidebar on this?

THE COURT: Yes.


(Sidebar.)
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(End sidebar.)

THE COURT: All right. You may proceed, Mr. Lombardi.

MR. LOMBARDI: Thank you, your Honor.

Q. Doctor, you told us you were aware of certain EPA work with respect to surfactants; is that right?

A. Yeah. I specifically said tallow amine. And that's not what this article's about.

Q. Okay. Well, let me just ask you a couple questions, then, just to get your response, Doctor.

Isn't it true that tallow amine falls within a category called AAPs?

A. Yes.

Q. And, actually, if you look at the article, isn't the article about AAPs?

MR. DICKENS: Objection, your Honor. This is what we just talked about.

14:50:00 MR. LOMBARDI: I'm laying a foundation.

THE COURT: Objection is sustained.

Q. BY MR. LOMBARDI: Okay. Let me just make sure I've got it right, Doctor.

AAPs is a category that includes POEA?

14:50:16 A. Yes.

Q. Okay. And isn't it true, Doctor, that it has been shown that there's no evidence that AAPs, including POEA, are neurotoxic?

A. I'm sorry, say it again.

14:50:26 Q. Isn't it true that it has been shown there is no evidence that AAPs, including POEA, are neurotoxic?

A. Okay. So --

Q. Do you agree?

A. Yeah.

14:50:41 Q. Okay. Do you agree that there's no evidence that AAPs, including POEA, are mutagenic?

A. Do I agree that --

Q. There's no evidence that AAPs, including POEA, are mutagenic?

14:51:03 A. No, there is evidence.

Q. Okay. So you disagree with the assertion that there's no evidence that AAPs are mutagenic, just so we have that clear on the record?

A. As of nine years ago, I think that may be true, but --

14:51:16

Q. Why are you referring to nine years ago?

MR. DICKENS: Objection, your Honor. I mean, he's asking specifically. He directed him to review something. This is exactly what we talked about.

14:51:27

THE COURT: Well, he may answer the question.

Without referencing the article, Doctor. I'm assume you have not seen that article before; is that right?

THE WITNESS: I have actually seen pieces of it.

14:51:37

Not the whole thing. I saw one paragraph of it.

THE COURT: All right. Well, you may answer the question, if you know the answer.

Q. BY MR. LOMBARDI: Should I reframe it for you, Doctor? Would it be easier?

14:51:49

A. Yes, please.

Q. You are aware that there's no evidence that AAPs, including POEA, the surfactant you talked about this morning, are mutagenic?

A. I'm aware of studies that show that they clearly

14:52:09

can cause DNA adduct formation or oxidative damage to

DNA. And they've shown mutagenic properties.

Q. Okay. And let me ask you one more. What's clastogenic mean?

A. Basically damage to the actual -- physical damage to the DNA material.

Q. Okay. And you're aware that there's no evidence that the AAPs, including POEA, are clastogenic; isn't that correct?

A. Yes.

Q. And, Doctor, I think you testified to this this morning, but just confirming, you're aware that the EPA has concluded that there's no evidence that AAPs, including POEA, are carcinogenic? You're aware of that?

A. I'm aware of that conclusion, but it's based on structural activity relationship by a computer program. There's never been any actual long-term bioassays on animals performing.

Q. Well, let's just break that down, though.

First, you're aware that that's the conclusion of the EPA; isn't that right?

A. It's a very conditional conclusion by EPA that they clearly state that the studies have not been run. And the only thing they offered is a structural activity relationship best guess. So I would not frame that in terms of some type of unequivocal answer by EPA.

EPA is basically saying, "Look, we don't really have any data on this, but we've plugged in the structure activity relationship, and it doesn't show any red flags," so --

14:54:04 Q. Doctor, I just want to make sure just -- just so that we have it right here for the record that I have your answer cleanly: Do you disagree that the EPA has concluded that there's no evidence that the AAPs, including POEA, are carcinogenic? Do you disagree with

14:54:20 that?

MR. DICKENS: Objection, your Honor. That's the exact question he just answered.

THE COURT: Overruled. You may answer.

THE WITNESS: I agree with that, but I also have

14:54:29 to include my clause that it could be misleadingly interpreted, because they made it clear in that paragraph that they really didn't have the data to make the decision. All they had was the structural activity relationship computer projection. That's it. It's very,

14:54:48 very, very weak.

Q. BY MR. LOMBARDI: I'm sorry. Did you finish your answer?

A. Yes, but it's just a weak conclusion.

Q. Okay. That -- in your opinion, it's a weak

14:54:55 conclusion; is that right?

A. Well, they pretty much say the same thing, too --

Q. Well --

A. -- that it's a weak conclusion.

14:55:02 Q. I guess when we get a chance to look -- I'll strike that.

So -- but, Doctor, you don't mean to suggest that structure-activity relationships aren't useful to study; right?

14:55:14 A. They're the most crude and rudimentary approach toxicologists have. That's what we use when a new chemical is created or -- or a new chemical is discovered, and we look at that relationship and say, huh, it's a cautionary mean. It could be immunogenic or, 14:55:35 as I said this morning, it could be a chlorinated hydrocarbon. It could be a carcinogen. I mean, it's a very crude process. It's the first thing we do when we come across a new chemical.

Q. It's useful information, isn't it, Doctor?

14:55:50 A. Yes.

Q. And structure-activity results are very helpful in determining how a chemical agent acts; isn't that right?

A. Yes, but it's really -- it's like a crude screen 14:56:03 test. It isn't a confirmatory test. It doesn't tell us

anything for sure.

Q. Now, Doctor, I want to talk -- you talked about some testing relating to dermal absorption.

Do you remember that, Doctor?

14:56:15 A. Yes.

Q. Okay. And what the testing -- I think you said that you came to a conclusion that dermal absorption of glyphosate was 10 percent, I think is what you said?

A. Yes. Based on the range in the published

14:56:31 studies that range up to 26 percent, typically in the 5 to 10 percent range when the unaccounted for material that's found in the tissue reservoir is added, as per the EOCD requirements.

Q. I think you said that when doing these tests you

14:56:58 have a choice --

A. I'm sorry. OECD.

Q. Okay. All set?

A. Yeah.

Q. I think you said that when doing these kinds of

14:57:07 tests, scientists look -- they induce some kind of absorption on the skin of the animal or whatever is being studied, and then they look at either feces or urine to determine the amount of glyphosate that was absorbed; right?

14:57:25 A. To do the job right, you look at both.

Q. But those are the options; right?

A. Right. You have to look at both, and they have to total together.

Q. And you said looking at urine is a, I think you said, horrible error; is that right?

14:57:38

A. Very serious error, yes.

Q. And the published literature actually, Doctor, says to look at the urine in those kind of tests; right?

A. Right. And that's because the studies performed by Monsanto injected the glyphosate intravenously into the animals, so most of it came out rapidly in the urine and ignored the feces.

14:57:54

Q. Sir, I'm talking about published literature.

A. Published literature has relied upon studies such as Wester or TNO and other studies that have been published that --

14:58:13

Q. Sir, the Wester study was published; correct?

A. Yes.

Q. What other published studies do you rely on to show that urine -- relying on urine was a horrible error. Wester was one published study. What's another? And, Doctor, I'm being very clear. I'm asking for published studies.

14:58:34

A. Most of these studies -- I guess all the rest of the studies are either Monsanto or Monsanto's

14:59:04

subcontractors or, in one case, another glyphosate producer.

Q. Sir, in the Wester study, which was a published study; is that right?

14:59:16 A. Yes.

Q. Now, you've actually never done a dermal absorption study yourself; right?

A. Not in my laboratories, no.

Q. Right. And you've never directed a dermal

14:59:27 absorption study; is that right?

A. Correct.

Q. And you've never -- Wester involved rhesus monkeys; is that right?

Do you remember, Doctor?

14:59:41 A. Yes.

Q. And you've never done any work with rhesus monkeys; is that right?

A. No. I've used rats and mice, but not primates.

Q. Okay. And rhesus -- you haven't directed a

14:59:57 rhesus monkey study; correct?

A. No. No. I have not worked with primates.

Q. And just so it's clear, the Wester study was a dermal absorption study of the kind that you've never personally done; is that right?

15:00:12 A. Correct.

Q. And it was done with rhesus monkeys, an animal you've never worked with; is that correct?

A. Yes.

Q. And the -- and you know -- did you know Dr. Wester by reputation?

15:00:23

A. No.

Q. Were you aware that he had published something on the order of over 400 dermal absorption studies in his time?

A. No.

15:00:35

Q. That would be -- if that's true, that would be more than you've published, certainly; is that right?

A. Yes.

Q. And Dr. Wester in his study -- he actually did a study; isn't that right?

15:00:46

A. He did.

Q. And in that study, he came to the conclusion that most of glyphosate absorbed in rhesus monkeys were -- was absorbed and excreted in the urine; isn't that right, sir?

15:01:06

Doctor, may I ask what you're looking at?

A. Well, the answer is no. You're incorrect.

Q. May I ask what you're looking at?

A. My report, page 59 --

Q. Okay. Thank you.

15:01:21

A. -- showing that the monkeys, when they received an IV dose -- intravenous bolus dose, then yes, much of it came out through the urine.

Q. Okay. And actually, Doctor, you are aware that IARC -- and you've reviewed IARC's report; is that right?

A. I'm sorry. I couldn't hear.

Q. You've reviewed IARC's report on glyphosate; is that right?

A. Certainly.

Q. And IARC's report on glyphosate actually cites to the Wester article; is that right?

A. Yes.

Q. All right. And IARC actually says that Wester -- concludes that Wester is a valid study; isn't that right?

A. Yes. However, I'd like to point out the dermal absorption was 22.6 percent and 26 percent when the unaccounted material bound in the tissue reservoir was included.

Q. Let me get IARC out for you, Doctor.

A. I don't think that's necessary. It's not in IARC. I'm referring to the actual --

Q. The Wester study?

A. -- Wester study which actually shows the values.

Q. You don't think the Wester study is in IARC?

A. No. No. I said that IARC -- okay. What I'm stating in response to your question --

Q. I just misunderstood you.

A. Yes.

15:02:57 Q. Are you saying that it's not in IARC?

A. No, no. It is in IARC, but not the figures of 26 percent absorption and 22. Those are taken from the Wester study when the tissue bound material was added to the total.

15:03:18 THE COURT: Mr. Lombardi, is this a good time to take the afternoon recess?

MR. LOMBARDI: Sure, your Honor. That would be just fine.

THE COURT: Ladies and Gentlemen, let's take the 15:03:28 afternoon recess now. We'll be in recess till 3:20 on the wall clock. Please do not discuss the case. We'll resume at 3:20. Thank you.

(Recess.)

(Sidebar.)

15:21:16 [redacted]

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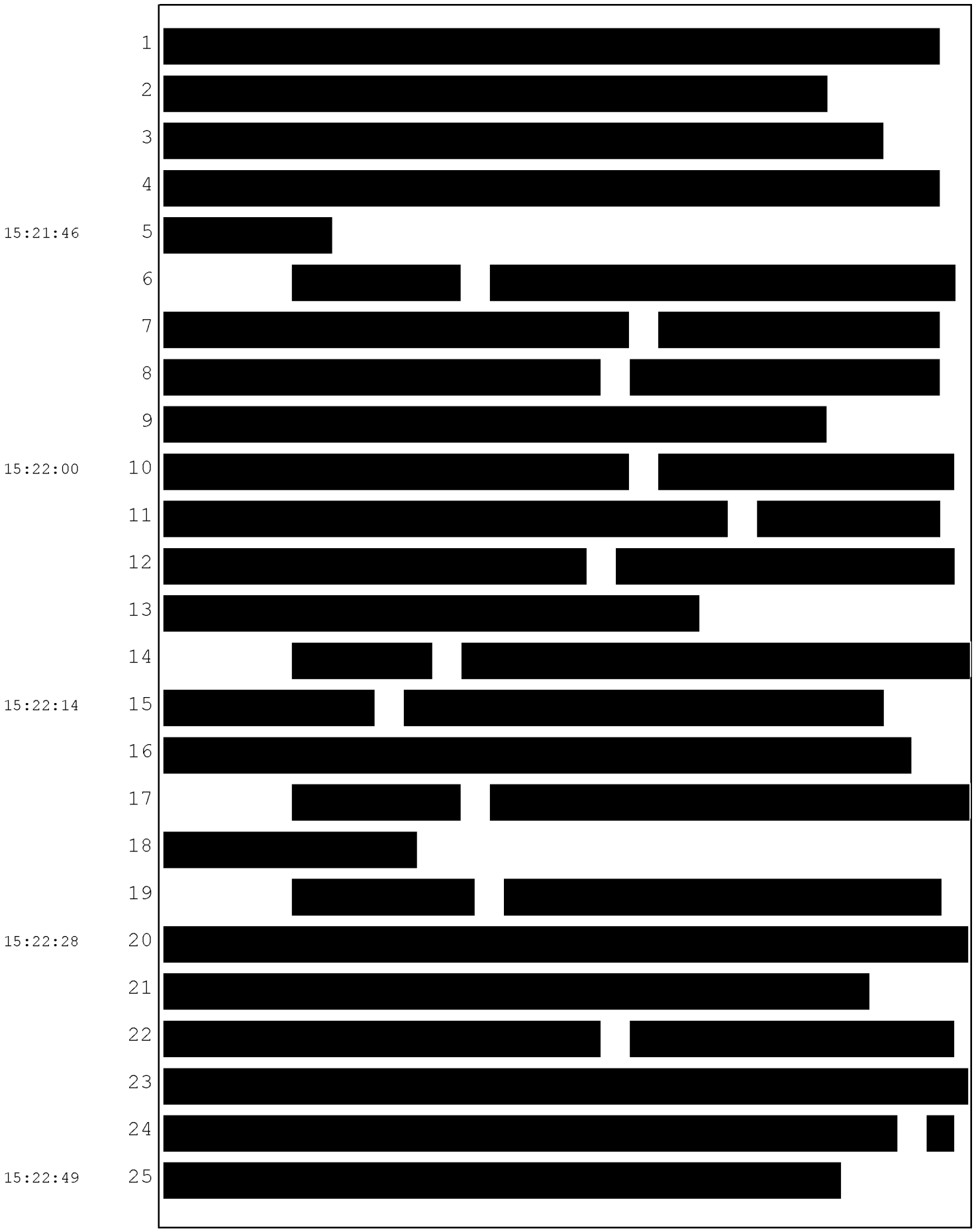
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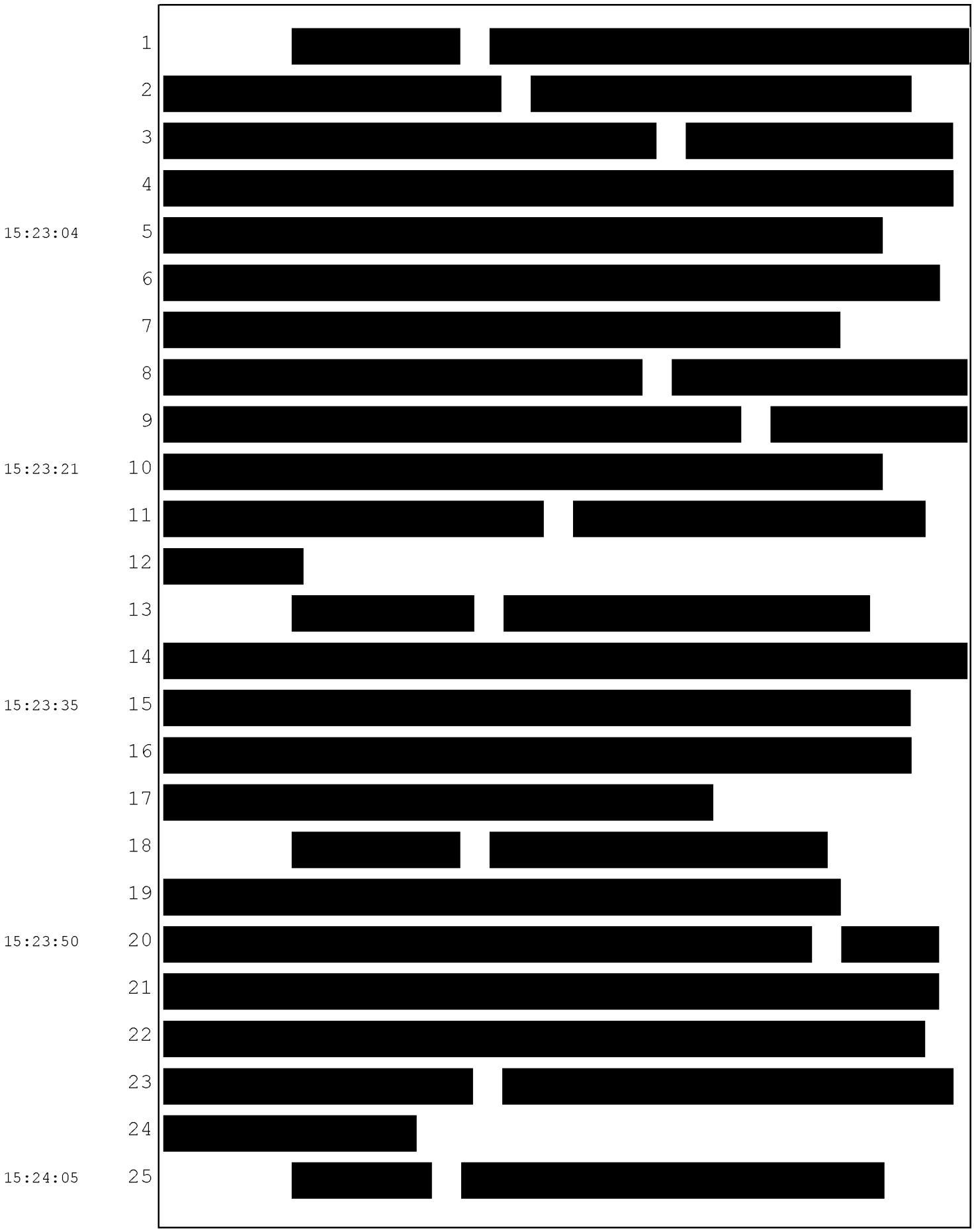
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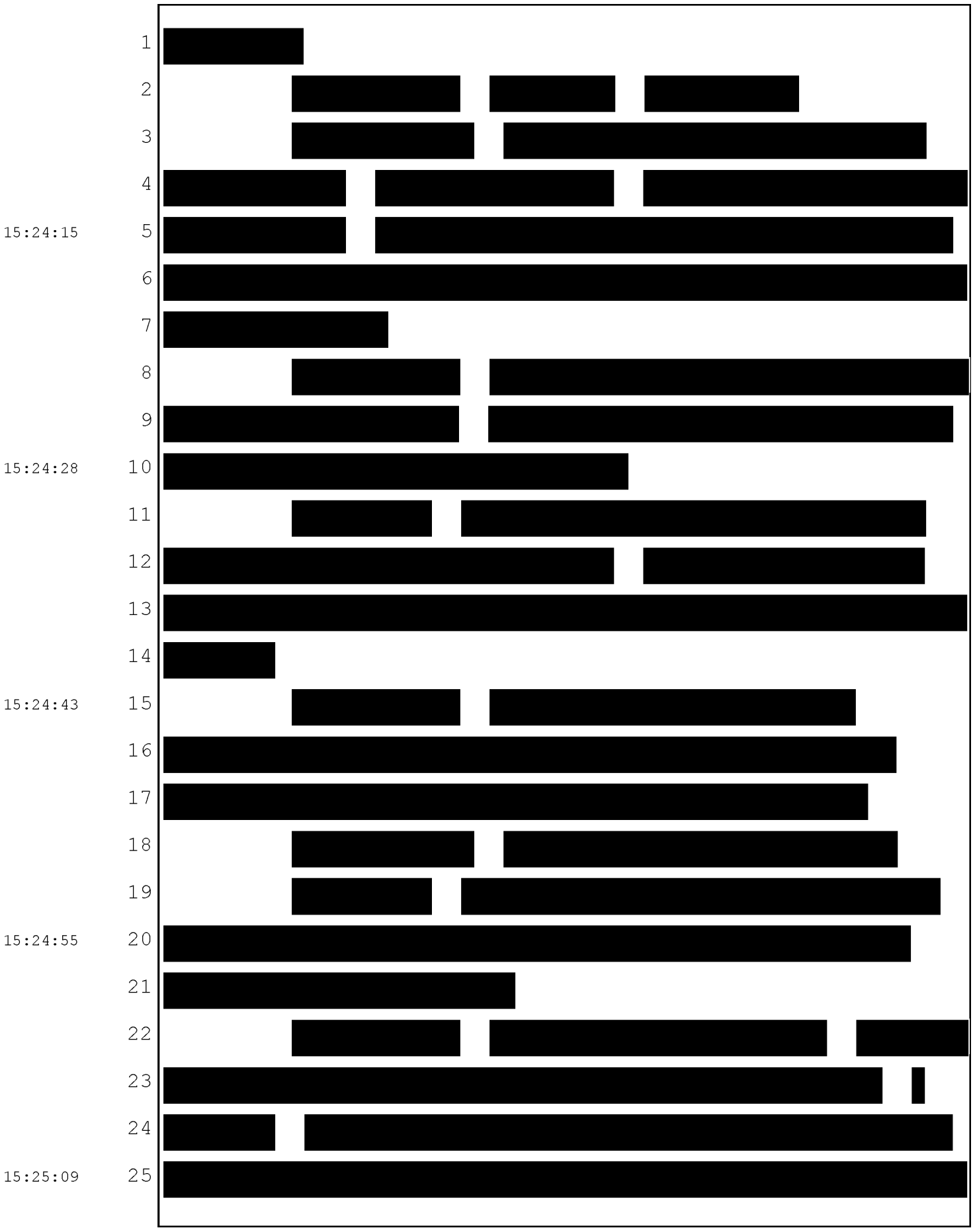
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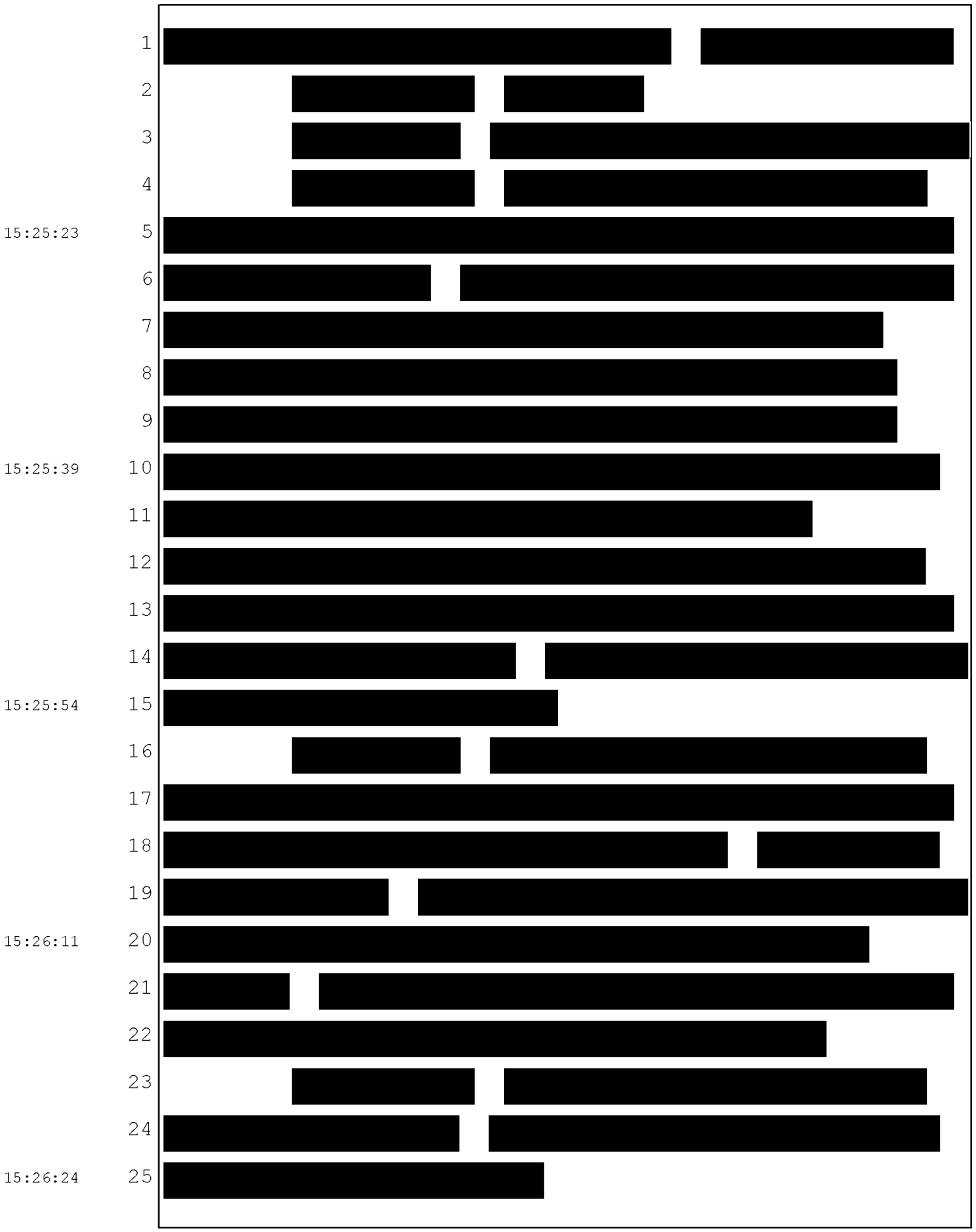
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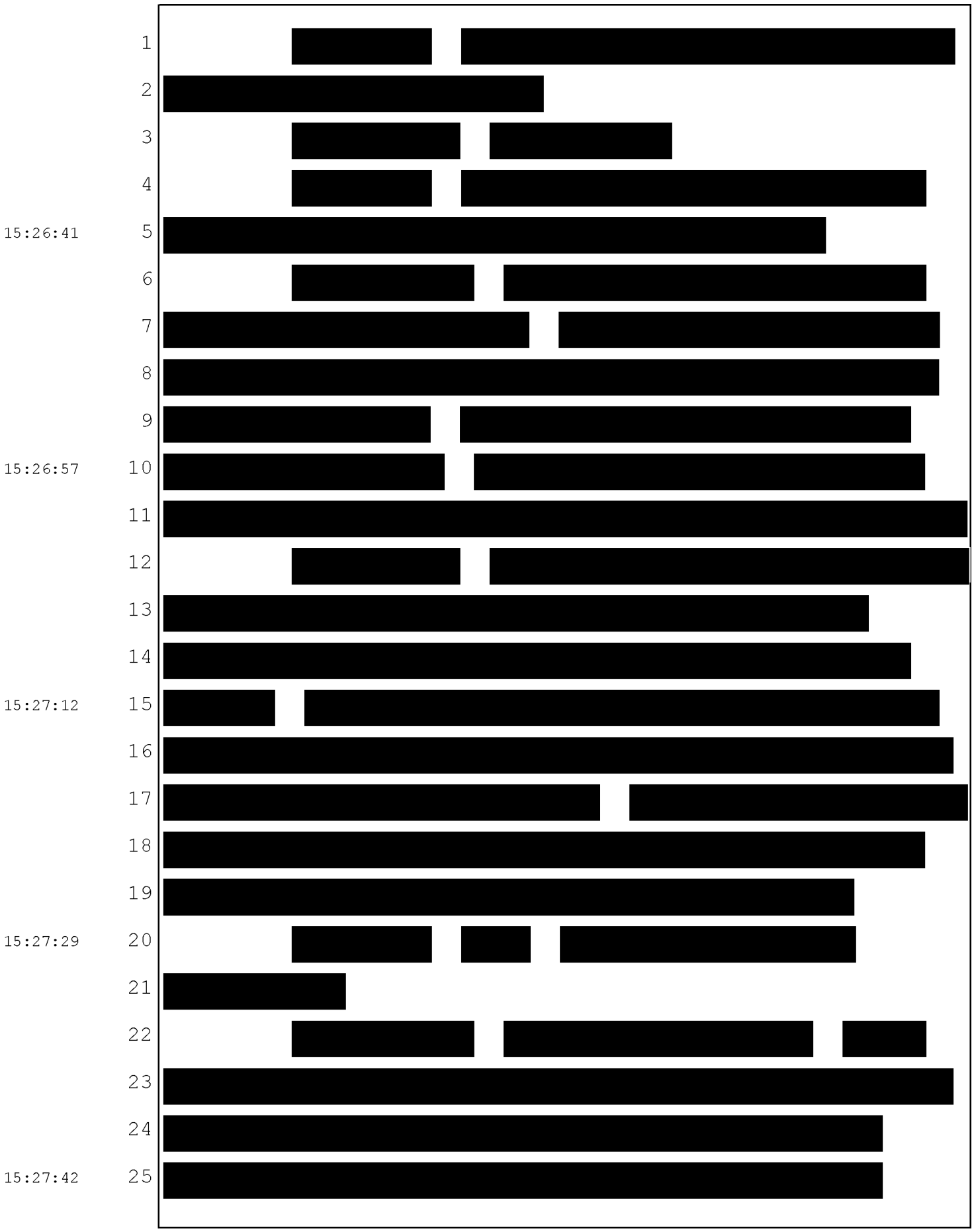
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[redacted]

(End sidebar.)

THE COURT: Welcome back, Ladies and Gentlemen. Dr. Sawyer remains under oath, and Mr. Lombardi, when you're ready, you may continue.

MR. LOMBARDI: Thank you.

Sorry about that, Doctor.

Q. Doctor, I think you've made some comment about how you couldn't go back and spray Mr. Johnson to determine his dose because that would be unethical.

Do you remember that?

A. Yes.

Q. Now, you have been an expert toxicologist in many, many cases; isn't that right?

A. Yes.

Q. And on many occasions, you have calculated a dose for somebody without re-exposing them to the agent of interest?

A. Correct.

Q. Thank you.

A. For example, like a dust sample and then calculated from that dust how much chemical was in it and knowing how much dust a person takes in each day.

15:29:01 Q. And you've done that calculation many times?

A. Certainly.

Q. All right. Thank you. Now, in addition, Doctor, just to confirm, I think you said this, but I just want to make sure I had it clear. You didn't

15:29:15 compute an actual dose for Mr. Johnson in this case; is that right?

A. I did compute it using the literature values, and I substituted a higher dermal absorption rate of 10 percent and made the computation.

15:29:31 Q. But, Doctor, I'm asking you specifically about -- specific to Mr. Johnson, you didn't calculate -- we went through this before, I think. You didn't calculate the drift that he was exposed to, how much got in through his gloves?

15:29:46 A. No, I did. I can take you to the actual page for his hands, the actual page for his back. I could show you all that data, if you wish. I used the published data for those skin sites for a 60 kilogram individual using a hydraulic nozzle, wearing a waterproof

15:30:09 jacket, waterproof pants, rubber boots, impermeable

gloves and a face shield.

Q. Doctor, what you used to calculate dose here was days of exposure. Isn't that what you just told us on direct?

15:30:28 A. No. I actually calculated the dose in milligrams per kilogram per day as well.

Q. You calculated a dose based on a generic model; isn't that right, Doctor?

A. Oh, I wouldn't call it generic. It's a tested

15:30:41 model.

Q. But it's a model; isn't that right?

A. It's the best model, yes, available.

Q. What you didn't do was sit down and compute an actual drift based on Mr. Johnson himself and based on

15:30:54 exactly what he was wearing, exactly what he was doing; isn't that true, Doctor?

A. I did. I just erred in the direction of assuming that he was wearing more protective gear than he had on, so my dose is an underestimate.

15:31:14 Q. Doctor, would you refer to page 293 of your deposition. Tell me when you have that, Doctor.

A. Okay.

Q. And, Doctor, it's a fact that you did not perform any calculation of the amount of glyphosate that

15:32:04 penetrated Mr. Johnson's clothes, isn't it?

A. I used the 40 percent value as published in the literature.

MR. LOMBARDI: Your Honor, I ask to publish page 293.

15:32:17 THE COURT: Yes. You may proceed.

MR. LOMBARDI: And let's put that up -- put slide 51 up on the screen, please.

Q. Sir, did you give this answer to this question under oath at your deposition:

15:32:42 "In your report, did you perform any calculation of the amount of glyphosate that penetrated Mr. Johnson's clothing?

"No. That's already been done in table -- I think in Table 25 in the report. Those calculations have 15:32:54 already been performed, and I didn't see any reason to repeat them."

Did you give that answer to that question --

A. That is correct.

Q. -- under oath?

15:33:01 A. That's what I'm trying to explain. I used the published values for all of the various conditions of gloves and coveralls and boots, et cetera.

Q. And no calculation of the amount of glyphosate that penetrated Mr. Johnson's clothing; correct?

15:33:17 A. Yes, I did. I used the 40 percent --

Q. Sir, did you give that answer under oath?

A. That's what I'm telling you right now.

Q. Sir, it does say "No"; right?

A. It's already been done. I didn't --

Q. In your report --

A. -- didn't re-spray the poor guy and do a study of his skin penetration, no.

Q. Are you telling the jury the only way to determine -- to do a calculation of Mr. Johnson's exposure is by spraying him, Doctor? Is that what you're telling the jury?

A. That's what you're asking me.

Q. I'm asking you: Are you telling the jury that that's the only way to determine Mr. Johnson's dose?

A. The only way to do it is by looking at what's been published in the literature of other workers who wore patches that were analyzed by the laboratory. That tells you how much went on various aspects of the body. And what you're asking me is -- doesn't even make any sense.

Q. Okay, Doctor. We'll -- we'll keep working on that.

Doctor, let's look at the Wester study that we talked about right before the break.

Do you recall that?

A. Yes.

Q. Okay. That's Exhibit 3099.

A. Okay.

Q. And this is the Wester document we were referring to earlier; is that correct?

A. The study from 1991?

Q. Correct.

A. Okay.

Q. That's what you're referring to; right?

A. Yes.

Q. And this is something that's in your report and you relied on; is that right?

A. Yes.

MR. LOMBARDI: Permission to publish, your Honor?

THE COURT: Any objection?

MR. DICKENS: No objection, your Honor.

THE COURT: Very well. You may proceed.

Q. BY MR. LOMBARDI: Let's put it up. It's titled "Glyphosate Skin Binding, Absorption, Residual Tissue Distribution, and Skin Decontamination."

Do you see that?

A. Yes.

Q. And as you noted, up at the top, it says 1991 was the date of publication; is that right, Doctor?

A. Yes.

Q. And basically what was done her was a studies of dermal absorption of glyphosate; is that right?

A. Yes.

15:35:29 Q. And some of the studies were done *in vitro*; correct?

A. Yes.

Q. And some of the studies were done with rhesus monkeys; correct?

15:35:36 A. Yes.

Q. And let's go to page 728. One of the first things they did was to determine where glyphosate is excreted if the glyphosate is administered percutaneously; isn't that right?

15:35:59 A. As well as IV, using a syringe and needle. Both ways.

Q. And here's what at page 728 -- if you look -- I'm going to show you where we're going here. Do you see down there at the bottom of the page "since all"?

15:36:21 Do you see that?

A. Yes.

Q. It says, "Since all of the IV-administered doses (Table 3) were excreted in urine, the percu- -- it's going to say percutaneous, I believe -- the percutaneous

15:36:36 absorption of glyphosate is estimated to be 0.8 to

2.2 percent of applied dose."

Do you see that? Do you see that, Doctor?

A. Yes.

Q. Okay. And that's the conclusion that Wester and co-authors came to in this study; is that right?

15:36:51

A. No. There was more.

Q. I'm going -- I'm going -- but they at least came to that conclusion so far; isn't that right?

A. Yes.

15:37:03

Q. All right. And then they note that, "The majority of the applied dose was recovered in surface washes," "approximately 75 percent," "(most of which was the skin surface wash)."

Do you remember that?

15:37:16

A. Yes.

Q. Okay. So that's -- most of the glyphosate stayed on the skin; is that right?

A. Yes.

Q. All right and then let's go to --

15:37:24

A. Wait a minute. You forgot the next sentence which is critical.

Q. Sure. Let's read it, "The majority of the applied dose was recovered" -- I'm sorry. I lost my place, Doctor. "Accountability was 75 to 80 percent of

15:37:39

administered doses"; right?

A. Okay. So what does the international rules, OECD, say about that?

Q. Well, Doctor, let's see what -- Dr. Wester --

A. No, no. Let's go with the rules, rather than this author. The rules say you have to take --

15:37:54

Q. Doctor --

A. -- that 20 percent that's unaccounted for that's stuck in the skin reservoir and count it as absorbed. That's the rule.

15:38:04

Q. Well, you didn't present us with any article that said anything to the contrary this morning; right, Doctor. I'm going with the article you referenced.

MR. DICKENS: Objection, your Honor. Can we have a sidebar?

15:38:23

(Sidebar.)

[redacted]

15:38:42

[redacted]

15:38:57

[redacted]

[redacted]

(End sidebar.)

THE COURT: So Dr. Sawyer, please, just listen carefully to the questions that Mr. Lombardi is asking you. Please, answer his questions and then other issues, if relevant, Mr. Dickens will raise on redirect. Okay?

THE WITNESS: Okay.

Q. BY MR. LOMBARDI: So Doctor, you just read the accountability language.

Do you see that?

A. Yes.

Q. Okay. Let's go to the next column -- because what they did in this study was they didn't just measure -- they used the urine; right? Wester used the urine. That's what we just saw; right?

A. Yes. In monkeys, they used urine and feces.

Q. He used urine, though; isn't that correct?

A. Well, he did urine and feces as well; correct?

Q. But he came to the conclusion that since all of the IV-administered doses were excreted in urine, the percutaneous absorption is estimated to be .8 to 2.2 percent.

Do you see that?

A. Yes.

Q. And he actually went beyond just looking at the urine to determine how much glyphosate was absorbed, didn't he, Doctor?

A. Yes.

Q. He actually euthanized a couple of monkeys; isn't that right?

A. Yes.

Q. And he had actually radiolabeled glyphosate so that you could determine where glyphosate went in the monkey's organs; isn't that right?

A. Yes.

Q. And the way these radiolabeling tests work is that if glyphosate gets into the organs, there will be a radio signal -- a radiolabeled signal and you can tell that it got there; right?

15:41:33

A. It's counted. It was C14, and it's counted with a scintillation counter.

Q. And let's go to -- it's the next column, Doctor, on page 729. Here's where he talks about the monkeys being euthanized.

15:41:52

Do you see that?

A. Yes.

Q. All right. "Two monkeys from each topical dose level (a total of four monkeys)" -- so I was wrong it was four, not two, Doctor -- "were euthanatized after the seven-day excretion period."

15:42:00

That's the period when they tracked the urine of the monkeys; is that right?

A. Yes.

Q. "And tissues were assayed for 14C content."

15:42:10

That's the radio label that you refer to; right Doctor?

A. Yes.

Q. And then here's what they found, "No radio activity was depicted in spleen, ovaries, kidney, brain,

15:42:21

liver, abdominal fat, bone marrow, upper spinal column or central nervous system fluid."

Do you see that?

A. Yes.

15:42:36 Q. So they didn't find any glyphosate in any organs of the monkeys after the seven-day excretion period passed; is that right?

A. At this point. Later, he does talk briefly about bone.

15:42:54 Q. Okay. And then if we go to the last paragraph -- what was concluded here? Very last page, 732, please.

"The percutaneous absorption" --

That's absorption through the skin; right,

15:43:18 Doctor?

A. Yes.

Q. -- "of glyphosate in the rhesus monkey is low (0.8 to 2.2 percent)."

Do you see that?

15:43:23 A. Yes.

Q. "Since the rhesus monkey is a good animal model for percutaneous absorption relevant to humans..., we can assume that the potential for glyphosate dermal toxicity in humans is also low."

15:43:37 That's what Doctor Wester and his co-authors

concluded in this article; is that right?

A. Yes. However, they also when they had the urine and feces output together, instead of 2.2 they get -- and/or the high-dose group, 2.9 percent and 4.4 percent in the low-dose group. You failed to mention that.

15:44:01

Q. Sir, I'm talking about percutaneous absorption. That's dermal absorption; right?

A. Yeah, yeah. But it comes out in urine and feces. In fact, in Dose D, they found four and a half times more in the feces than they did in the urine.

15:44:16

Q. They actually didn't conclude that it came out in the feces.

A. They left that out of their conclusion, but other published studies have published that finding from their study.

15:44:28

Q. Let's see what IARC said about it, Okay. Because you know that IARC cited to the Wester article; correct?

A. Right.

Q. And so that is -- I'm going to put it up on the screen, Doctor, but if you want to look at it yourself, IARC is Exhibit 2624. We'll have it on the screen, if you prefer that.

15:44:34

A. Okay.

Q. And do you have 2624, Doctor?

15:45:07

A. Yeah.

Q. It's page 41 to 42 of the document you're looking at.

A. Okay.

15:45:24 Q. All right. And do you see there's a reference to the Wester article there?

A. Yes.

Q. And the paragraph starts, "Small amounts of glyphosate." Do you see that?

15:45:42 A. Yes.

Q. Okay.

MR. LOMBARDI: Okay. Let's publish that if we can, your Honor.

THE COURT: Any objection?

15:45:47 MR. DICKENS: No objection?

THE WITNESS: No.

THE COURT: Very well. You may proceed.

MR. LOMBARDI: Slide 102, please.

Q. Okay. Doctor, I've put on the screen that

15:46:02 paragraph from the IARC Monograph.

Do you see that?

A. Yes.

Q. Okay. And it's specifically talking about the Wester study and the absorption of dermal exposures in

15:46:15 humans.

Do you see that?

A. Yes.

Q. "Small amounts of glyphosate can be absorbed after dermal exposures in humans *in vitro*"; right?

15:46:24 A. Yes.

Q. "For example, when an aqueous solution of 1 percent glyphosate was applied in an *in-vitro* human skin model, only 1.4 percent of the applied dose was absorbed through the skin."

15:46:36 Do you see that?

A. Yes.

Q. That's referring to one of the findings of the Wester study; correct?

A. Yes.

15:46:44 Q. "Glyphosate is typically formulated as an isoprophylamine salt and is dissolved in a water-based vehicle" --

Do you see that?

A. Yes.

15:46:55 Q. -- "while the stratum corneum is a lipid-rich tissue."

Do you see that?

A. Yes.

Q. And that's what we talked about before, the

15:47:09 hydrophilicity versus the --

What's the other one -- I'm getting the words confused, Doctor.

-- lipophilicity and --

What's the word for water loving?

15:47:22 A. Hydrophilic.

Q. -- hydrophilic; right? That's what it's referring to there, lipophilic and hydrophilic?

A. Yes.

Q. Okay. Thank you. And then it says, "*In-vitro* 15:47:35 studies using human skin show that percutaneous absorption of a glyphosate-based formulation was no more than 2 percent of the administered dose."

Do you see that?

A. Yes.

15:47:46 Q. So that means that when they did studies with human skin, they again found absorption of 2 percent; correct?

A. Right.

Q. "Over a concentration range of 0.5 to 154 15:48:01 micrograms to centimeters squared and a topical volume range of 0.014 to 0.14 milliliters to centimeters squared"?

A. Yes.

Q. "In addition, very little glyphosate...was 15:48:19 sequestered in the stratum corneum after dermal

application."

Do you see that?

A. Yes.

Q. So the -- IARC cited to the Wester study; is that right?

15:48:27

A. Right. They didn't actually look at the raw data which shows that it also came out in the feces, and Wester didn't add that. I mean, how do you think it got into the feces? It wasn't magic. It was dermally absorbed and came out in the feces.

15:48:43

Q. Doctor, you know that when you do mouse -- when you do rhesus monkey studies that what happens is that monkeys will touch their skin and then put it in their mouth, and that's how it comes out the feces; isn't it, Doctor?

15:48:54

A. These patches were inaccessible.

Q. Isn't that true?

A. That's not what happened.

Q. It was on their stomachs, wasn't it, Doctor?

15:49:04

A. That's not what happened.

Q. Well, Doctor, at least you figured this all out -- you figured out this urine versus feces things, but the folks at IARC apparently did not; is that right?

A. They just took the study as written.

15:49:17

Q. Well, they accept- -- they could read the study

just as well as you could; right?

A. This is not the only document. The Spanish government --

MR. LOMBARDI: Your Honor.

15:49:30 THE COURT: Objection. Sustained.

Q. BY MR. LOMBARDI: Doctor, IARC -- we've heard for weeks now, 17 independent scientists from around the world, they're capable of reading studies, aren't they?

A. Yes.

15:49:43 Q. And they came to a different conclusion than you did, didn't they, Doctor?

A. IARC just did not make any new conclusions. They just took the information from the paper and put it in theirs.

15:49:56 Q. And they said nothing about your incredible feces error you talked about; isn't that right, Doctor?

MR. DICKENS: Objection. Argumentative.

THE COURT: Overruled.

THE WITNESS: There are many documents --

15:50:11 Q. BY MR. LOMBARDI: Doctor --

A. And papers --

Q. Doctor --

A. -- that say.

MR. LOMBARDI: Your Honor, this is --

15:50:15 THE COURT: Dr. Sawyer, please just listen to

Mr. Lombardi's questions and do the best you can to answer his questions directly, please.

Q. BY MR. LOMBARDI: Doctor, I'm talking about IARC; right?

15:50:26 A. So the question is what?

Q. The question is: IARC disagrees with your reading of the Wester article; isn't that correct?

A. It's different, yes.

Q. Thank you. Doctor, you talked about latency

15:50:42 towards the end of your testimony.

Do you remember that, your direct testimony?

A. Yes.

Q. Latency; right?

A. Yes.

15:50:48 Q. And latency, in a general sense, relates to the period of time between initial exposure and the time you start to show -- you start to manifest the disease; is that right?

A. No. It's the time of diagnosis.

15:51:06 Q. Okay. It's from initial exposure, at least. We agree on that; is that right?

A. Yes.

Q. So we're talking about initial exposure. And when we say that, in this case, it would be from the time

15:51:20 of initial exposure to glyphosate until -- what's the

time you like to use for latency, Doctor?

A. The definition itself, until the disease is diagnosed.

Q. And from that -- from the time of initial exposure to -- in your definition, which I'll use for today -- until the time the disease is diagnosed; right?

15:51:31

A. Correct.

Q. It's called latency because, in some respects, it's hidden; right? You don't know you have the disease during the latency period; right?

15:51:47

A. Yeah. There can be some coughing with lung cancer before it's diagnosed or many other precursors depending on the type of malignancy.

Q. And you could have cancerous cells without having it show in any way physically on your person; right?

15:52:04

A. Certainly.

Q. What happens during latency is the cancer slowly grows until such time as it manifests itself and it can be diagnosed; right?

15:52:16

A. Right. And that's how the epidemiologic studies measure it, from the time of first exposure to the diagnosis.

Q. And you have never published on latency; is that right?

15:52:28

A. No.

Q. And you gave us some testimony about latency. I think you talked about some studies of -- I tried to write this down is it Cyclosporin A?

15:52:39 A. Yes.

Q. That's what you referenced?

And so if I understood you what you said, that's something used during transplants; right?

A. It's a immunosuppressant to prevent tissue

15:52:50 rejection.

Q. During transplants; right?

A. Yes.

Q. And you talked about a latency period related to Cyclosporin A and non-Hodgkin's lymphoma; is that right?

15:52:58 A. Yes. It occurs very rapidly.

Q. And that's obviously a different kind of exposure than an environmental exposure would be?

A. Entirely different drug.

Q. Okay. Thank you. And Doctor, you showed us --

15:53:11 well, let me just ask you this: In your expert report, you make reference to a statement made by Dr. Portier about latency, don't you?

A. What page?

Q. Well, do you recall referring to Dr. Portier --

15:53:31 an article written by Dr. Portier and others related to

latency? Let me show you the article, Doctor. If you just look at 2927.

A. Yeah. I see it in my report on page 161, yes.

Q. Okay. So if you could look at page 2927, please.

THE COURT: Mr. Lombardi, do you mean Exhibit 2927?

MR. LOMBARDI: I apologize. Yes, I do, your Honor.

THE WITNESS: Okay. I've got it.

Q. BY MR. LOMBARDI: And what you referred to there was at the second page of the article, and the first -- the carryover paragraph, is that right, the last sentence there? On page 2. With Bates Number, Doctor, it's page 742 of the article itself.

A. All right. I have the page.

Q. Oh, I'm sorry. And what you referred to is the last sentence of that first paragraph; is that right?

A. "Median follow-up time in the AHS was 6.7 years, which is unlikely to be long enough to account for cancer latency." I see that.

Q. That's what you referred to?

A. Yes.

Q. Okay. Let's --

MR. LOMBARDI: Your Honor, I'd ask permission to

publish that.

THE COURT: Any objection?

MR. DICKENS: No objection.

THE COURT: All right. Very well. You may proceed.

MR. LOMBARDI: And this is Defendant's Exhibit 2927. Let's go to the first page, just so that folks --

Q. This was, I think, displayed earlier in the case, Doctor. You wouldn't know that, but it starts -- the title starts, "Differences in the carcinogenic evaluation of glyphosate between IARC and EFSA."

Do you see that?

A. Yes.

Q. And then -- and you see Dr. Portier is there, right, as one of the -- not as the lead author, but one of the authors; correct?

A. Yes.

Q. All right. So let's go to that second page where he talks about latency. He's specifically talking about glyphosate here; right?

A. Correct.

Q. And he's talking about glyphosate and non-Hodgkin's lymphoma; right?

A. Yes.

Q. And what he says is, "In addition, the median follow-up time in the AHS" -- the AHS is the Agricultural Health Study; is that right?

A. That's right.

15:56:10 Q. And so this is an epidemiological study; right?

A. Yes.

Q. And at this time -- this was at a time that he's referring to a study that was published by De Roos in 2005; isn't that right?

15:56:25 A. Yes.

Q. And so it says, "In addition, the median follow-up time in the AHS was 6.7 years."

Do you see that?

A. Yes. I reference that in my report.

15:56:35 Q. Yeah. And it says, "Which is unlikely to be long enough to account for cancer latency"; right?

A. I said that in my report as well.

Q. Okay. And that's what -- that's what Dr. Portier said; right?

15:56:46 A. Yes. What's the point?

Q. All right. Now, let's -- you showed another --

MR. LOMBARDI: Can we go to the Elmo? May I use the Elmo, your Honor?

THE COURT: Yes.

15:57:02 Q. BY MR. LOMBARDI: Okay. Your Honor -- I mean,

Doctor, it says, "First exposure there."

Do you see that?

A. Yeah.

Q. And so we have -- Portier says 6.7 years not likely enough; right?

15:57:18

MR. DICKENS: Your Honor, that's a misrepresentation as to what's in the actual article.

MR. LOMBARDI: I think I just read the -- just said what's in the sentence, your Honor.

15:57:34

THE COURT: Overruled. You can return to it on redirect if you'd like, Mr. Dickens.

Q. BY MR. LOMBARDI: Okay. So let's look now at -- you talked about another article, Doctor, and that's the Weisenburger article. This was right at the end of your direct examination. Do you remember that one?

15:57:45

A. Certainly.

Q. Okay. All right. Let's look at the Weisenburger article that's Plaintiff's Exhibit 880. And I want to go to the section of it that you were talking about this morning. That's on -- of the article itself, it's -- I think it's page 5460, Doctor. It's Plaintiff's Exhibit 880, so it will be in your Plaintiff's binder, the one that you used this morning.

15:58:00

A. 880?

Q. 880.

15:58:18

A. Okay.

THE COURT: I don't know if 880 is in the Plaintiff's binder.

MR. LOMBARDI: Oh, was it not in your binder.

15:58:36 MR. DICKENS: That's correct.

(Interruption in proceedings.)

MR. LOMBARDI: I don't mind using the Elmo, if you're okay with that. How about in our binder it's 3094 -- Exhibit 3094.

15:59:22 THE WITNESS: Okay. Ready.

Q. BY MR. LOMBARDI: All right. And I believe, Doctor, you started -- the section you were referring to started at page 5460.

Do you see that? It's about --

15:59:45 A. Yes.

Q. Okay. Do you have -- it's the one that says, "Latency period of non-Hodgkin's lymphoma."

Do you see that?

A. Yes.

15:59:51 MR. LOMBARDI: And, your Honor, I'd ask to publish that.

THE COURT: Any objection?

MR. DICKENS: No objection, your Honor.

THE COURT: Very well. You may proceed.

15:59:59 MR. LOMBARDI: Okay. And if we can put that up,

please, and go -- it's -- at the bottom it's 5460. There you go.

Q. All right. Now, this is written back in 1991 or so; is that right, Doctor?

16:00:16 A. Yes.

Q. All right. And it says, "The latency period for the development of non-Hodgkin's lymphoma following an environmental exposure is largely unknown."

Do you see that?

16:00:25 A. Yes.

Q. Okay. And it says, "One valid source of information on the latency period of NHL can be found in the literature on NHL developing after the treatment of Hodgkin's disease with chemotherapy and/or radiotherapy."

16:00:42 Do you see that?

A. Yes.

Q. Okay. Now, those are obviously very different situations from environmental exposure; right?

A. Yes.

16:00:50 Q. All right. "In such studies, the median latency period for NHL is about five to six years."

Do you see that?

A. Yes.

Q. Okay. So what that's saying is that for studies

16:01:02 involving people with -- undergoing chemotherapy or

radiotherapy, the median time to develop Hodgkin's lymphoma is five to six years; is that right?

A. Yes.

Q. All right. Let's go to the next page. Let's just keep reading. "In these studies" -- I think I might have skipped -- I think there are studies that involve the carryover. Doctor, are you able to read the carryover? I'll read it to you from here so we don't have to go back: "In such studies" -- we started on the other page -- "the median latency period for NHL is about five to six years, not unlike that for secondary acute leukemia."

Do you see that?

A. Yes.

Q. All right. "In these studies, the latency of NHL in some cases was as short as two years, but it also may be as long as 15 -- greater than or equal to 15 years."

Do you see that?

A. Yes.

Q. All right. Then it's going to talk about latency periods for atomic bomb survivors; right?

A. Yes.

Q. All right. And for atomic bomb survivors, the latency period for the younger ones, under 25 years, was

about 9 years -- 9 years latency period?

A. Yes.

Q. And for those who were older, it was 14 years. Do you see that in the next sentence?

16:02:31 A. I do.

Q. All right. "In contrast" -- so let's go to the last line there. "In contrast, the median latency period for acute leukemia associated with chronic low-dose exposure to benzene is 15 to 20 years."

16:02:48 Do you see that?

A. Yes.

Q. So benzene, that would be an environmental exposure?

A. It's a different chemical, but yeah.

16:02:57 Q. And -- but benzene, they're referring to an exposure that was obtained environmentally; right?

A. Yes.

Q. And the median latency period in that instance for acute leukemia -- different disease -- right, but 15

16:03:11 to 20 years?

A. Correct.

Q. And the latency in similar situations, would you expect it'd be similar for non-Hodgkin's lymphoma; right?

A. That's what it states, yes.

16:03:23 Q. And, Doctor, your aware that Dr. Weisenburger

has expressed further opinions on latency in more recent years; isn't that right?

A. I don't know.

Q. You don't know one way or the other?

16:03:40 A. I don't.

Q. Are you aware that Dr. Weisenburger has said --

MR. DICKENS: Objection. Your Honor, he just answered he doesn't know.

THE COURT: All right. You may ask a different

16:03:50 question.

MR. LOMBARDI: Okay.

Q. So, Doctor, there are -- and also in the epidemiology studies, one of the studies you referred to -- well, let me just -- let's go back to the Elmo

16:04:01 here, if we could, for just a second.

So here for environmental exposures, low-dose exposure to benzene was 15 to 20 years, and this is in the Weisenburger article; right? "Yes," sir?

A. It is.

16:04:27 Q. Thank you.

And in the Eriksson epidemiology article, which you've referred to, do you remember that one?

A. Yes. Yes.

Q. To the extent you considered that a valid

16:04:42 epidemiological study, it had -- it showed a latency

period for glyphosate of at least ten years; isn't that right?

A. Yes.

Q. Okay. And those are all latency related to non-Hodgkin's lymphoma; isn't that right? And environmental exposure?

A. Yes. But keep in mind were -- these are the mean or median times, not the extent of the range. And I remind you on prior page -- or the same in the Weisenburger article, was the two different bell curves, one --

Q. Sure.

A. -- for high acute exposure versus low chronic.

Q. Sure, Doctor. And Dr. Portier, when he made his statement, was talking about glyphosate and NHL specifically; right?

A. Yes.

Q. Eriksson was studying glyphosate and NHL specifically; is that right?

A. Yes.

Q. And Weisenburger was talking about environmental exposures generally, not glyphosate and NHL; isn't that right?

A. Yes. And one has to be careful with that, because different chemicals have tremendously different

latencies depending on the mechanism of induction.

Q. But that was the article that you referred the jury to; isn't that right? The Weisenburger article?

A. Not for the purpose of benzene. I didn't mention anything in my report about benzene.

Q. Well, I think this is an easy question, but you were the one that put Weisenburger up when you talked about latency; isn't that right? On your direct?

A. I put it in my report, and I quoted the same thing that you told the jury, that the latency period following environmental exposures is relatively unknown and has been estimated between 1 and 25 years.

Q. Thank you, Doctor.

MR. LOMBARDI: No further questions, your Honor.

THE COURT: Mr. Dickens, do you have further questions?

MR. DICKENS: Thank you, your Honor.

REDIRECT EXAMINATION

BY MR. DICKENS:

Q. Dr. Sawyer, I want to start where you just ended off. You just said something about the latency period. I believe you said latency is 1 to 25 years; is that right?

A. Actually, even a little less. The World Trade

Center was .4.

Q. And you mentioned you actually did some work with the World Trade Center; correct?

A. I did early on.

16:07:15 Q. And so the .4 that you're referencing, what is that with respect to?

A. That's a -- actually, a value that is derived and published by a governmental agency.

Q. And that's something you reviewed in the

16:07:34 preparation of your opinions in this case?

A. Yes.

Q. And you reviewed it to reach your opinions with respect to latency?

A. Correct.

16:07:40 Q. And you say .4 years or .4. What is the .4 referencing?

A. That is actually referencing for -- specific to leukemia, lymphoma or lymphatic hemapoietic malignancies. In other words, the World Trade Center health program

16:08:07 determined that the threshold cutoff for non-Hodgkin's lymphoma latency was .4 years to 2 years. That is their window for the minimum latency period by definition.

Q. Okay. And the jury has seen that document before, but is that Exhibit -- Plaintiff's Exhibit 820 in

16:08:28 your binder?

A. Yes.

MR. DICKENS: Permission to publish Plaintiff's Exhibit 820, your Honor?

THE COURT: Any objection?

16:08:41 MR. LOMBARDI: No objection.

THE COURT: You may proceed.

Q. BY MR. DICKENS: And once again, is this the specific section for lymphoproliferative cancers that you're referring to, Doctor?

16:09:05 A. Yes, yes. And hematopoietic cancers, yes.

Q. And so the .04, that means they actually found that non-Hodgkin's lymphoma can develop from exposure to diagnosis in 146 days; is that not correct?

A. That's correct. That's the minimum. And they

16:09:24 refer to the minimum window as .4 to 2 years, so there's some variability there.

Q. Okay. And if we can now turn to that Dr. Weisenburger article we were just looking at, which is Plaintiff's Exhibit 880.

16:09:40 MR. DICKENS: Permission to publish, your Honor?

THE COURT: Any objection?

MR. LOMBARDI: No objection, your Honor.

THE COURT: Very well. You may proceed.

Q. BY MR. DICKENS: With respect to the actual

16:09:51 latency periods that you were shown, Doctor, for benzene,

which Mr. Lombardi wrote on his sheet, that was actually chronic low-dose exposures; is that right?

A. That is correct.

Q. And did Mr. Johnson have chronic low-dose exposure, or was his more consistent with the short-term high dose?

16:10:08

A. Consistent with the bell curve and designated as A in Figure 4.

Q. Okay. And so with respect to Bell Curve A, the actual median that was being discussed, that's right where that A is; correct?

16:10:21

A. Yes.

Q. And so when you say the bell curve, just because the median is six years or five years, that means that's the middle; right?

16:10:34

A. That's right.

Q. And so there's going to be people who develop cancer in less time and people that develop cancer in more time?

A. That's correct.

16:10:42

Q. And in any of your opinions that you've -- or in any of the opinions of these authors, do you have an understanding that they're saying, "It's impossible to develop non-Hodgkin's lymphoma or other types of cancer in as short a period as two years"?

16:10:51

A. It can be developed much shorter than two years, actually.

Q. Okay. And the same is true with respect to the other document that you were shown in the Portier documents; correct?

16:11:06

A. Yes.

Q. And that was a median of 6.7 years?

A. Right. That was a median. Not a -- it's either an early or late extreme.

16:11:15

Q. So nothing in that article says, "You have to have 6.7 years from exposure to diagnosis"?

A. That's correct.

Q. And nothing you saw in that article or from Dr. Portier's opinion suggests that you cannot develop

16:11:30

non-Hodgkin's lymphoma from glyphosate or Roundup exposure in two years or less?

A. Correct.

Q. And your opinion in this case is that Mr. Johnson's non-Hodgkin's lymphoma was caused by his

16:11:42

exposure to Roundup or Roundup formulations; correct?

A. Yes.

Q. And that's despite the fact that it developed in 2.25 years --

A. That's correct.

16:11:50

Q. -- from exposure to diagnosis?

Now, you were asked some questions with respect to the Wester study. Do you recall that?

A. Yes.

Q. And I believe in your book it's referred to -- or I'll do Plaintiff's Exhibit 558.

MR. DICKENS: Permission to publish, your Honor?

THE COURT: Any objection?

MR. LOMBARDI: No objection.

THE COURT: Very well. You may proceed.

Q. BY MR. DICKENS: And this is the Wester study, correct, Doctor, that you're referring to?

A. Yes.

Q. And you actually cite to this Wester study in page 58 to 59 of your report; correct?

A. As well as page 60 and 61, yeah.

Q. So this is a study that you did review and factor into your consideration and the opinions that you reached?

A. That's correct.

Q. And was this the only study that you considered?

A. No.

Q. The IARC document that you were shown there had one source there; correct?

A. Yes.

Q. And what was that?

A. It simply took some sentences -- excuse me -- from the Wester study and adopted them into their text.

Q. Okay. But you reviewed far more than just the Wester study correct?

16:13:14 A. Yeah, there have been studies published that discuss the Wester study, and I don't think -- there's other things, but I can't talk about them.

Q. Okay. And --

A. I'm not allowed to.

16:13:30 Q. Understood. If we can turn to --

All right. In the materials and methods section.

MR. LOMBARDI: Can you give me a -- before we go too much further, I'd just like to know what document

16:14:08 this is.

MR. DICKENS: It is 558.

MR. LOMBARDI: This is Wester? You have something different on the screen, I think.

MR. DICKENS: I don't believe so.

16:14:26 MR. LOMBARDI: You have the Wester study on the screen?

MR. DICKENS: I do.

MR. LOMBARDI: Oh, okay. Got it. Confusion, but no objection.

16:14:33 MR. DICKENS: It's probably my fault.

MR. LOMBARDI: It's not.

MR. DICKENS: No, it's not?

Q. All right. Turning to the second column under the materials and methods, I'm going to direct your attention to something, Doctor. Specifically, it says, "The animals were placed in metabolic chairs." What are metabolic chairs?

A. Well, when dealing with primates --

MR. DICKENS: I apologize. There we go.

MR. LOMBARDI: That was your fault.

MR. DICKENS: That is my fault.

Q. What are metabolic chairs?

A. These are devices that have been designed for primate studies in which -- I hate to say it. It's not something I would use -- it maintains the animal in a chair for a prolonged period, basically strapped into a potty chair.

Q. Okay. And when you say "strapped," are there arm straps as well?

A. They're restrained.

Q. So Mr. Lombardi's suggestion that somehow they were touching their chests and then touching their mouths and that's how they got the feces --

A. No. They're in a very controlled, very inhumane environment.

Q. So that simply was incorrect?

A. Yes.

Q. Let's turn now to Table 4, Doctor.

And you reference the chart -- this is the disposition of glyphosate following topical administration to rhesus monkeys.

Do you see that?

A. I do.

Q. And what is topical administration referring to?

A. Dermal.

Q. Okay. So how was this particular study done with the rhesus monkeys?

A. The dose was applied -- there are two doses, a low dose, which is Dose C, and Dose D, which is a -- even a lower dose, and that was applied to the monkeys dermally using patches over a period of -- the size of 20 square meters -- centimeters -- I'm sorry -- 20 centimeters, not meters.

Q. Okay. And --

A. Roughly 20 centimeters is like about, you know, 2 or 3 inches square, sort of like the size of a gauze pad, and that's taped down, and then that's covered with a shield fabric, and it's fully protected from any exogenous contamination or touching.

Q. Okay. And there's actually the doses, which is

listed under this chart.

Do you see that?

A. Yes.

Q. Which one of these doses, Dose C or D, would be more applicable to applicators such as Mr. Johnson?

A. Dose D.

Q. So Dose D is more relevant to humans that are out there spraying Roundup or Ranger Pro; correct?

A. Correct. And this is also performed in a primate, which is the closest specie to a human.

Q. So when you're actually doing these type of dermal absorption studies, once again, the monkey is the closest to humans that you can get; right?

A. Yes.

Q. And in this study, what had more excretion out of the urine or the feces?

A. Well, the urine is .8, and the feces was 3.6, and the total of those two together adds up to 4.4 percent, and --

Q. So --

A. -- 3.6 is four-and-a-half times higher than .8.

In other words, four-and-a-half times more went out of the feces than in the urine, and that's because these animals were slowly dosed through a dermal absorption patch, as opposed to hitting them with a

syringe.

Q. Okay. And that is -- you know, the dermal patch, that's more consistent than an IV in bolus to a human; correct?

16:18:57 A. Yeah, IV bolus is completely incorrect, and it distorts the excretion pattern in such a way that it makes it appear that it all comes out in the urine.

Q. And that's what we see here. That's just simply not true.

16:19:12 A. Yeah, we see in this time study that when they gave the monkeys IV doses, that 95 to 99 percent of the IV-administered dose was recovered in the urine. And -- but when they'd give it with the topical patch, that's not the case.

16:19:33 Q. When you do it with the topical patch, you're actually getting more in the feces than the urine?

A. That's correct.

Q. And why would that be?

A. Because at a low dose, the liver is able to

16:19:44 metabolize the dose. If you overdose the animal, as in Dose C in Table 4 here, we see that the urine was actually higher than the feces at 2.2 and .7 in the feces, but at a lower dose, the liver is taking and metabolizing that material, because the material of --

16:20:10 the liver has what we call a saturation point. For

example, if we were all to go out at 5 o'clock and have a drink, we would be metabolizing alcohol at roughly 100 or 120 milligrams per kilogram of our body weight per hour.

Now, if we all went out at 5:00 and we drank three drinks the same, in one hour, three drinks now, we're still metabolizing that alcohol at that same capacity. The liver can only handle 100 or 120 milligrams of alcohol per kilogram per hour. It's the saturation of that.

And so if you give the animal a smaller steady dose of the glyphosate, they're able to metabolize it and flush it out in their feces, through the bile, but if you overdose the animal, giving it all at once with a syringe or putting a really high dose on the patch, then you get spillover to the urine, and that's exactly what happened in this study. And there's been a lot published on this. I'm not permitted to tell you where or why, but it's been heavily published or criticized with respect to --

MR. LOMBARDI: Your Honor, there's absolutely no restriction on him presenting us with whatever published articles he has on this.

THE COURT: Thank you, Mr. Lombardi.

THE WITNESS: When I say "published," I mean by industry. In their own documents.

Q. BY MR. DICKENS: And IARC -- you mentioned you

looked at that. IARC, you know, they only actually looked at published data; correct?

A. A peer-reviewed -- in the peer-reviewed journals, yes.

16:21:48 Q. Based on your review of IARC and everything, is it -- have you reviewed more studies than IARC has?

A. Yes.

Q. There's a column here I want to ask you about, Doctor, with respect to the total for Dose D. That's

16:22:08 89.8 percent, plus or minus 6.9. What's the significance of this number?

A. That is the -- out of the C14 labeled glyphosate, they recovered 82 percent of it. In other words, 18 percent of it was unaccounted for. It was not

16:22:25 found in organs. It was, you know, uncertain what happened to it.

Q. And so is this what you were referring to earlier with respect to there's a portion of the dose that just wasn't recovered?

16:22:42 A. That's right.

Q. And you mentioned OECD guidelines. What do those standard guidelines say you're supposed to do with the portion that's not recovered?

A. Well, the guideline is very specific. It reads

16:22:55 that it has to be added to the absorbed dose unless --

and they use the word "extraordinarily" or "exceedingly" definitive data can demonstrate otherwise.

And in this and other studies on glyphosate, almost always there's some unaccounted for material. And it should be added into the absorbed dose. Because there are studies that show that glyphosate forms a reservoir in the skin over time and it builds up in the skin.

Q. Now, you mentioned that -- or you were asked whether or not you did a specific analysis of Mr. Johnson's exposure. Do you recall that?

A. Yes.

Q. And would it be possible to come up with an exact amount of Mr. Johnson's exposure to Roundup or Ranger Pro?

A. Yes, it is possible if we use that original equipment under similar environmental conditions and set up monitoring patches on his clothing and let him re-expose himself.

Q. And rather than exposing Mr. Johnson to that again, you indicated that you -- there was another study that you used to generate the information; correct?

A. Yes. Where actual laboratory testing was done of the collection patches placed on various parts of the body among applicators using what we call the nozzle, which is used in field work as opposed to pulling a

tractor.

Q. Okay. Now, Mr. Johnson -- well, first of all, in that study, the comparison you made were to workers who were actually using nonpermeable or impermeable clothing; correct?

16:25:06

A. Well, as the document stated, waterproof. Waterproof jacket, waterproof pants, rubber boots, gloves and a face shield.

Q. And Mr. Johnson wasn't wearing a face shield or waterproof clothing, was he?

16:25:18

A. No.

Q. And so Mr. Johnson's exposure would actually be greater than those applicators that you used in your comparison to come up with the exposure now?

16:25:23

A. Much so. And also remember that the amount used in the applicator studies was approximately a third of what he was using per hour.

Q. So, in fact, your exposure estimate or analysis was underestimated for what Mr. Johnson's exposure truly was?

16:25:40

A. It was.

Q. And that's a conservative number. But still based on that, you found that it was sufficient to cause cancer in Mr. Johnson?

16:25:49

A. Yes.

Q. Mr. Lombardi asked you some questions about toxicity findings and a six pack. Do you remember that?

A. Yes.

Q. Do the findings in the six pack mean that glyphosate does not cause cancer?

A. No. And I tried to explain that the long-term animal bioassays for cancer are not part of the six pack.

Q. And if -- you were asked some questions about being inert. If something's inert, does that mean that it will not have a synergistic effect with other chemicals in a product?

A. Inert from a biological standpoint, it should not have any effect. But from a scientific standpoint -- I mean, from a -- in the capacity that the word is used by Monsanto, inert -- they're saying it's not the specific ingredient that kills the weeds.

As good Attorney Lombardi pointed out, we're in full agreement with that, that inert, under Monsanto's label, means simply it doesn't kill weeds.

But from a toxicological standpoint, inert means it's not harmful. It's not reactive. It doesn't cause any problems. So what we're left with are ingredients in the product that are -- from a toxicological standpoint, they're not inert. They're actually active, they're additive and some of them are carcinogenic.

Q. How would -- Mr. Johnson's Tyvek suit, how would that, kind of, block spray paint, blood and sewage but allow Roundup or Ranger Pro to get through?

A. It is ports. It has 1 micron ports. So anything that's in the molecular state, in a fluid, can slowly go through those pores.

Q. So the fact that there were other things on there that were liquid, that means nothing with respect to Roundup or Ranger Pro?

A. Solids won't get through. Sewage with the particulate and so on, the particularity's not going to make it through 1 micron.

Q. Mr. Lombardi also referred to what Mr. Johnson was using as a wand. Would you refer to what he was using for the truck sprayer as a wand?

A. No. It had interchangeable pressure washer heads.

Q. And would those interchangeable pressure washer heads create higher pressure and more aerosol and mist than a typical wand?

A. It was massive aerosol.

MR. DICKENS: I have no further questions, your Honor.

THE COURT: All right. Ladies and Gentlemen --

MR. WISNER: Your Honor, if we could finish the

recross, so he can go.

THE COURT: Well, counsel can approach.

Do you have any further questions?

MR. LOMBARDI: I can try to limit it to two quick ones, your Honor, but I don't want to be the one that's standing between everybody and the door.

16:28:31

THE COURT: Okay. If you only have two questions, that's fine.

You may proceed.

RECROSS-EXAMINATION

BY MR. LOMBARDI:

Q. Doctor, when you talked about the World Trade Center study, that did not involve an environmental exposure like glyphosate; isn't that right, for the latency period?

16:28:46

A. No. But other --

Q. We're trying to get everybody -- if you'd just answer my question.

A. No, it did not. No, no.

16:28:55

Q. It dealt with ionizing radiation?

A. A number of chemicals that cause NHL.

Q. Ionizing radiation is what it specifically says in this study; isn't that right, the portion that you referred to?

16:29:07

A. Oh, you're referring to the latency document?

Q. Yes, yes.

A. That was based on ionizing radiation, correct.

Q. Thank you.

16:29:15 Which is different than environmental exposure like glyphosate; isn't that right?

A. That's correct.

Q. And, Doctor, you went into a lengthy discussion of Wester. But just so it's clear to everybody here, you

16:29:24 disagree with what the people who did the studies in Wester concluded, don't you?

A. I do. And keep in mind that's a Monsanto-funded study.

Q. But they said -- actually -- well, let me just

16:29:39 ask you this: It says, "The percutaneous absorption of glyphosate is estimated to be 0.8 to 2.2 percent."

That's what the conclusion was; isn't that right?

A. Yes. But it's wrong.

16:29:51 Q. And that's different than your conclusion?

A. And other published studies disagree.

Q. And IARC accepted this study as a valid study and a valid conclusion; isn't that right?

A. Yes. They took it as is.

16:30:04 MR. LOMBARDI: No further questions, your Honor.

THE COURT: All right. Thank you.

All right, Ladies and Gentlemen. Then we're going to -- we're going to conclude now for today. Please remember: Do not discuss the case, and we'll resume again tomorrow morning at 9:30. All right?

16:30:15

Oh, and I did receive a question from one of the jurors about the end date. Yes, our goal is to finish by August 10th. And I believe we will meet that deadline. Thank you.

16:30:34 (Jury leaves courtroom.)

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16:31:50

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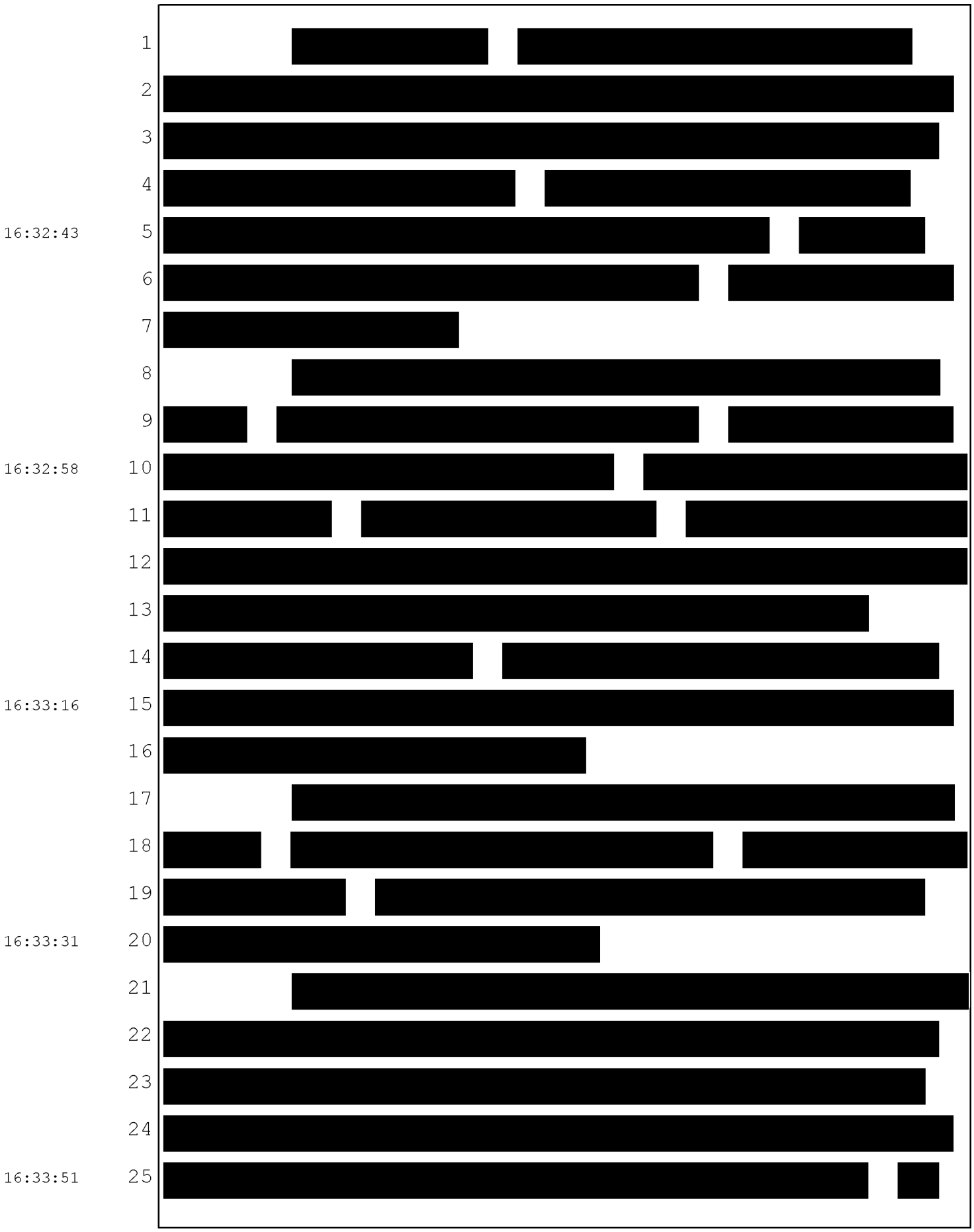
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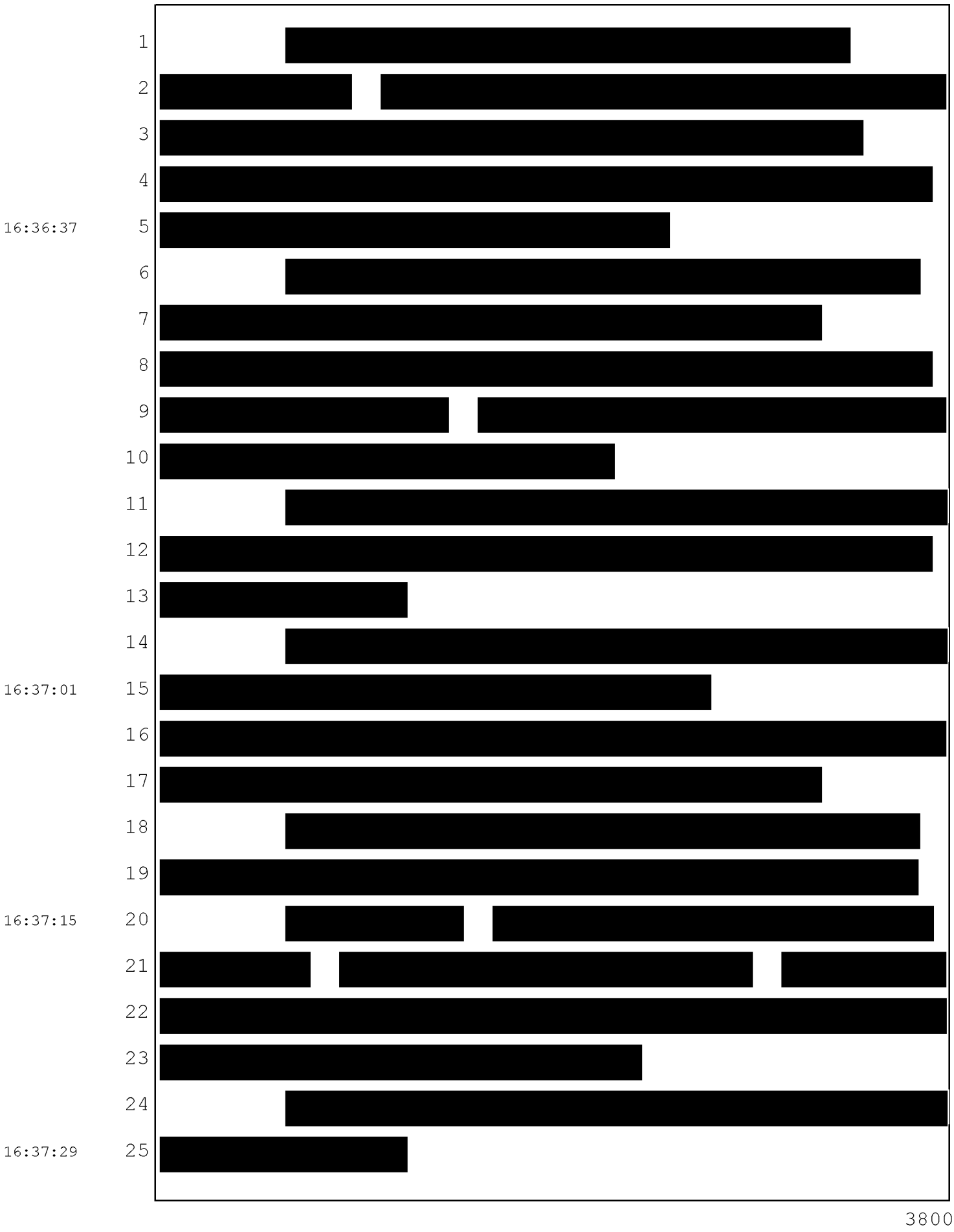
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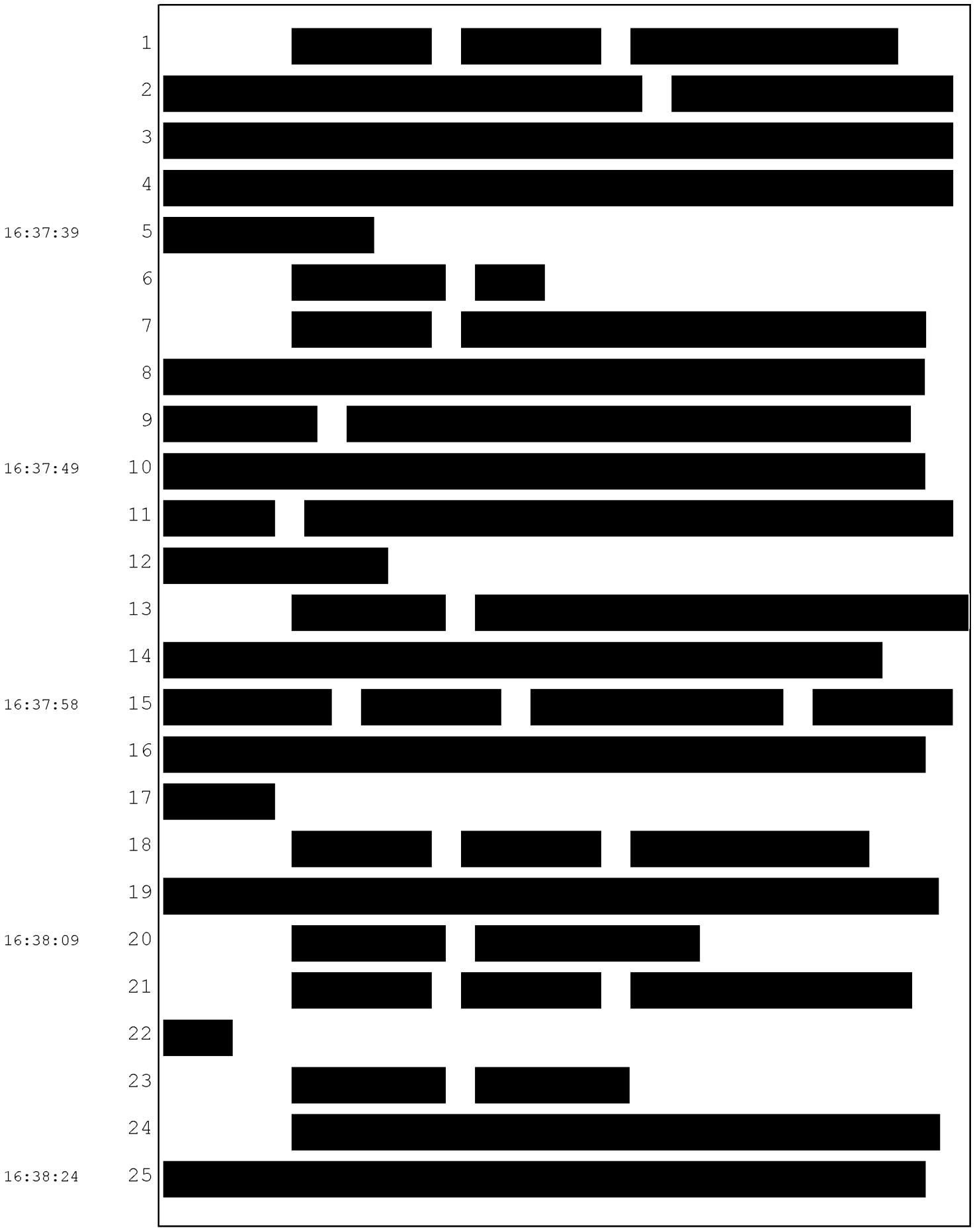
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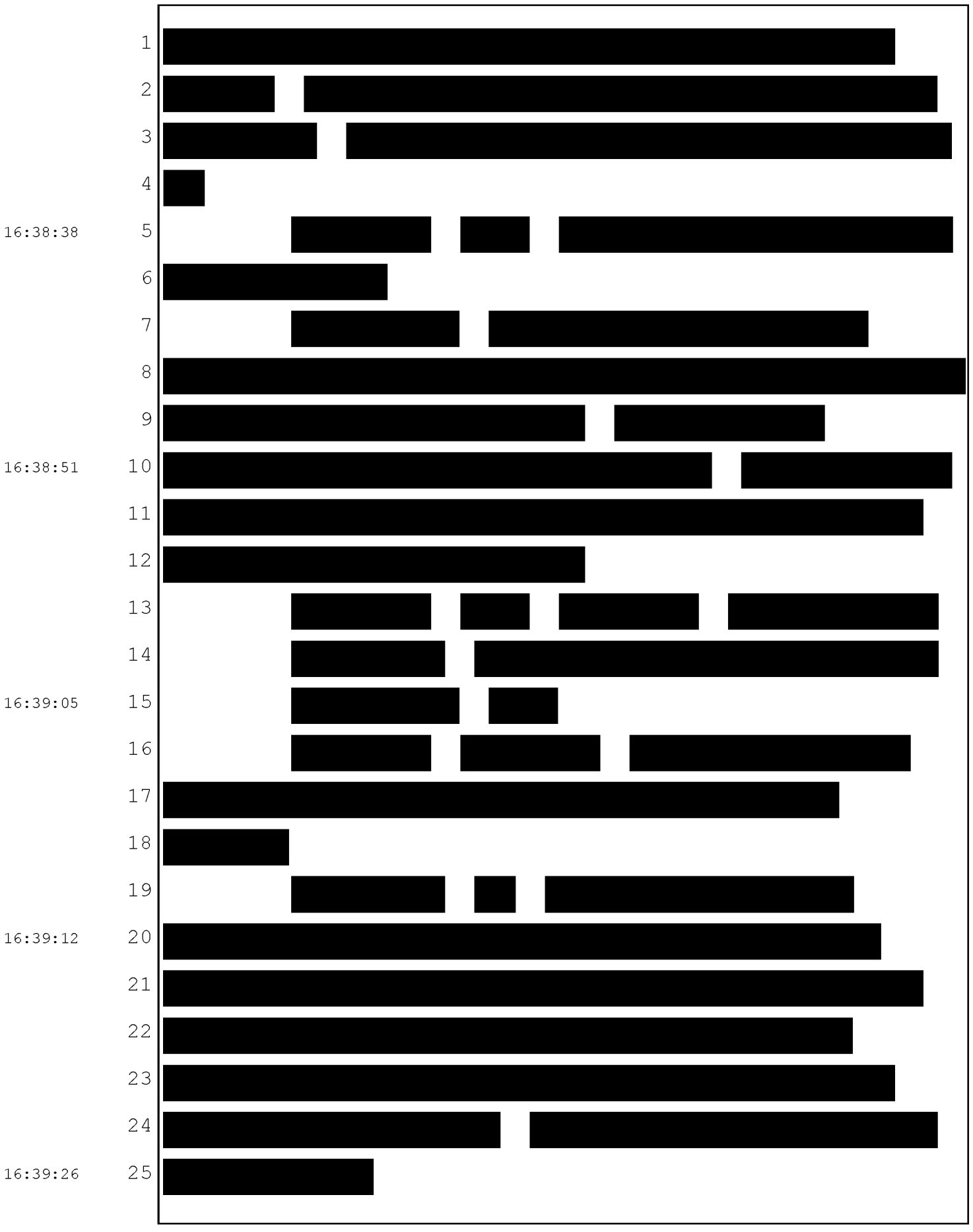
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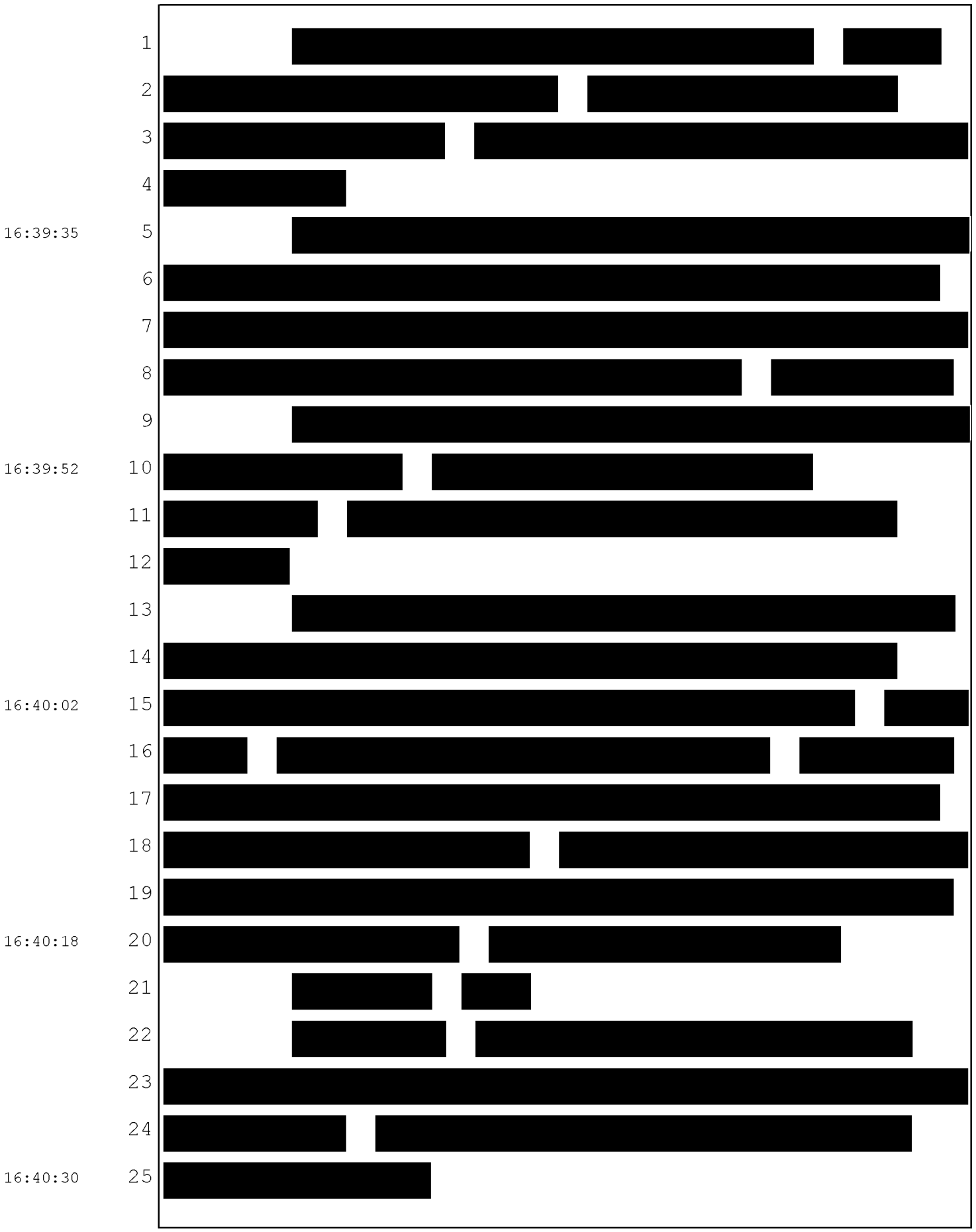
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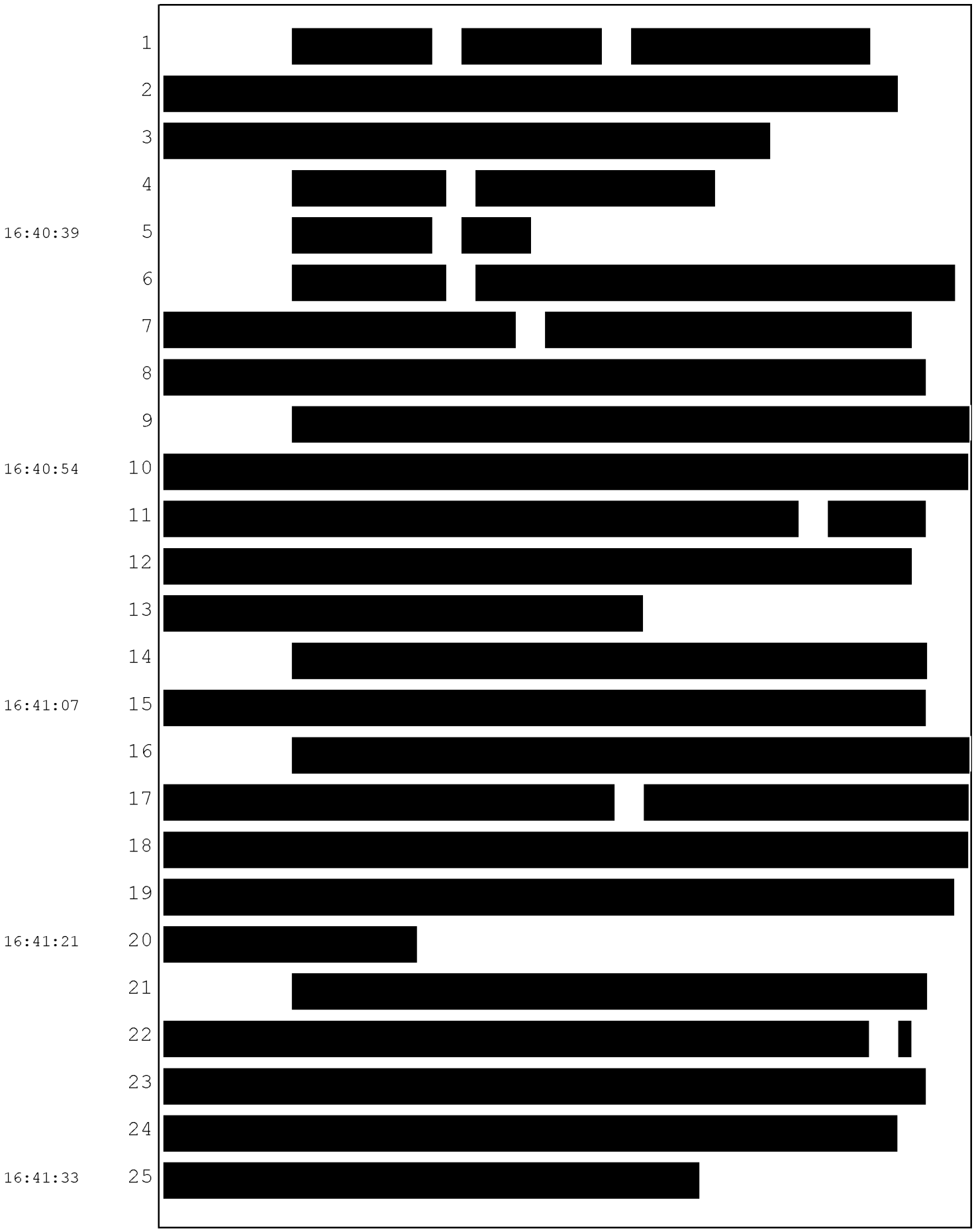
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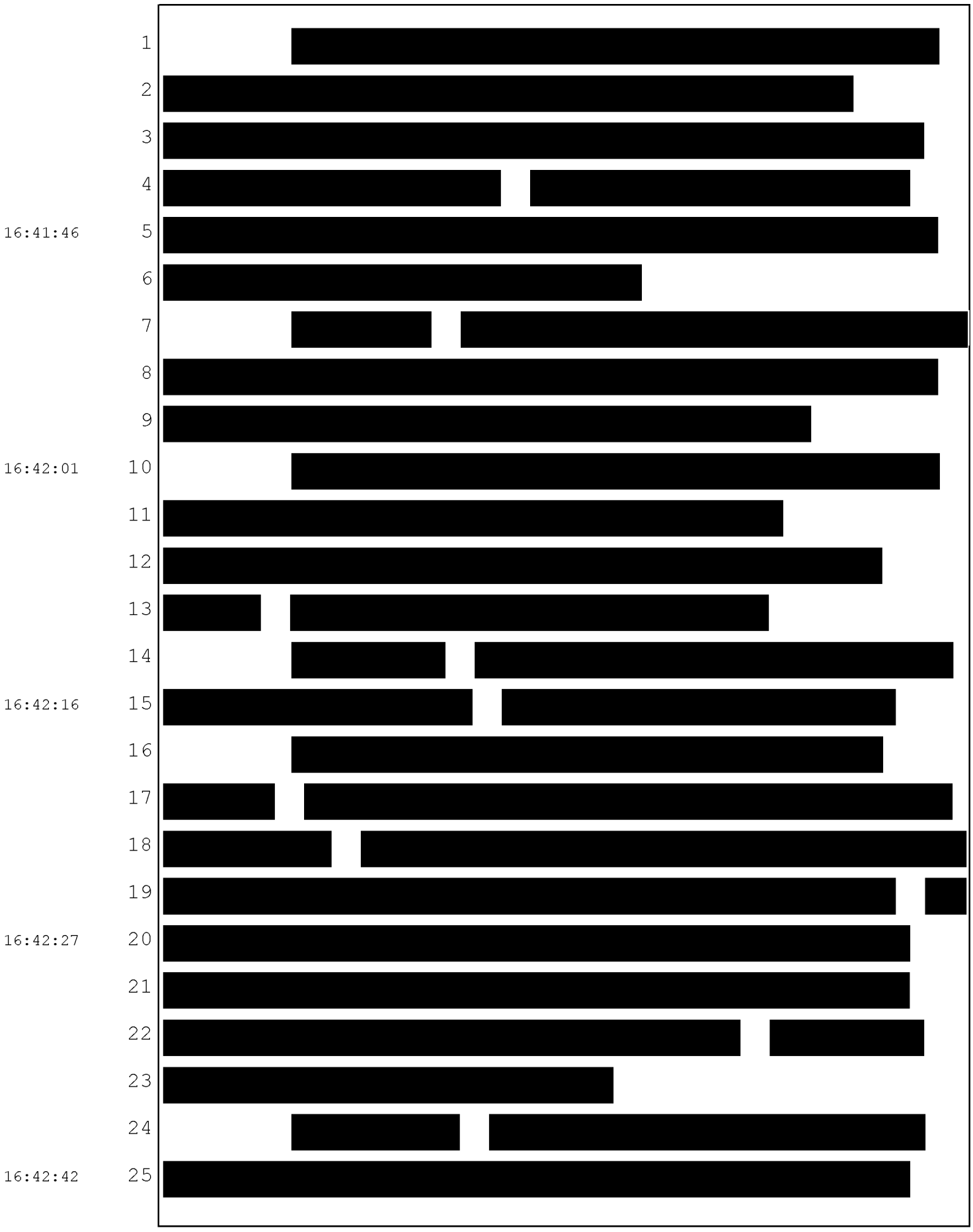
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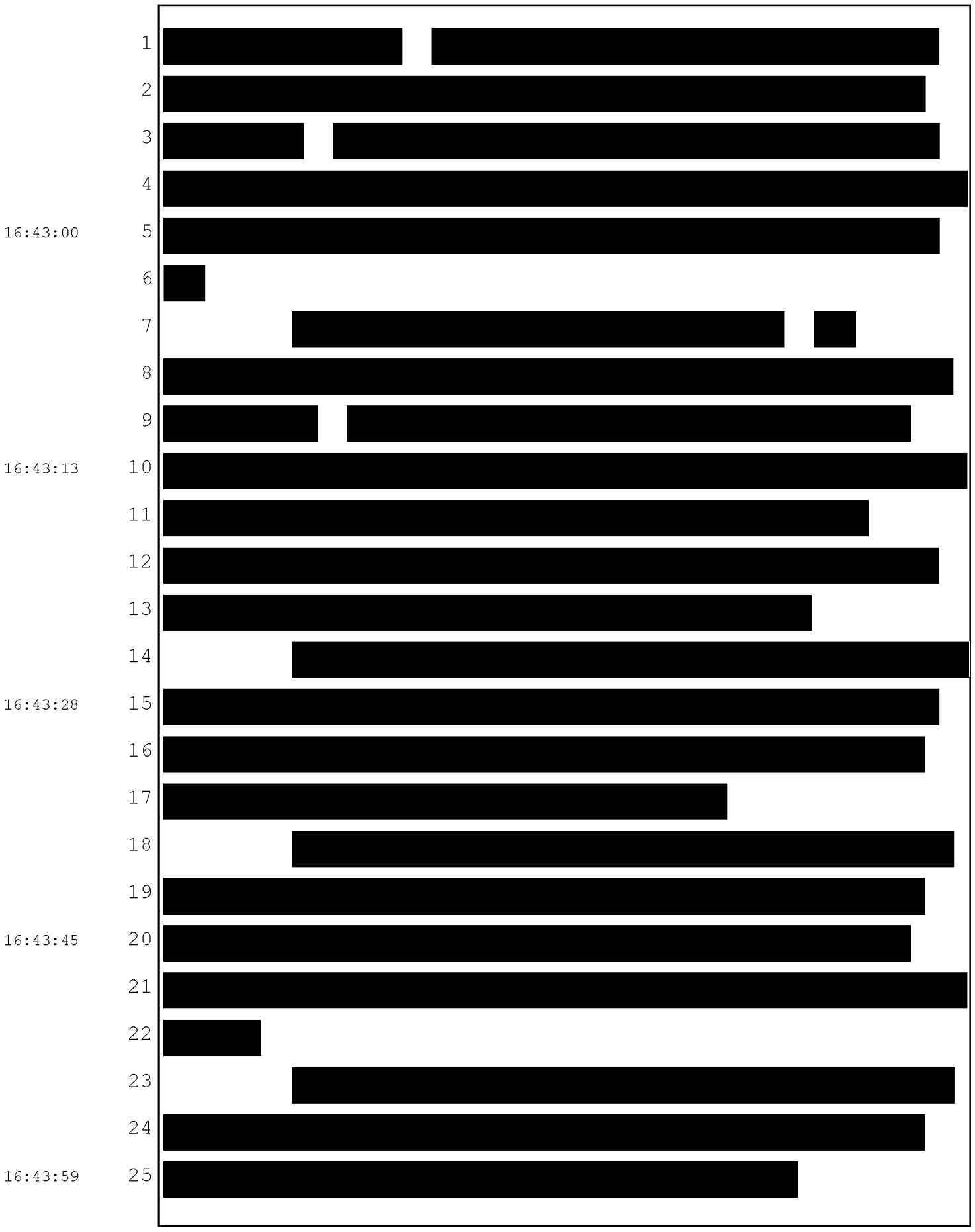
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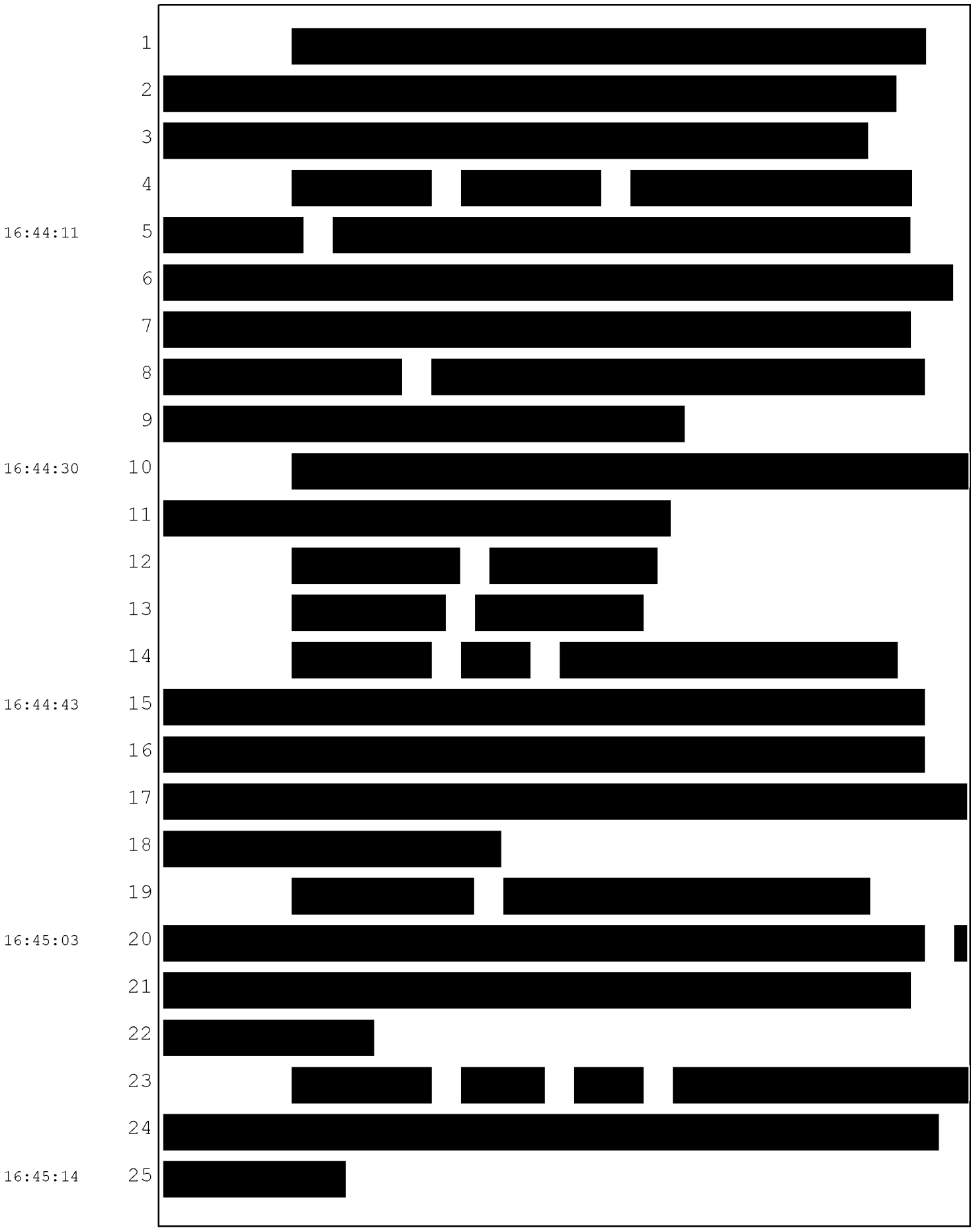
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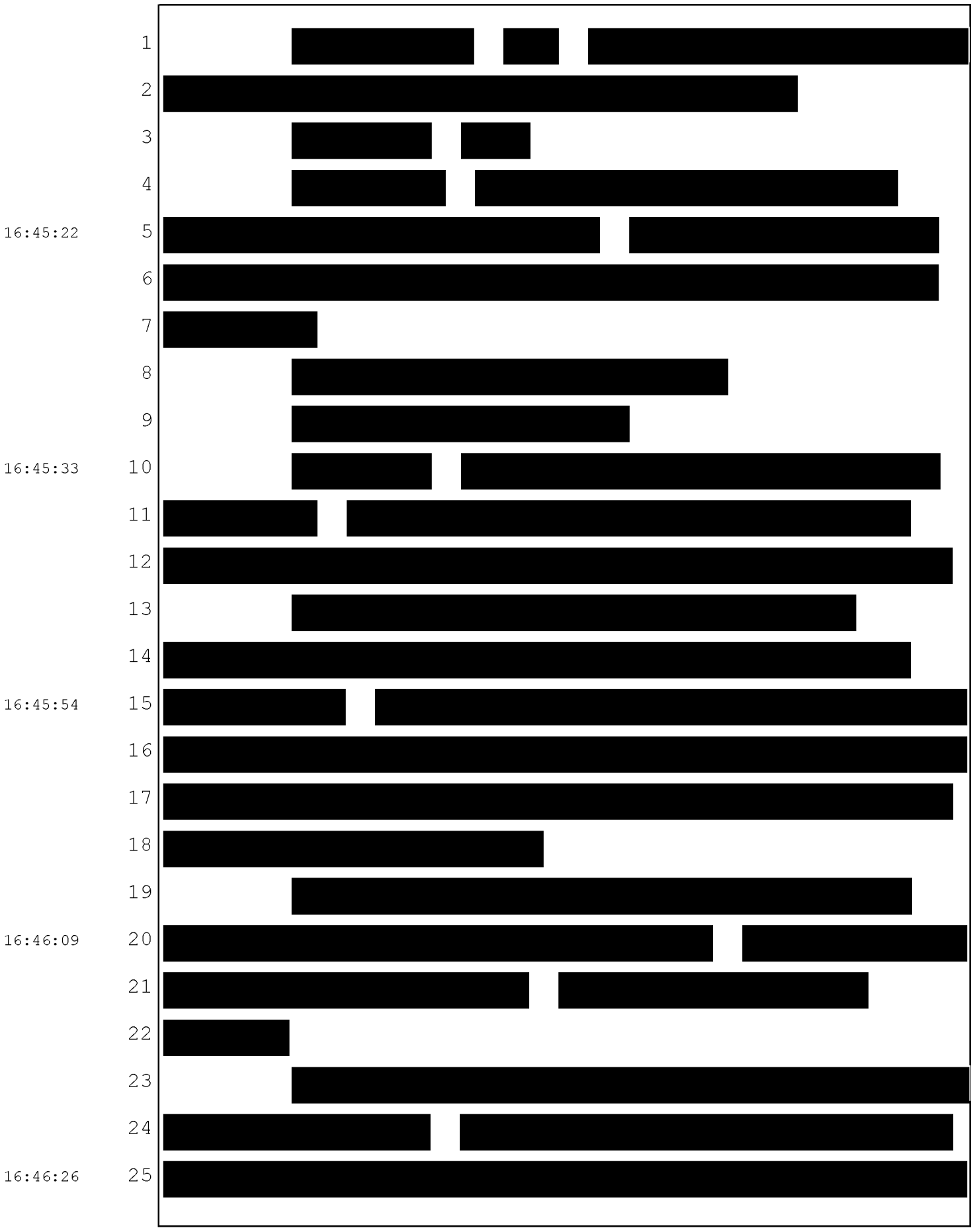
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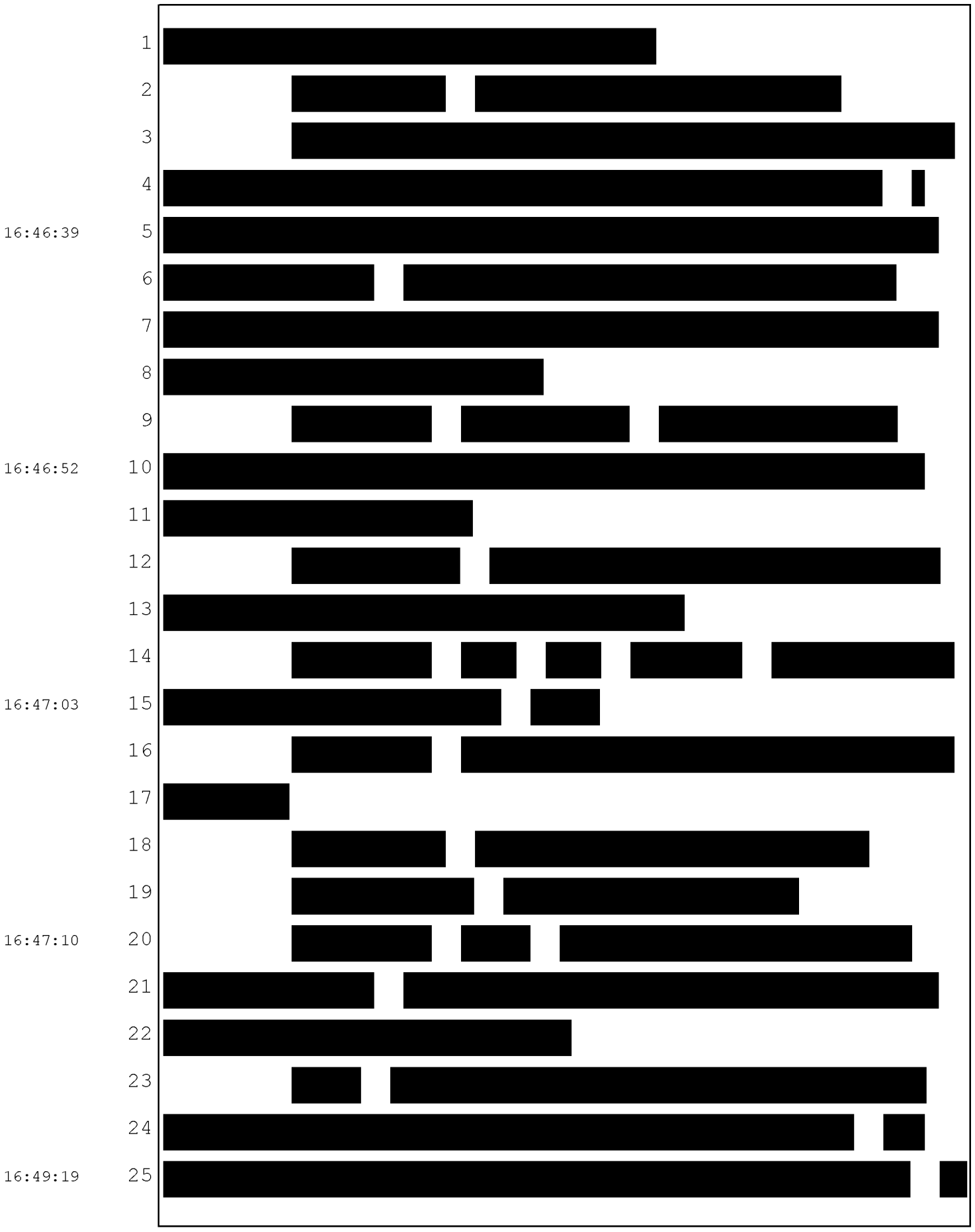
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(Time noted: 4:49 p.m.)

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REPORTER'S CERTIFICATE

I certify that the proceedings in the within-titled cause were taken at the time and place herein named; that the proceedings were reported by me, a duly Certified Shorthand Reporter of the State of California authorized to administer oaths and affirmations, and said proceedings were thereafter transcribed into typewriting.

I further certify that I am not of counsel or Attorney for either or any of the parties to said Proceedings, not in any way interested in the outcome of the cause named in said proceedings.

IN WITNESS WHEREOF, I have hereunto set my hand: July 26th, 2018.

<%signature%>
Leslie Rockwood Rosas
Certified Shorthand Reporter
State of California
Certificate No. 3462