

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

URT UMWELT UND)
RECYCLINGTECHNIK GMBH,)
)
)
Petitioner,)
)
vs.)
)
DUESENFELD GMBH,)
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)
)
Patent Owner.)

Case No. IPR2024-00887
U.S. Patent No. 11,050,097

VIDEO-RECORDED DEPOSITION OF VOLKER SPIES
VIA ZOOM
June 13, 2025
Volume 1

Reported by: Dana Peabody, RDR, CRR, CSR No. 6332

Job No. CA 7408338

Page 2 1 Deposition of Volker Spies, taken on behalf of 2 Patent Owner, via Zoom, commencing at 4:36 CEST, on 3 June 13, 2025, before Dana Peabody, CSR No. 6332. 4 5 APPEARANCES: 6 7 For Petitioner: 8 JONATHAN ROBERTS, ESQ. 9 BRIAN KAUFFMAN, ESQ. 10 NIXON VANDERHYE P.C. 11 901 No. Glebe Rd. 12 Arlington VA 22203 13 jr@nixonvan.com 14 15 For Patent Owner: 16 STEVEN C. CARLSON, ESQ. 17 ROBINS KAPLAN LLP 18 BELLE V. BOROVIC, ESQ. 19 555 Twin Dolphin Drive, Suite 310 20 Redwood City CA 94065 21 scarlson@robinskaplan.com 22 23 MATTHEW A. SMITH, ESQ. 24 SMITH BALUCH LLP 25 700 Pennsylvania Avenue SE, Suite 2600 Washington DC 20003 smith@smithbaluch.com Also Present: Vani Dantam	Page 4 1 PROCEEDINGS 2 3 THE VIDEOGRAPHER: Good afternoon. We're 4 going on the record at 4:36 p.m. Central European 5 Summertime on Friday, June 13, 2025. 6 Please note this deposition is being 7 conducted virtually. Quality of recording depends 8 on the quality of camera and internet connection of 9 participants. What is seen from the witness and 10 heard on screen is what will be recorded. We have 11 tried to troubleshoot the witness's audio, but we 12 are proceeding as is, agreed with counsel. Audio 13 and video recording will continue to take place 14 unless all parties agree to go off the record. 15 This is Media Unit Number 1 of the 16 video-recorded deposition of Volker Spies taken by 17 counsel for patent owner in the matter of URT Umwelt 18 und Recyclingtechnik GmbH versus Duesenfeld GmbH, 19 filed in the United States Patent and Trademark 20 Office, before the Patent Trial and Appeal Board, 21 Case Number IER202400887 and United States Patent 22 Number 11 -- excuse me -- 1150097. This is being 23 conducted remotely using virtual technology. 24 My name is Brandon Miller representing 25 Veritext Legal Solutions, and I am the videographer.
Page 3 1 INDEX 2 3 EXAMINATIONS 4 WITNESS PAGE 5 VOLKER SPIES 6 MR. CARLSON 6 7 MR. SMITH 97 8 9 EXHIBITS 10 11 EXHIBIT DESCRIPTION PAGE 12 Exhibit 1006 "Perry's Chemical Engineers' 61 13 Handbook" 14 Exhibit 1008 Spies resume 7 15 Exhibit 1013 Hanisch translation German 82 16 Version 17 Exhibit 1016 LithoRec translation 31 18 Exhibit 1020 Hanisch translation 79 19 Exhibit 1023 Spies declaration 26 20 Exhibit 1026 US Patent Application Publication 93 21 Lithium Battery Treatment Method 22 Exhibit 1032 Mitsubishi patent 92 23 24 25	Page 5 1 The court reporter is Dana Peabody from the firm 2 Veritext Legal Solutions. 3 I'm going to give the patent number again. 4 United States Patent Number 11050097. I'm not 5 related to any party in this action nor am I 6 financially interested in the outcome. If there are 7 any objections proceeding, please state them at the 8 time of your appearance. 9 Counsel and all present, including 10 remotely, will now state their appearances and 11 affiliations for the record, beginning with the 12 noticing attorney. 13 Then the court reporter will introduce 14 themselves and administer the oath to the witness, 15 and then counsel may proceed. 16 Thank you. 17 MR. CARLSON: Thank you. 18 For Patent Owner Duesenfeld, Steven 19 Carlson from the firm Robins Kaplan, LLP, and with 20 me in attendance is Belle Borovik. 21 MR. SMITH: Matthew Smith from Smith 22 Baluch, LLP, for the Patent Owner Duesenfeld. 23 MR. ROBERTS: Jonathan Roberts from the 24 law firm of Nixon & Vanderhye. I'm joined by my 25 partner, Brian Kauffman. We represent Petitioner

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Page 6 1 URT. 2 THE REPORTER: Good morning, everyone. My 3 name is Dana Peabody, California CSR Number 6332. 4 Mr. Spies, will you please raise your 5 right hand? 6 7 VOLKER SPIES, 8 having been duly sworn, or affirmed, was examined 9 and testified as follows: 10 11 EXAMINATION 12 BY MR. CARLSON: 13 Q. Mr. Spies, thank you for joining us today. 14 What's your educational background, 15 please? 16 A. My educational background is a chemical 17 engineer. 18 Q. Okay. And beyond -- do you have a 19 bachelor's degree. Is that correct? 20 A. No, it's compare -- I have a degree as a, 21 so called, Diplom engineer, German, and it's 22 comparable to a master degree. 23 Q. Comparable to a master's degree, okay. 24 A. Yes. 25 Q. How many years of university education did	Page 8 1 sales roles over the years. Is that correct? 2 A. Correct. 3 Q. Were you doing mostly sales work or 4 technical work kind of throughout your career? 5 A. Both sales work and technical work. I've 6 been active also in designing systems and 7 engineering, project management. But it's not pure 8 sales experience I have. 9 Q. Okay. 10 A. Commissioning, troubleshooting. 11 Q. Okay. With troubleshooting, was safety 12 part of your responsibility? 13 A. Can you please repeat? 14 Q. Has safety been part of your 15 responsibility over the years? 16 A. Safety, yes. 17 Q. Okay. How? 18 A. I mean, when designing a system, you have 19 to take a close look whether the system you design 20 is safe for operation in various respects. 21 Q. And what's been your role in ensuring 22 safety of systems over the years? 23 A. I've been involved in design questions 24 where work safety is in question, I've been in work 25 with questions where explosion protection is in
Page 7 1 you have? 2 A. Six years. 3 Q. Six years. Okay. So your diploma that 4 you've got on your CV from the University of 5 Dortmund. Is that correct? 6 A. Correct. 7 Q. That's equivalent to a United States 8 master's degree? 9 A. Equivalent, yes, yes. 10 Q. Okay. And you received that in 1993. Is 11 that correct? 12 A. Correct. 13 Q. Okay. So you see on this -- you see in 14 front of you Exhibit 1008? 15 (Exhibit 1008 marked for identification.) 16 THE WITNESS: 1008. One second, please. 17 MR. CARLSON: Somehow it may have an extra 18 -- 010008, but it should be 1008. 19 THE WITNESS: Uh-huh. 20 BY MR. CARLSON: 21 Q. And that's your CV. Is that correct? 22 A. That's my CV, yes. 23 Q. Okay. And did you prepare that document? 24 A. That's from myself, yes. 25 Q. Okay. It looks like you've had a lot of	Page 9 1 case, so various aspects of safety. 2 Q. Okay. And you've been at BHS now for how 3 many years? 4 A. Now, for seven years. 5 Q. And prior to working at BHS, did you work 6 at a company called AVA? 7 A. I joined BHS -- it's now BHS, but I was 8 working as a managing director of AVA, and then we 9 integrate -- I came to the BHS crew when AVA was 10 purchased, and it was my job in the last years to 11 integrate AVA into BHS. 12 Q. Okay. Now, I don't see on your CV AVA 13 called out as a separate job. I see it mentioned 14 under BHS, but were you working at AVA GmbH before 15 it was acquired by BHS? 16 A. No, no, I joined -- I joined AVA at that 17 point of time where the purchase was done. 18 Q. Oh, I see. Okay. 19 A. So I have taken over the position as 20 managing director from the former owner, who sold 21 the company. It was a family owned company, and at 22 the point of time when BHS acquired AVA, that's the 23 point where I joined. 24 Q. I see. 25 A. I was part of the team who acquired AVA,

Page 10 1 and then once it was acquired, I joined AVA. 2 Q. I understand. 3 Before you joined AVA and BHS, did you do 4 any work in the field of battery recycling? 5 A. In the field of battery recycling, no. 6 Q. Since joining BHS, what have you done to 7 design recycling systems? 8 A. I was part of the team within BHS who 9 designed dryer sections and who did the flow sheet 10 development for BHS. 11 Q. So you actually helped design dryer 12 sections at BHS? 13 A. Yes, yes. 14 Q. Which sections? 15 A. The actual dryer-related accessories. So 16 we also supply complete entire plants, so looking at 17 the transition points in order to work or get a 18 full, let's say, operational plant installation. 19 Q. Okay. And through that work with BHS, has 20 safety been part of your responsibility? 21 A. Yes, of course. 22 Q. In what capacity, particularly with BHS? 23 A. Over there, mostly with questions of 24 explosion protection. 25 Q. So are there well-known issues of	Page 12 1 under nitrogen, then the explosion -- explosive 2 situation is not there any longer. 3 Q. Besides explosion situation, what -- I 4 want to go through the hazards. Okay. What kind of 5 hazards are there in a battery recycling plant? 6 MR. ROBERTS: Objection, form; objection, 7 foundation. 8 THE WITNESS: The kind of hazards. Oh, 9 you have a lot of -- many kinds of hazards. There's 10 hazards for health because we are dealing with 11 sometimes things which are -- which can cause 12 cancer, and the cathode material, there's cancerous 13 substances included, there's explosion issues, and, 14 of course, work safety. You're dealing with 15 temperatures, so it's not the type of plant which is 16 straightforward and easy. 17 BY MR. CARLSON: 18 Q. What do you mean by that, it's not 19 straightforward and easy? 20 A. Yeah, I mean, if you're drying sand, for 21 example, then it's not so -- it's not so dangerous. 22 You ever parade water out of sand? There's not so 23 much that can happen. 24 Q. What's not so straightforward and easy 25 about battery recycling?
Page 11 1 combustibility and flammability with recycling 2 plants? 3 A. Yes, I mean, we are dealing with flammable 4 substances in that plant, and they are with low 5 boiling points, so it's essential to design a system 6 which is safe for operation, and you have to deeply 7 look into that topic to design a safe system. 8 Q. What do you mean, deeply look into the 9 topic? 10 A. It means you have to analyze the chemistry 11 which is behind this -- the thermodynamics related 12 to this -- to the unit operations. 13 Q. What do you mean by that? 14 A. It means, especially when you're operating 15 on the flammable substances, inertization is always 16 a topic that needs to be guaranteed that at every 17 point of time, you have a nitrogen atmosphere in 18 order to avoid combustible situations. 19 Q. Why is that? 20 A. Well, there's always three factors you 21 need to take care into account when it comes to 22 explosion protection: You need to have an ignition 23 source, you need to have oxygen, and flammable 24 substances, and if you eliminate one of those, there 25 is no more danger of explosion. So if you operate	Page 13 1 MR. ROBERTS: Objection. Asked and 2 answered. 3 THE WITNESS: I already told you. The 4 hazards, I've already given you. These are the 5 major ones. 6 BY MR. CARLSON: 7 Q. So let's start at the -- at the shredding 8 stage, at the comminution stage. What are the 9 hazards related to comminution? 10 MR. ROBERTS: Objection. Scope. 11 THE WITNESS: The hazards. When you're 12 comminuting batteries, there's always the question 13 that you're -- it's only possible to comminute a 14 shredder batteries which are discharged. Otherwise, 15 there's the danger that the content or the energy 16 which is still in the battery is released 17 instantaneously. Shredding always, especially in 18 combination with metals, may produce sparks, and in 19 combination with what I've already told you with 20 respect to explosion protection, this is a hazard, 21 there's an explosion risk in the shredder. 22 BY MR. CARLSON: 23 Q. And after the shredder, where does the 24 battery material go? 25 MR. ROBERTS: Objection, scope; objection,

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Page 14 1 form; objection, foundation. 2 I'll caution counsel, Duesenfeld waived 3 its ability to cross-examine Mr. Spies on topics in 4 his original declaration. That's going to be a 5 running objection. To the extent that you're asking 6 him stuff about his original declaration, I'm going 7 to object to that. 8 MR. CARLSON: I'm not. 9 BY MR. CARLSON: 10 Q. You may answer the question. I want to 11 review the various hazards in the battery recycling 12 process, and after the shredder, is it common that 13 batteries go into a bunker? 14 MR. ROBERTS: Objection. Same objections. 15 Objection, Scope; objection, form; objection, 16 foundation; objection, improper hypothetical. 17 THE WITNESS: I mean, there's -- it's a 18 separate unit operation, the shredder and, of 19 course, it has to be transported, so depending on 20 the type of -- the next step is removal of the 21 electrolyte depending on -- 22 BY MR. CARLSON: 23 Q. Before -- you may finish. You may finish. 24 A. And then the next is a transport stage. 25 Q. Before the removal of the electrolyte in	Page 16 1 transports the material onwards, that's moving 2 parts; you're dealing with hazardous materials; 3 there are cancer, cancer genous, may cause cancer. 4 These are the dangers. They remain the same in the 5 whole installation. 6 BY MR. CARLSON: 7 Q. And the screw that moves the material in 8 the bunker, is there a risk from friction? 9 A. True. 10 MR. ROBERTS: Objection. Form. Sorry. 11 Foundation, scope. 12 BY MR. CARLSON: 13 Q. Can you explain your answer, Mr. Spies? 14 A. I mean, when you have two parts moving 15 against each other, one is standing, that's the wall 16 of the screw, and the screw which is moving, there's 17 the -- there's friction, yes. 18 Q. And what could go wrong with the friction? 19 A. Temperature warp development. If 20 something blocks, the temperature may rise and 21 potential risk of explosions. 22 Q. And from the bunker, does the material -- 23 if you're in a batch process, does the material then 24 move into a dryer? 25 MR. ROBERTS: Objection, form; objection,
Page 15 1 the drying apparatus, is there commonly a bunker 2 between the shredder and the drying apparatus? 3 MR. ROBERTS: Objection. Scope, 4 foundation. 5 THE WITNESS: In case of a batch-operated 6 drying unit, yes, there is a bunker. 7 BY MR. CARLSON: 8 Q. What are the hazards associated with a 9 bunker? 10 MR. ROBERTS: Same objections. 11 THE WITNESS: The same hazards. There's 12 also the danger of explosion, evaporation of gases, 13 so it's also nitrogen blanketed to remove the 14 hazards. 15 BY MR. CARLSON: 16 Q. Okay. So I want to understand very 17 clearly in the bunker the various hazards that may 18 occur. 19 Can you review that more -- with more 20 detail, what are the hazards in a bunker? 21 MR. ROBERTS: Objection. Form, scope, 22 foundation, asked and answered. 23 THE WITNESS: Exactly, it is -- they are 24 always the same, always the same dangers. There's 25 an explosion risk; you have normally a screw which	Page 17 1 scope; objection, foundation; objection, improper 2 hypothetical. And how about relevance? Objection. 3 Relevance. 4 MR. CARLSON: Mr. Roberts, your objections 5 are getting quite numerous, and I'm going to caution 6 you, and we have limited time today, and you're 7 taking up a lot of time on the record with these 8 objections. Everything in here is directly 9 responsive to his declaration. 10 BY MR. CARLSON: 11 Q. Please, Mr. Spies, you may answer. 12 A. Can you please repeat the question? 13 MR. CARLSON: The court reporter, could 14 you please read back the question? 15 (The requested portion was read back.) 16 THE WITNESS: Yes. 17 BY MR. CARLSON: 18 Q. Okay. What are the hazards of the dryer? 19 A. The same, like mentioned before: 20 Explosion, health risks. The hazards remain 21 unchanged. 22 Q. Can the battery material self-ignite? 23 A. The battery material self-ignite? 24 Q. Yeah. 25 A. Normally not, no.

Page 18 1 Q. Well, is there a risk of self-ignition of 2 the shredded battery material? 3 A. Self-ignition, no, because the battery is 4 discharged. There is no self-ignition. 5 Q. Well, what if the batteries are not 6 discharged? 7 A. Then you will see it already in the 8 shredder. It's getting really hot over there. 9 Q. Okay. So if the batteries are not fully 10 discharged, there's a risk of self-ignition? 11 A. Yes. 12 Q. Do the hazards all go away if you 13 discharge the battery electrically? 14 A. No, because the substances you're dealing 15 with, they remain unchanged. So there's only one 16 risk of self-ignition, this direct heat introduction 17 into the product. This is eliminated, but the 18 hazards remain the same. 19 Q. Okay. Which hazards remain the same if 20 you fully discharge the battery? 21 A. Still the substances are the same, the 22 same -- the explosion risk is still there, the 23 health risk is still there because the components do 24 not change. 25 Q. Are the -- the health risks still there if	Page 20 1 major point you do. 2 Secondly, avoid water. No water inside 3 the process. 4 Q. Why not? 5 A. Because there's a reaction between the 6 conductive salt and water, and this may cause 7 hydrofluoric acid formation. 8 Q. Is hydrofluoric acid a toxic compound? 9 A. Yes, very toxic. 10 Q. How do you control water in the process? 11 A. Make sure that no water is in the 12 batteries which enter your shredders are dry. 13 Q. Which -- I want to know which entity you 14 work with. Is it BHS-Sonthofen GmbH? Is that who 15 you work for? 16 A. Yes. 17 Q. And does BHS Sonthofen GmbH supply 18 recycling systems worldwide? 19 A. Yes, we do. 20 Q. And these plants are designed by -- the 21 people designing these plants, what's their typical 22 education? 23 A. The typical education of these peoples, 24 they are process engineers and mechanical engineers. 25 Q. Do they often have advanced degrees?
Page 19 1 you discharge the battery? 2 A. Yes, of course. 3 Q. And what are some of the health risks? 4 A. Sorry? 5 Q. What are some of the health risks that 6 remain if you discharge the battery? 7 MR. ROBERTS: Objection. Asked and 8 answered. 9 THE WITNESS: Yeah, the health risk, the 10 health risk is, for example, inside some of the 11 cathode materials, there is, for example, cobalt, 12 and cobalt may cause cancer. 13 BY MR. CARLSON: 14 Q. And what about hydrogen fluoride? 15 A. Hydrogen fluoride is not directly part of 16 the battery itself. 17 Q. But can hydrogen fluoride be generated? 18 A. Yes. 19 Q. How? 20 A. It can. As decomposition of the 21 conductive salt, for example. 22 Q. Are there special requirements needed to 23 reduce the risks of all these hazards? 24 A. The major measure you take is put 25 everything under a nitrogen blanket. That's the	Page 21 1 A. Sorry? 2 Q. Do they often have advanced degrees? 3 A. Yes, they are all educated, all have 4 university degrees, minimum bachelor, normally 5 master or some PhD as well. 6 Q. They normally have a master degree or a 7 PhD? 8 A. Yes. 9 MR. ROBERTS: Objection. Misstates prior 10 testimony. 11 BY MR. CARLSON: 12 Q. I want to make sure that that's -- so 13 there was an objection. I want to make sure that's 14 correct. 15 Do most of the people designing these 16 systems at BHS -- strike that. 17 Do most of the people designing the 18 battery recycling systems at BHS have master's 19 degrees or PhDs? 20 A. Yes, correct. 21 Q. Why? 22 A. That's a little bit kind of company policy 23 that we want to have well-educated engineers 24 designing such systems. 25 Q. Now, BHS-Sonthofen GmbH sells battery

Page 22 1 recycling systems worldwide, correct? 2 A. Yes, we do. 3 Q. Like, how many countries -- like, how many 4 installations, roughly, around the world does BHS 5 have for battery recycling? 6 A. How many are there? Maybe five. 7 Q. Okay. Just five? 8 A. Complete, complete entire installation 9 yes, maybe. 10 Q. Okay. Is Covington, Georgia, one of them? 11 A. Sorry? 12 Q. Covington, Georgia, with Ascend, was that 13 one of them? 14 A. No, it's not. 15 Q. So in the various battery recycling -- 16 well, let's talk about the dryers. 17 Does -- only talking about the dryers for 18 battery recycling, how many vacuum drying 19 installations around the world does BHS have? 20 A. Maybe ten, ten, 15. I don't know exactly. 21 Q. Okay. And is Covington, Georgia, one of 22 those ten or 15? 23 A. Yes, it is. 24 Q. Now, among these various facilities that 25 BHS has installed for vacuum drying around the	Page 24 1 there was a fire, yes. 2 Q. Why was there a fire? 3 A. Hmm? 4 Q. Why? 5 A. I was not exactly involved in that 6 project. I can tell you, I'm not 100 percent 7 informed about the routes for the fire. 8 Q. Was that at Covington, Georgia, at the 9 Ascend plant? 10 A. Not that I know. 11 Q. Are you aware of any fires ever happening 12 at the battery recycling plant at Covington, 13 Georgia, owned by Ascend Elements? 14 A. No, I don't know about that. 15 Q. Is safety your business? 16 A. Safety is our business, yes. 17 Q. Would you be aware of safety incidents 18 around the world related to the vacuum drying plants 19 that BHS provides? 20 A. About the vacuum drying plants, yes. 21 Q. Okay. If there was an incident worldwide 22 at a BHS vacuum drying plant related to fire or 23 explosion, would you know about that? 24 MR. ROBERTS: Objection. Asked and 25 answered, form, scope, relevance. Come on.
Page 23 1 world, have there ever been any thermal incidents? 2 A. Thermal incidents? 3 Q. Correct. 4 MR. ROBERTS: Objection. Scope, 5 relevance. 6 THE WITNESS: No, we did not, no, to the 7 best of my memory, no, we don't have. 8 BY MR. CARLSON: 9 Q. There's never been any kind of thermal 10 incident at a BHS-owned -- a BHS-built vacuum drying 11 facility? 12 MR. ROBERTS: Objection. Asked and 13 answered, form, scope, relevance. 14 THE WITNESS: No, we do not have any 15 installation that burned down. 16 BY MR. CARLSON: 17 Q. Well, I'm not saying that burned down, but 18 that there was a thermal incident. 19 Do you know what a thermal incident means? 20 A. What exactly do you mean by that term? 21 Maybe -- 22 Q. Well, if there's a -- a fire, for example. 23 A. A fire? 24 Q. Yeah. 25 A. You mean -- yes, I remember one case where	Page 25 1 THE WITNESS: Yes, I would be aware of 2 that, yes. 3 BY MR. CARLSON: 4 Q. So if the plant at Covington, Georgia, 5 owned by Ascend Elements had fires in 2025, would 6 you know about that? 7 MR. ROBERTS: Same objections. 8 THE WITNESS: Unless the client informs us 9 about it, yes. If there's a fire which is not 10 reported, then I can't know it. 11 BY MR. CARLSON: 12 Q. Okay. But, normally, if there was a fire 13 at a BHS-owned plant, at a BHS-supplied plant -- let 14 me clean up the question. Pardon me. 15 Normally, if there was a fire at a plant 16 supplied by BHS, would you personally know about it? 17 MR. ROBERTS: Same objections. 18 THE WITNESS: Yes, if it's reported to us, 19 then I would know it, yes. 20 BY MR. CARLSON: 21 Q. And you're not aware of any fire or 22 explosion at the Ascend Elements plant in Covington, 23 Georgia, ever? 24 MR. ROBERTS: Same objections. You said 25 you're on a limited time schedule. Can we please

Page 26 1 move this on? 2 THE WITNESS: I don't know about any of 3 these incidents. 4 BY MR. CARLSON: 5 Q. Would it surprise you if you learned the 6 plant has been shut down almost the entirety of 2025 7 because of fires? 8 A. We don't have any direct contact with the 9 client, so I don't know whether it's operating or 10 not. 11 Q. I'd like to look at your declaration. So 12 please turn to page 10 -- Exhibit 1023. 13 (Exhibit 1023 marked for identification.) 14 THE WITNESS: Page 10? 15 BY MR. CARLSON: 16 Q. Yes. Not page 10, pardon me. Look at 17 paragraph 34, please. 18 A. Yes, I got it. 19 Q. Why don't you read paragraph 34 to 20 yourself. 21 A. I've read it, yes. 22 Q. What do you mean that, "A person of 23 skill -- of ordinary skill would have recognized the 24 need to better control drying and would have known 25 that batch drying is the better option for better	Page 28 1 evaporate all the electrolyte components, then it's 2 still hazardous. 3 Q. Okay. So if you -- so wet shredded 4 battery material is hazardous. Is that correct? 5 A. What do you mean by "wet shredded"? 6 Q. So if you've shredded the material, but 7 not yet dried it, is it dangerous? 8 A. Like I said before, yes. 9 Q. And would that material that's been 10 shredded but not yet dried -- would it readily 11 participate in chemical reactions? 12 A. I didn't get -- please repeat. 13 Q. Yeah, if you shred material, but you don't 14 dry it yet -- 15 A. Yes. 16 Q. -- the chemical -- would the battery 17 material readily participate in chemical reactions? 18 A. Once the material is shredded, there is no 19 direct chemical reaction, so the energy which 20 contained the battery is out, it's released, so 21 there's no instantaneous chemical reaction with the 22 shredded battery material. 23 Q. But you might form hydrogen fluoride, 24 right? 25 A. If you exceed the decomposition
Page 27 1 control of drying?" What do you mean by that? 2 A. In this respect, it means that with the -- 3 with a machine operating in batch, you have 4 dedicated residence time, no distribution, and this 5 gives you a good -- good control, good possibility 6 of control, the drying process. 7 Q. Why do you need that? 8 A. Hmm? 9 Q. What's the importance of that? 10 A. It's the importance to, for example, 11 control the material temperature, heating 12 temperature, so this is very well controllable once 13 you have dedicated residence time. 14 Q. Okay. And why do you need to do this 15 control? 16 A. In order to -- to avoid overheating and -- 17 it's always the topic of drying, to have a dedicated 18 drying temperature. 19 Q. What happens if you don't dry it long 20 enough? 21 A. It's still wet, and then you can't process 22 it later on or transport it. 23 Q. Is it still hazardous at that point if 24 it's too wet? 25 A. It might be hazardous, yes. If you don't	Page 29 1 temperature, yes, then yes. 2 Q. So what kind of chemical reactions might 3 this -- the wet and shredded battery material 4 undergo? 5 A. The major -- the major hazard is the 6 decomposition of electrolyte and HF formation. 7 That's the major hazard. 8 Q. And how might that happen? What 9 conditions might prompt that to happen? 10 A. The presence of water and too much 11 temperature. 12 Q. Okay. So if there's water present or too 13 much temperature present, then the wet and shredded 14 battery material might undergo chemical reactions? 15 A. Yes, at least this part, not the complete 16 lag mass or analog material. 17 Q. Okay. And if you dry the material just a 18 little bit, is that reactivity still present? 19 A. Nobody can tell you. Part of the 20 electrolyte is still there, so drying just a little 21 bit, it does not help you too much. It's not 22 safe -- a safe status. 23 Q. So how do you control the drying process 24 to make sure that the battery material is safe? 25 A. It's mostly controlled in batch operation

Page 30 1 by the time and the final temperature of the 2 product. 3 Q. Okay. So if you don't dry the material 4 long enough, is it still potentially unsafe? 5 A. Yes. 6 Q. Why do you prefer a batch operation over a 7 continuous operation? 8 A. It's mostly because of the -- let's say 9 better controllable boundary conditions like 10 temperature and time and so on. The particle size 11 distribution, the dedicated particle size 12 distribution, that's the major reason for batch 13 drying. 14 Q. Could you explain that to me. I didn't 15 quite understand. 16 A. What? 17 Q. What impact does particle size 18 distribution have? 19 A. If you go into -- like I said before, the 20 particle size distribution of a batch system is 21 dedicated. All the particles have the same 22 residence time. If you go to a continuous systems, 23 you get a distribution of particle sizes there, some 24 particles which pass the dryer faster than others. 25 So that's statistics. Goals distribution.	Page 32 1 Q. Do you recall citing to this paragraph in 2 your declaration? 3 A. Sorry? 4 Q. Do you recall citing to this paragraph in 5 your declaration? 6 A. No, not to the best of my memory. 7 Q. Okay. Who wrote your declaration? 8 A. Hmm? I wrote my declaration. It's my 9 declaration, yes. 10 Q. Is it all -- did you actually write your 11 declaration? 12 A. Yes. 13 Q. How much of your declaration did you 14 actually write? 15 MR. ROBERTS: Objection. Asked and 16 answered, form, scope. I'll throw in a privilege 17 and work product objection just because. He's 18 answered the same question three times -- two times, 19 three times, I don't know. Let's move it on. 20 You're on a limited time schedule. 21 BY MR. CARLSON: 22 Q. How much of your declaration did you 23 actually write? 24 MR. ROBERTS: Same objections. 25 THE WITNESS: It's my declaration, so...
Page 31 1 Q. And what would be the problem if certain 2 particles pass through the continuous system faster 3 than others? 4 A. The problem is that they may not be dried 5 enough, not be dry enough, so -- and the final 6 moisture you need to have in order to have a safe 7 product is not guaranteed. 8 Q. Turn to -- I'm going to introduce 9 Exhibit -- okay. I've introduced Exhibit 1016. 10 (Exhibit 1016 marked for identification.) 11 BY MR. CARLSON: 12 Q. Do you see that, Mr. Spies? 13 A. 1016. Yes. 14 Q. And I want to turn to page 98. 15 A. Uh-huh. Okay. 16 Q. It's not page 98 of the -- on the exhibit, 17 it's page 98, which is page a 115 on my scrolling 18 counter. 19 A. 115? 20 Q. Yeah. 21 A. Uh-huh, okay. 22 Q. And do you see a section entitled "Process 23 Development of a Suitable Distillation Process for 24 Electrolyte Recovery"? 25 A. Uh-huh.	Page 33 1 BY MR. CARLSON: 2 Q. Well, no, I asked you how much did you 3 actually write? 4 A. I wrote the declaration, yes -- 5 Q. Well, I'm a little -- I'm wondering, 6 though, why you don't remember seeing this document 7 when you cited to this document yourself or the 8 declaration that you wrote yourself. 9 MR. ROBERTS: Is there a question there? 10 BY MR. CARLSON: 11 Q. Do you recall this page that we're looking 12 at, page 98 of the document, of Exhibit 1016? 13 A. Of course, I know the LithoRec. 14 Q. What happened in this paragraph? What's 15 this paragraph talking about? 16 A. It's talking about electrolyte 17 distillation or removal of electrolytes within 18 process development, yes. 19 Q. Okay. So what are they doing in this 20 paragraph? 21 A. They were evaporating electrolytes, and 22 components are measured. 23 Q. What are they evaporating electrolytes 24 from? 25 A. Hmm?

Page 34 1 Q. What are they evaporating electrolytes 2 from? 3 A. I don't know by word all of the literal 4 translations, so -- 5 Q. Would it help you to look at the 6 untranslated version? 7 A. It would -- certainly would be easier, 8 yes, of course. 9 Q. Okay. Do you think you need to look at 10 the untranslated version? 11 A. No, I can understand the English version 12 as well. 13 Q. Okay. So what are they actually doing 14 in -- on page 98 of LithoRec? 15 A. There's a measuring curve to conduct -- 16 decomposition of conducting salts and some -- 17 Q. Did you ever read this paragraph before? 18 A. Hmm? 19 Q. Did you ever -- 20 A. I've read it before, but it's -- yes, I've 21 read this document, but it's a long time ago, so 22 please excuse I'm not 100 percent -- 23 Q. When did you last read this document? 24 A. This document -- this time -- 25 Q. Well, this page, when did you last read	Page 36 1 Q. Please turn to Exhibit 1023, which has 2 been marked. 3 THE WITNESS: 1023. Yes. 4 BY MR. CARLSON: 5 Q. Please turn to paragraph 8. 6 A. Yes. 7 Q. Okay. Did you write this paragraph? 8 A. Yes. 9 Q. What's the date of this declaration you 10 signed? 11 A. Which one is this? 1023? 12 Q. Yes. If you look at the last page of 13 Exhibit 1023, you'll see the date. What's the date? 14 A. May 7th. 15 Q. Okay. Of 2025? 16 A. Yes. 17 Q. And so when you wrote paragraph 8 of 18 Exhibit 1023, were you doing that from memory? 19 A. I can't remember that. 20 Q. How were you citing to page 98 of LithoRec 21 in May 2025 when you hadn't seen that page in 22 LithoRec for over a year? 23 MR. ROBERTS: Objection. Misstates prior 24 testimony. He said he didn't remember when he last 25 looked at it.
Page 35 1 this page? 2 A. I can't recall exactly. Maybe a year ago. 3 I don't know. 4 Q. Okay. So was it maybe a year ago that you 5 last read this page? 6 A. Maybe, maybe longer. I don't know. I 7 can't recall. 8 Q. How did you draft your declaration 9 yourself, that you wrote yourself, right? 10 A. Yes, what's the question? So -- 11 Q. Okay. So you testified you wrote your 12 declaration yourself, right? 13 A. Yes. 14 Q. And your reply declaration was served 15 about a month ago. Is that right? 16 A. Yes. 17 Q. Okay. And in your reply declaration, you 18 cite to this page of this document, right? 19 A. I don't remember that. 20 Q. Why don't you look at your declaration. 21 Because you do. 22 A. Sorry? 23 Q. Do you want to see that? Because you do. 24 A. Maybe you're right if you ask it like 25 that.	Page 37 1 THE WITNESS: Exactly, that's the case. 2 BY MR. CARLSON: 3 Q. When did you last look at page 98 of 4 LithoRec? 5 MR. ROBERTS: Objection. Asked and 6 answered. 7 THE WITNESS: I can't tell -- as I said, I 8 can't tell you the exact date. I can't -- I don't 9 recall. 10 BY MR. CARLSON: 11 Q. Did you look at page 98 of LithoRec when 12 you prepared this reply declaration in May 2025? 13 A. As I said, I can't tell you when I had a 14 last look at this LithoRec page over there. I can't 15 remember. 16 Q. If you had -- well, what's your best 17 recollection of the last time you saw page 98 of 18 LithoRec? 19 MR. ROBERTS: Objection. Asked and 20 answered. He can't remember. 21 THE WITNESS: That's the case. I don't 22 recall when I last looked at that page. 23 BY MR. CARLSON: 24 Q. Did you look at page 98 of LithoRec when 25 you wrote your declaration?

Page 38 1 MR. ROBERTS: Objection. Asked and 2 answered, form. 3 MR. CARLSON: Mr. Roberts -- 4 THE WITNESS: Sorry. 5 MR. ROBERTS: Yes. 6 MR. CARLSON: -- I'm entitled to an answer 7 here, and you're obstructing the deposition. 8 MR. ROBERTS: You've gotten one four times 9 at least. If you keep asking, it's your time. 10 THE WITNESS: Sorry. Just got some water 11 in my wrong throat. 12 I can't remember when I had to last look 13 at this page. I can't recall. 14 BY MR. CARLSON: 15 Q. Okay. So what's happening on page 98 of 16 LithoRec? Let's go back to Exhibit 1016. 17 A. Page 115, correct. 18 Q. Yes, 115 of the page counter. 19 A. I don't know. Some distillation test 20 about the operation of the electrolytes. 21 Q. Okay. But what are they evaporating the 22 electrolytes from? 23 A. Sorry? I didn't get you. 24 Q. What are they evaporating the electrolytes 25 from?	Page 40 1 citing to page 98 of LithoRec, did you try to 2 understand this acronym? 3 A. Sure, of course. If you try to -- if you 4 read something, you -- I mean, you don't go into 5 every single point in detail. 6 Q. Okay. What is the IPC-WWU? 7 A. I don't know what it means in the long 8 phrase. 9 Q. Okay. Let's go to the prior page. 10 A. Yes. 11 Q. Do you see the Picture B-18? 12 A. Yes. 13 Q. Okay. Do you see the header says 14 "Electrode Stack IPC-WWU"? Do you see that? 15 A. Uh-huh, yes. 16 Q. Does that refresh your recollection of 17 what an IPC-WWU is? 18 A. But I don't know what the long version of 19 this IPC-WWU means. 20 Q. Okay. Does the picture -- what do you 21 think is being shown in the picture here of Figure 22 B-18? 23 A. It's this electrode stack. 24 Q. Okay. Do you think that's what's being 25 dried on page 98?
Page 39 1 A. They drained some battery cells, and from 2 that battery cells, they did some distillation 3 tests. 4 Q. You see in the middle of the paragraph, it 5 refers to a separator/electrode composite? 6 A. First -- where -- I didn't -- 7 Q. In the main paragraph, the first paragraph 8 under the section header B2, 3, about ten lines 9 down, it refers to a separator/electrode composite. 10 Do you see that? 11 A. Yeah. 12 Q. What's that? 13 A. Separator/electrode composite is something 14 which normally is called a cell. 15 Q. It's a whole battery cell? 16 A. Separator/electrode, yes. 17 Q. Is it shredded? 18 A. This case, it's not shredded. 19 Q. When you turn to the prior page -- before 20 we do that, on page 98, there's an acronym that's 21 used. It's IPC-WWU. Do you see that? 22 A. Yes. 23 Q. What's that? 24 A. I don't know. 25 Q. Okay. When you prepared your declaration	Page 41 1 A. That, and remove the upper part of this 2 and dry it, yes. 3 Q. Okay. Now, you see right below the 4 picture, it says it's laboratory scale? 5 A. Which picture? What do you mean? 6 Q. Oh, Figure B-18. 7 A. Yes. 8 Q. There's a -- the very first line under the 9 picture refers to it being done at laboratory scale. 10 A. Opening concepts, yes. 11 Q. Okay. So do you believe that the work 12 being described on pages 97 and 98 was being done at 13 laboratory scale? 14 A. Yes. 15 Q. Were they comminuting the electrode 16 separator composite? 17 A. Well, it's shown over here, it's not 18 comminuted. 19 Q. What was the goal of the work being 20 described on page 98 of LithoRec? 21 A. The goal is to get access to the 22 electrolyte. 23 Q. Okay. What was being crystallized? 24 A. What do you mean by "crystallized"? 25 Q. Well, it talks about a distillation

Page 42 1 process, and if you look at the -- let's see -- the 2 second paragraph of Section B.2.3 says that, quote, 3 "The distillation results showed that the conductive 4 salt was still present in all fractions." 5 Do you see that? 6 A. Not at the moment. Yeah, "The 7 distillation results showed that the conductive salt 8 was still present in all fractions," yes. 9 Q. Are these distillation fractions it's 10 talking about? 11 A. Yeah because fractions -- distillation and 12 crystallization are two different things. 13 Q. So there's salt present in all 14 distillation fractions? 15 A. Yes. 16 Q. Why is there salt present in the 17 distillation fraction? I thought the salt would be 18 left behind. 19 A. I mean, there is also the possibility that 20 not only the single material is evaporated. Also, 21 there is a part of the -- of other components which 22 are, let's say, how to say -- just missing the 23 English vocabulary -- are moved together with 24 this -- with one distillation fraction. 25 Q. Okay. But why does the salt move with the	Page 44 1 context for this paragraph, what were they trying to 2 do on page 98? 3 A. They are trying to distinguish which 4 components can be evaporated and we had to -- 5 which components can be -- or component can be found 6 later on. 7 Q. Okay. Were they trying to inactivate the 8 separator/electrode composite? 9 A. The result is an inactivation, yes. 10 Q. Why do you see that? 11 A. Within a battery cell, you don't have any 12 electrolytes, it's no longer a battery cell. 13 Q. Where does it say here they're trying to 14 inactivate the separator/electrode composite? 15 MR. ROBERTS: Objection. Misstates prior 16 testimony. 17 THE WITNESS: Because the -- the battery 18 always contains a cathode, anode, and the 19 electrolytes, so if the electrolyte is missing, 20 there's no more battery there, the battery 21 characteristics got lost. 22 BY MR. CARLSON: 23 Q. But if only part of the electrolyte is 24 evaporated, is the -- is the separator/electrode 25 composite inactivated?
Page 43 1 distillate? 2 A. It might stick to one of those components. 3 Q. There's talk -- the next section on page 4 99 talks about alkaline recrystallization of the 5 conductive salts. 6 Do you see that, B.2.4? 7 A. B.2.4. Uh-huh. 8 Q. So what's being recrystallized from the 9 distillation process? 10 A. It's the conductive salt. 11 Q. Okay. So when you come back to -- in the 12 conductive salt -- what is the conductive salt? 13 A. One conductive salt in battery can be 14 lithium hexafluorophosphate. 15 Q. And does that -- with my limited 16 background in chemistry, I'm a little surprised that 17 lithium hexafluorophosphate would evaporate and 18 transmit with, go with, the evaporating solvent. 19 Can you explain that to me? 20 MR. ROBERTS: Objection. Form. 21 THE WITNESS: At the moment, I can't 22 explain to you. 23 BY MR. CARLSON: 24 Q. So what's the purpose -- let's come back. 25 Now that we've looked at more of the	Page 45 1 A. That means that's the best-kept secret of 2 the producer of battery cells, that's the 3 composition of the electrolyte, and if one component 4 is missing, then it's not functioning properly, or 5 at all. 6 Q. Okay. But if you evaporate only a little 7 bit of the battery materials, is it -- is it 8 inactivated? 9 A. If you take out one component, it's 10 inactivated, yes. 11 Q. Well, that's not what I asked. I want to 12 ask my question again. 13 If you remove just a small percentage of 14 the electrolyte from the battery material, does it 15 become inactivated? 16 A. Both the percentage or a small portion, I 17 can't tell you, I don't know. 18 Q. You just don't know? 19 A. No, I don't know. 20 Q. Why don't you know? 21 A. It's the case. I mean, so what should I 22 say? 23 Q. So if you remove just a little bit of the 24 solvent from the battery, does it become 25 inactivated?

Page 46 1 A. I mean, if some components are missing, 2 it's not active anymore, so -- 3 Q. Well, I'm not asking you if components are 4 missing. Let me ask my question again. 5 A. I don't know. I don't know whether if -- 6 it's sufficient, let's say, to remove a small 7 percentage of electrolytes to become inactive or not 8 working properly. Maybe it's working to some 9 extent. I don't know. 10 Q. Okay. Let me ask again. If you comminute 11 battery material and you remove just a small 12 percentage of the solvent from the shredded 13 material, does that shredded material become 14 inactivated? 15 A. It's inactivated as long as one component 16 is missing, yes. 17 Q. Okay. But that's not what I asked. Let 18 me try again. 19 MR. CARLSON: In fact, the court reporter, 20 can you please read back the question? 21 (The requested portion was read back.) 22 THE WITNESS: I mean, if you shred a 23 battery, it's not working as a battery any longer, 24 and if you remove parts of it, it's not active 25 anymore.	Page 48 1 MR. ROBERTS: And just for clarity, is 2 that 226? 3 MR. CARLSON: Yes, 226 of the underlying 4 document, which is going to be a higher number on 5 the page counter. 6 MR. ROBERTS: 243. 7 MR. CARLSON: Probably right. 8 THE WITNESS: Which one? 9 BY MR. CARLSON: 10 Q. 243. Mr. Roberts had it right. 11 MR. ROBERTS: We're recording that, right? 12 I want to play that back. 13 MR. CARLSON: Yes, we are. Mr. Roberts 14 got that one right. 15 THE WITNESS: Yep. 16 BY MR. CARLSON: 17 Q. Okay. So you see about halfway down, it's 18 the top of the fifth paragraph? 19 A. Yeah. 20 Q. You see it refers to a MEWA QZ1200 21 cross-flow shredder? 22 A. Uh-huh. 23 Q. You see that? 24 A. Yes. 25 Q. And is a cross-flow shredder sometimes
Page 47 1 BY MR. CARLSON: 2 Q. That's not what I'm talking about. I'm 3 not talking about is a battery still a battery. 4 Okay? 5 MR. CARLSON: Ms. Court Reporter, can you 6 please read back the question again? 7 (The requested portion was read back.) 8 THE WITNESS: I don't know. I don't know 9 how to answer, so -- apart from what I've already 10 said, so -- maybe it's a question of understanding 11 as well. I'm sorry. 12 BY MR. CARLSON: 13 Q. You're not able to answer the question? 14 MR. ROBERTS: Objection. Misstates prior 15 testimony. 16 THE WITNESS: No. 17 BY MR. CARLSON: 18 Q. Mr. Spies, you're not able to answer the 19 question. Is that correct? 20 MR. ROBERTS: Same objection. 21 THE WITNESS: Yeah, actually, I don't know 22 what to answer else than I've already said. 23 BY MR. CARLSON: 24 Q. Let's turn to another exhibit. Going back 25 to Exhibit 1016. Let's turn to page 226.	Page 49 1 referred to as a cross-flow hogger? 2 A. Yes. 3 Q. What's a cross-flow shredder? 4 A. It's difficult for me to explain that. 5 Q. What's it do? 6 A. Hmm? 7 Q. What's it do? 8 A. Comminute material. That's what they do. 9 Q. Okay. It shreds batteries, right? 10 A. Yes. 11 Q. Does it work under vacuum? 12 A. The shredders don't work under vacuum, no. 13 Q. There is a description of a -- the next 14 page, so look at page 227. It refers to -- it's the 15 first paragraph, and it's the second to the bottom 16 line. And it refers to a vibratory fluidized-bed 17 dryer. 18 Do you see that? 19 A. Yes. 20 Q. Does that work under vacuum? 21 A. Vibratory fluidized-bed dryer, the 22 classical vibratory fluidized-bed dryer does not 23 work under vacuum, no. 24 Q. What is a vibratory fluidized-bed dryer? 25 A. It's a dryer where -- which operates,

Page 50 1 let's say, under cross-flow. We have a vibratory 2 motion in one direction, and air going through the 3 bed of material from underneath. 4 Q. I'd like to turn to page 230 of the 5 underlying document, which is page 247 on the 6 counter. 7 A. Yep. 8 Q. Have you seen this picture before? 9 A. This Figure G-1? 10 Q. Yes. 11 A. Yes, I've seen it before. 12 Q. Okay. Does this figure disclose a vacuum 13 drying process? 14 A. No. 15 Q. Why not? 16 A. The picture discloses a drying process, 17 but it's not specifically cited that it's a vacuum 18 drying process. 19 Q. Okay. And is there anything on this 20 document which would suggest it's not a vacuum 21 drying process? 22 A. This picture just indicates that it's a 23 drying process. 24 Q. Okay. Now, does it show a cross-flow 25 hogger? That's in the middle toward the top.	Page 52 1 A. No. 2 Q. Let's turn to page 235 of the underlying 3 document, which is page 252 on the counter. 4 A. 235. This table? 5 Q. Yeah. And does this listing of components 6 for the process suggest that there is a vacuum 7 drying process being taught? 8 A. It's the same statement like before. It's 9 a drying process. It's not specifically -- it's not 10 vacuum drying, which is mentioned here. 11 Q. So there's no teaching here on page 235 of 12 how to assemble a vacuum drying process? 13 A. It's just a drying process. Nowhere. 14 Q. Okay. So this section of LithoRec then, 15 which starts at page -- I'll say 224 -- let's go 16 back to page 224. 17 A. 224, uh-huh. 18 Q. Actually not. Pardon me. Go to 22 -- 19 222. So it's page 239 on the counter, and it's 222 20 on the underlying document. 21 Do you see that? 22 A. Uh-huh, yes. 23 Q. It refers to the conceptual design of a 24 recycling pilot plant. Do you see that? 25 A. Uh-huh, yes.
Page 51 1 A. That's mentioned, yes. 2 Q. Okay. And does a cross-flow hogger work 3 under vacuum? 4 A. It's not working under vacuum, no. 5 Q. Okay. And the dryer is connected to the 6 cross-flow hogger, right? 7 A. It's connected with the dryer, yes, 8 correct. 9 Q. Okay. And everything's on the same 10 nitrogen circuit. Is that right? 11 A. It's on the same nitrogen circuit, yes. 12 Q. Does this inform your understanding as to 13 whether or not the process depicted in Figure G-1 is 14 a vacuum drying process? 15 A. I mean, the figure just tells you it's a 16 drying process, it's not specifically to vacuum 17 drying process. 18 Q. Okay. Is there anything on this figure 19 that would suggest that it is a vacuum process? 20 A. It's just -- it's the typical way how you 21 design such a system. It's an overall functional 22 diagram which tells you it needs a drying process, a 23 drying -- 24 Q. Okay. But is there anything on here that 25 suggests that there's actually a vacuum present?	Page 53 1 Q. And what's the purpose of this section, 2 generally? 3 A. It lays out the -- it's a functional -- 4 unit operations you need for this conceptual 5 recycling plant. 6 Q. Okay. Why do you say conceptual? 7 A. It's -- the whole purpose of this LithoRec 8 project was to develop or, let's say, find concepts 9 for battery -- for a battery recycling plant, that's 10 why it says "conceptual." 11 Q. Okay. So what -- I want to -- you can 12 flip through page 222 until 230. Just flip through 13 the couple pages there to refamiliarize yourself 14 with it. 15 A. Until which page? 16 Q. 230. 17 A. Uh-huh, okay. 18 Q. When was the last time you saw these 19 pages? 20 A. The last page I've seen today. 21 Q. Okay. Besides today, when is the last 22 time that you saw this section from page 222 to 230? 23 A. Well, I don't remember completely. 24 Q. Like, how far back was it? 25 A. It's also difficult for me to answer

14 (Pages 50 - 53)

Page 54 1 because I was using a German extract where it looked 2 a little bit different, it looks a little bit 3 different from what you have over here. 4 Q. Okay. And when is the last time that you 5 looked at that German abstract? 6 A. That part, I don't know exactly. It's so 7 long ago, like the rest. Some weeks ago. Really, I 8 don't remember exactly the time. 9 Q. Do you recall reading this section of 10 Exhibit 1016, or the German translation thereof, in 11 connection with the preparation of your reply 12 declaration? 13 A. At least part of it, yes. 14 Q. So in this section between pages 222 to 15 230 of Exhibit 1016 or the German equivalent 16 thereof -- 17 A. Uh-huh. 18 Q. -- what teachings are there that would 19 instruct a person of skill to develop a vacuum 20 drying process? 21 A. In the paragraph "Machine Drying 22 Selection," there are various factors being 23 discussed. So -- 24 Q. Such as? 25 A. Hmm?	Page 56 1 Q. So if a person has a bachelor's degree in, 2 let's say, you know, mechanical or chemical 3 engineering, and they've been in the field for a 4 couple years with a couple years' industry 5 experience, and they had this page, this section of 6 LithoRec from pages 222 to 230, and the rest of the 7 document as well, would they be able to develop a 8 vacuum drying system for processing battery -- 9 lithium batteries? 10 A. Yes, that's not a miracle, yes. 11 Q. Will they be able to do it safely? 12 A. Hmm? If somebody is skilled, sure. I 13 mean, there is not only the aspect of drying 14 temperature and process optimization, there are 15 other aspects as well, like we discussed earlier in 16 our session about safety and explosion protection 17 and so on. If somebody's skilled, we can do it. 18 Q. We heard your discussion about all the 19 hazards. We went through some length about the 20 various hazards in battery recycling, and you 21 yourself said that most of the people at URT have an 22 advanced degree to develop these systems. 23 MR. ROBERTS: Objection. Misstates prior 24 testimony. 25 ///
Page 55 1 Q. Such as? 2 A. Batch or continuous, and there is the 3 question about drying temperature to be restricted. 4 This points to vacuum drying, and it says in the 5 same -- this, in turn, speaks in favor of drying 6 under vacuum to keep the drying temperature lower, 7 and it's typically what you do when vacuum drying. 8 Q. Okay. So -- 9 A. That's one option. 10 Q. Besides that. I see that. I'm well 11 familiar with that sentence. Besides that sentence, 12 what else in LithoRec, and particularly in this 13 section of LithoRec, would teach a person of skill 14 how to actually implement a vacuum drying process? 15 A. I mean, those hints about low temperature 16 in combination with what is already known about, I'd 17 say, decomposition temperature, the evaporation of 18 electrolyte components, this is enough to point to a 19 vacuum drying system. 20 Q. Well, I understand it may be enough to 21 point to a vacuum drying system. Does it actually 22 enable somebody to develop a vacuum drying system? 23 A. Vacuum drying systems are nothing -- no 24 devices that need to be developed. They are known 25 for years, so they are there for decades.	Page 57 1 BY MR. CARLSON: 2 Q. Why do you think a person of -- with a 3 bachelor's degree and two years' experience would be 4 able to develop a safe and effective battery 5 recycling system? 6 MR. ROBERTS: My apologies. I didn't wait 7 for the question. 8 Misstates prior testimony. 9 THE WITNESS: Where is the -- I didn't get 10 the link to a bachelor's degree. 11 BY MR. CARLSON: 12 Q. Okay. If someone had only a bachelor's 13 degree and a couple years of industry experience, 14 would that be enough training to develop a battery 15 recycling system in view of all the hazards we 16 discussed earlier, with a vacuum drying system? 17 A. I mean, the fact that we, in our company, 18 focus on people with -- with master's degree does 19 not mean that somebody with bachelor is not able to 20 do it. If you have experience, it's possible as 21 well. I mean, batch drying systems under vacuum, 22 there are no miracle. They are state of the 23 technologies, nothing so special. 24 Q. So at BHS, the systems for vacuum drying 25 of shredded battery material were designed typically

Page 58 1 by people with master's degrees and PhDs, correct? 2 A. The sizing we do nowadays, yes, they 3 are -- I mean, we had to look on this, that they 4 have to university degree, yes. 5 Q. Are you familiar in your professional 6 experience with people developing vacuum drying 7 systems for shredded battery material where the 8 systems were designed by someone with only a 9 bachelor's degree and a few years of experience? 10 A. I don't know whether somebody else has 11 done it. I really don't know. 12 Q. You don't know? 13 A. No. I mean, it's not unlikely, yeah, 14 but -- 15 Q. Well, what's the basis of your opinion 16 then that someone with a bachelor's degree and a few 17 years of experience in the industry could design a 18 vacuum drying process for drying shredded battery 19 material in view of all the hazards associated with 20 this process? 21 MR. ROBERTS: Objection. Scope. 22 THE WITNESS: I mean, if somebody -- also, 23 people with university education and a bachelor's 24 degree, they are qualified people, so with some 25 experience, they are in a position to design such a	Page 60 1 Q. Is there anything else in LithoRec that 2 would teach how to design a vacuum drying system for 3 shredding batteries and then drying the batteries? 4 A. To the best of my memory, this is the 5 major section for that. 6 THE VIDEOGRAPHER: Counsel, just so we 7 know -- please continue, Mr. Spies. 8 THE WITNESS: To the best of my memory, 9 this is the major section which refers to vacuum 10 drying, but I've not learned everything in my memory 11 what maybe might be cited at another state, point of 12 this document. 13 THE VIDEOGRAPHER: Sorry to interrupt, 14 Counsel. I just want to let you know I need to take 15 a break in a few moments to change the media, but 16 please finish the line. 17 MR. CARLSON: Okay. This is a fine place 18 to stop. 19 THE VIDEOGRAPHER: Thank you. Stand by. 20 MR. CARLSON: We're tight on time, so if 21 we can keep the break to maybe five minutes. 22 THE VIDEOGRAPHER: This marks the end of 23 Media Unit Number 1. Going off the record at 24 6:08 p.m. Central European. 25 (Recess.)
Page 59 1 system. 2 BY MR. CARLSON: 3 Q. Have you ever heard of that happening? 4 A. Hmm? 5 Q. Have you ever heard of that happening? 6 A. Yes. 7 Q. Where? 8 A. You mean the design of such systems? 9 Q. Yes. 10 A. Yeah, no, I mean, even -- we are all 11 master's, but now it just comes to my memory, we 12 have also one bachelor in our team. 13 Q. How many people on the team? 14 A. Sorry? 15 Q. How many people on the team, technical 16 people? 17 A. Technical people designing these systems? 18 Q. Yeah, how many people are on your team 19 that design these systems? 20 A. Ten. 21 Q. Ten. And how many have only a bachelor's 22 degree? 23 A. One. Oh, two. Two. 24 Q. One or two? 25 A. Yeah.	Page 61 1 THE VIDEOGRAPHER: We are back on the 2 record at 6:18 p.m. Central European, and this marks 3 the beginning of Media Number 2, the deposition of 4 Volker Spies. 5 Please proceed, Counsel. 6 BY MR. CARLSON: 7 Q. Welcome back, Mr. Spies. 8 A. Yes, thank you. 9 Q. Did you talk with your counsel over break? 10 A. No. 11 Q. Not one word? 12 A. No. 13 Q. Turning back to Exhibit 1016, is there a 14 disclosure of a vacuum installation? And, in 15 particular, I've reference the section from page 222 16 to roughly 230. 17 A. Not to the best of my memory, no. 18 Q. So let's talk about Exhibit 1006. I'll 19 introduce that now. Pardon me. I need to find 20 Exhibit -- 21 (Exhibit 1006 marked for identification.) 22 BY MR. CARLSON: 23 Q. Okay. Can you see Exhibit 1006? 24 A. No. 25 Q. I think it's a long exhibit. It may take

Page 62 1 a -- you need to reload -- for your browser. 2 A. 1006, yes. 3 Q. Right. You see that? Just so we know 4 we're look at the same page, what does the cover 5 page of the document say? 6 A. It's the extract from "Perry's Chemical 7 Engineers' Handbook," yeah. 8 Q. Okay, good. 9 Now, you said "extract," but this is quite 10 a long document, right? Do you see, like, 1500 11 pages there? 12 A. For sure, yes, it's a very big book. 13 Q. Big book. 14 All right. Well, this is what we've got, 15 so I want to move to -- well, do you remember 16 looking at Perry? 17 A. Sorry? 18 Q. Do you remember looking at Perry? 19 A. Yes. 20 Q. When is the last time you looked at Perry? 21 A. Some months ago or some time ago. I can't 22 recall. I can't remember the date. 23 Q. Was it -- like, how many months ago 24 roughly? 25 A. Really, I don't -- I can't tell you a	Page 64 1 Q. Okay. And for the purposes of your 2 declaration, were you trying to establish the base 3 of your opinions? Why did you cite to Perry? 4 A. This is one source when you go into, let's 5 say, developing or getting an opinion about one 6 topic. I mean, it's -- it's a document which is 7 quite near our book, it's quite near to have a look 8 at it, to get an initial overview. 9 Q. Okay. So -- pardon me one second while I 10 look at my papers. 11 Well, let's look at page 12-44, which on 12 the counter is page 1174. 13 A. 12-44, okay. 14 Q. Do you see that? 15 A. Yes. 16 Q. Do you see a header that says "Batch 17 Through Circulation Dryers"? 18 A. "Batch Through" -- yes. 19 Q. And below there, there's a header that 20 says "Vacuum-Shelf Dryers." Do you see that? 21 A. Yes. 22 Q. What's a vacuum-shelf dryer? 23 A. Well, they are vacuum-shelf dryers. It's 24 something like -- like a batch dryer, indirectly 25 heated, heated through the wall. They are operating
Page 63 1 date. I don't know. 2 Q. Was it more than three months ago? 3 A. No, I don't think so. I can't recall the 4 date, really. I can't tell you. 5 Q. Why did you cite to Perry? 6 MR. ROBERTS: Objection. This is a 7 cross-examination. His direct testimony is in. You 8 want to ask a better question? 9 MR. CARLSON: Sure, just to make you 10 happy, Jonathan. 11 MR. ROBERTS: Helping you move along. 12 BY MR. CARLSON: 13 Q. So were you attempting to introduce Perry 14 as an obviousness combination? 15 A. What's the meaning by that? 16 Q. Well, I'm going to come back. 17 MR. CARLSON: With apologies, Jonathan. 18 BY MR. CARLSON: 19 Q. You relied on Perry in your reply 20 declaration, correct? 21 A. Yes. 22 Q. Why? 23 A. Perry is a standard handbook for chemical 24 engineers where a lot of knowledge, material, data, 25 and know-how is collected at one point.	Page 65 1 under vacuum. 2 Q. Okay. But what's a shelf dryer mean? 3 A. It's meaning that the drying takes place 4 on the surface -- on the shelf of the dryer. 5 Q. Okay. So is -- can you kind of describe 6 the -- well, look at page -- on the same page, 7 Figure 12-48. Do you see that, in the bottom left 8 corner? It's on page -- on the same page, 12-44. 9 A. Yes. 10 Q. And do you see Figure 12-48? 11 A. Yes. 12 Q. Does that depict a vacuum-shelf dryer? 13 A. No. 14 Q. No? 15 A. It's a tray dryer. 16 Q. A tray dryer? 17 A. Yeah, something different. 18 Q. Oh, really? Okay. 19 And so how does a vacuum-shelf dryer 20 differ from a vacuum-tray dryer? 21 A. In this way, how it is shown over here. 22 It's a dryer where the particles are placed on a 23 shelf, and then air moves over the shelves and takes 24 away the moisture. 25 Q. Okay.

Page 66 1 A. And that's a different drying technology 2 than drying it under vacuum. I mean, there's 3 thousands of different dryers. 4 Q. Okay. Is a tray dryer a vacuum dryer? 5 A. They are forms of tray dryers which 6 operate under vacuum, yes. 7 Q. Okay. So the vacuum-shelf dryer, you've 8 got the items to be dried to be put on shelves. Is 9 that correct? 10 A. For a vacuum-shelf dryer, yes, it's put on 11 a tray, and then it's -- in the kind of box, and the 12 thing is put under vacuum, yes. 13 Q. Okay. Well, why do you put the things on 14 trays, on shelves? 15 A. Just to give the -- sometimes those -- the 16 plates are heated and to, let's say, give the heat 17 transfer. That's why you put them on shelves. 18 Q. Why don't you put everything piled up in 19 the middle of the dryer? 20 A. Well, then it's difficult to, let's say, 21 have access and get heat transferred to the middle 22 of the pile. That's why you separate it and keep it 23 distributed on shelves. 24 Q. I see. So the distribution matters? 25 A. The distribution matters, yes.	Page 68 1 A. You always have to find a balance between 2 drying time when you apply a vacuum installation, 3 the vacuum level, and the drying temperature. This 4 is what is meant by "optimizing." 5 Q. So what are the various factors you try to 6 optimize? 7 MR. ROBERTS: Objection. Asked and 8 answered. 9 THE WITNESS: I mean, as I said, drying 10 time -- drying temperature is always one parameter. 11 BY MR. CARLSON: 12 Q. Right. 13 A. If you don't want to -- if you go, for 14 example, to a pharmaceutical industry, you will 15 always often has -- also have the decomposition 16 issue where drying temperature needs to be kept low. 17 Q. Right. 18 A. And this, as a consequence, applies to a 19 low vacuum, which is needed to keep the drying 20 temperature low. 21 Q. Okay. 22 A. So we have material characteristics which 23 give you the drying time -- 24 Q. Okay. 25 A. -- to receive the dedicated final
Page 67 1 Q. Okay. In the -- in the vacuum dryers for 2 battery recycling, is that a shelf dryer? 3 A. No, that's not a shelf dryer, it's a drum 4 dryer. 5 Q. A drum dryer. 6 What's the difference? 7 A. It's not a shelf dryer because we need 8 some agitation -- because it's needed some agitation 9 to keep the material moving, and that's the 10 disadvantage of the shelf dryer where materials just 11 laying on the shelf, lying on the shelf, so... 12 Q. When you design a drum dryer for battery 13 recycling, do you look to teachings about shelf 14 dryers? 15 A. Again, "drum dryer" is not the correct 16 word. Because drum dryer is, again -- it's another 17 type of dryer. 18 Q. Okay. But when you design a dryer for 19 battery recycling to dry shredded battery material, 20 do you look to teachings from vacuum-shelf dryers? 21 A. Normally not, no, no. 22 Q. All right. You talk in your declaration 23 about optimizing the parameters. 24 A. Uh-huh. 25 Q. What do you mean by that?	Page 69 1 moisture. 2 Q. So we've got the process which has a 3 shredder, right, and then a -- maybe a bunker, 4 optionally a bunker, and then you've got the dryer. 5 You have all these parts in the system, right? 6 A. Uh-huh. 7 Q. And you -- 8 A. Yes. 9 Q. You need to control for hazards, right? 10 A. Yes. 11 Q. And we talked a lot about these hazards. 12 There's quite a few hazards, right? 13 A. Yes. 14 Q. How trivial is it to control for those 15 hazards? 16 A. You mean how -- 17 Q. How trivial is it to control for those 18 hazards? 19 A. I mean, you always have to look at the 20 complete picture, control the hazards, get all the 21 factors balanced, optimize your product result. So 22 that's the standard routine operation of a chemical 23 engineer. So they're all educated, 24 university-educated persons, so it's not trivial, 25 you need to know something about it for that,

Page 70 1 experience is necessary. 2 Q. What do you mean, "it's not trivial"? 3 A. You have -- trivial not in the sense that 4 you have to take into account a lot of factors. 5 Q. Like, how many factors? 6 A. Hmm? 7 Q. Like, how many factors? 8 A. There is not a dedicated number of factors 9 you have to consider because it varies from 10 installation to installation. If, for example, 11 there are no organic solvents involved, it's less, 12 so the number of factors you can't -- you have to 13 decide from case to case. 14 Q. Okay. So if you had someone with a 15 bachelor's degree in, let's say, chemical 16 engineering or mechanical engineering and who had 17 been in the field for a couple years, two to three 18 years, for example, how much guidance would they 19 need in order to develop a vacuum drying system to 20 dry shredded battery material? 21 A. Developing such a system is always -- 22 there's always teamwork, so you don't -- normally 23 you don't do it by yourself. You have -- you make 24 an initial design, and then somebody else has a look 25 at it, then you optimize some things, and then	Page 72 1 engineers, they are better, they are more, let's 2 say, self-operating, others need more guidance. 3 There's nothing -- it's not a black-and-white 4 question to answer. 5 BY MR. CARLSON: 6 Q. Okay. But, you know, the average engineer 7 who's got a couple years of experience in the field, 8 who's got a bachelor's degree, how much guidance 9 would they have? If they were looking at LithoRec, 10 and they're starting with LithoRec and their basic 11 knowledge of what they know, how much guidance would 12 they need in order to develop a vacuum drying system 13 for shredding and then drying the shredded battery 14 material? 15 MR. ROBERTS: Objection. Form, asked and 16 answered, compound question, I think. 17 THE WITNESS: I think these people -- with 18 somebody with some experience, he's -- he will be in 19 a position to come to a size of a dryer, which 20 works. 21 BY MR. CARLSON: 22 Q. Well, I didn't ask about the size of the 23 dryer, I'm asking to develop the entire system. 24 A. The size of the dryer -- I mean, a vacuum 25 dryer itself is not only the machine, it's always
Page 71 1 you iteratively come to the final solution. 2 Q. Okay. So the person coming out of -- the 3 person's who's got a bachelor's degree of -- with 4 chemical engineering or mechanical engineering, for 5 example, with a couple years of experience in the 6 field, they would not normally be the one themselves 7 to design a system for shredding batteries and then 8 drying the shredded batteries, right? 9 MR. ROBERTS: Objection, misstates prior 10 testimony; objection, form. 11 THE WITNESS: I mean, these people, they 12 may design such a system, yes, but it's not in 13 contradiction to what I said before. I mean, 14 designing such a plant is always teamwork. 15 BY MR. CARLSON: 16 Q. How much guidance would that person need 17 if it had a -- you know, a bachelor's degree and 18 they had a couple years' experience in the field? 19 How much guidance would they need in order to 20 develop a system to shred the batteries and then dry 21 the shredded batteries? 22 MR. ROBERTS: Objection. Asked and 23 answered. 24 THE WITNESS: This is nothing you can put 25 into one number. There are people -- some -- some	Page 73 1 combined with the vacuum system, and this needs to 2 be designed as well. 3 Q. Right. 4 A. So that's part of this design process. 5 Q. And how much guidance -- how much guidance 6 would that person, who's got a bachelor's degree and 7 a couple years of experience -- how much guidance 8 would that person need in order to develop -- when 9 he's looking at the LithoRec system, how much 10 guidance would they need to develop an overall 11 system that comminutes the batteries and dries the 12 shredded batteries? 13 MR. ROBERTS: Same objections. 14 THE WITNESS: Again, I mean, what should I 15 answer? What is -- what does "guidance" mean? I 16 mean, there are certain, let's say, rules, how to 17 design such a system. They follow the rules, then 18 they come to a certain result, and then you look 19 whether it seems -- it looks feasible or not, so. 20 BY MR. CARLSON: 21 Q. Would they have any trouble? 22 A. Sorry? 23 Q. Would they have any trouble designing this 24 system? 25 A. They will -- they will be in a position to

Page 74 1 do so, yes, they will come to a reasonable result. 2 Q. Will it be safe? 3 A. Of course, otherwise they would not -- 4 wouldn't have done their job properly. 5 Q. Well, that's a question, right? 6 You said that URT itself -- not URT -- BHS 7 has had at least one fire associated with its vacuum 8 drying system, correct? 9 A. The fire was not in the vacuum drying 10 system. 11 Q. Where was the fire? 12 A. Hmm? 13 Q. Where was the fire? 14 A. In the comminution system, not in the 15 vacuum drying system. 16 Q. Okay. So the person of skill who's got a 17 bachelor's degree and a couple years of experience, 18 would they have any trouble making a comminution 19 system that is safe and effective and that works 20 with a vacuum dryer? 21 A. I mean, that's -- if -- yes, that's their 22 job, yes. 23 Q. So would they have any trouble? 24 A. I mean, they will -- they are in a 25 position to design such a system, and, as I said,	Page 76 1 hogger. 2 Q. Right. And is this going -- what's the 3 buffer tank? 4 A. The buffer tank is the intermediate 5 storage for the -- for the hogger. It's afterwards. 6 Q. Okay. And then it goes into a dryer? 7 A. Not directly. There is some locks in 8 between and some, let's say, screw to overcome a 9 distance, then it goes into the drying system. 10 Q. When you -- so is this showing a batch 11 process or a continuous process? 12 MR. ROBERTS: Objection. Asked and 13 answered. 14 THE WITNESS: Yeah, again, it shows a 15 drying system. It's not explicitly batch or 16 continuous. 17 BY MR. CARLSON: 18 Q. Okay. So, to make a batch process, what 19 do you need to do that's different than what's shown 20 here? 21 A. I mean, you have a buffer tank, you have a 22 connection. In order to make -- you said you make 23 it a batch process? 24 Q. Yeah. 25 A. To make a vacuum drying process, you just
Page 75 1 and it's teamwork to look from left and right, make 2 the so-called hazard study and to -- and come to a 3 proper -- proper selection and sizing of the system. 4 Q. What is shown in LithoRec on how to make 5 a -- well, let me ask you this: The teachings in 6 LithoRec, let's go back to Exhibit 1016. 7 A. 1016. 8 Q. Let's go back to page, like, 226 of the 9 underlying document, which is page 243 on the 10 counter. 11 A. 226. 12 Q. Actually, I want to turn to page -- pardon 13 me. 230. 14 A. Yes. 15 Q. You see Figure G-1? 16 A. Yes. 17 Q. Okay. Is that a continuous process or a 18 batch process? 19 MR. ROBERTS: Objection. Asked and 20 answered. 21 THE WITNESS: That's not so explicitly 22 stated in this -- in this figure. It can be both. 23 BY MR. CARLSON: 24 Q. Okay. Do you see the shredder? 25 A. It's mentioned over there, this cross-flow	Page 77 1 need the -- or as part of the dryer, there would be 2 a vacuum station needed to produce the vacuum. 3 Q. Okay. So there's no vacuum shown here? 4 A. No vacuum station, no. 5 Q. What is -- what else do you need to do to 6 make a batch process here? 7 A. That one buffer tank you have, I mean, the 8 batch process for drying, belt conveyer, which is 9 charged directly on the belt conveyer. It's 10 possible. So the major, let's say -- I would say 11 the major components are shown. Normally you 12 discharge into another hopper to keep the dryer 13 empty for further processing. 14 Q. What do you mean by that? 15 A. Hmm? 16 Q. What do you mean by that? 17 A. Normally the dryer is the heart of the 18 process, and you try to design -- you will design a 19 system in such a way that the dryer is operating as 20 much as possible. So if you don't have a buffer 21 underneath the dryer for the -- it's a dried 22 material, then the dryer must wait until it's empty. 23 So that's why you normally put a buffer underneath 24 before you go on to. 25 Q. The buffer that's shown in Figure G-1, it

Page 78 1 shows a buffer tank. What's that refer to? 2 A. That's an intermediate tank. Let's say, 3 for example, one of the system is not working. Then 4 you have some buffer of material so that the rest of 5 the plant is able to be running; for example, if you 6 have to do service on your comminuting station. 7 Q. So is this buffer tank that's shown in 8 Figure G-1 -- is that, like, a bunker? 9 A. It's a bunker, yes, yeah. 10 Q. What needs to be done to make that safe? 11 A. The bunker, well, as it's shown over here, 12 to make it safe, you need -- you will operate the 13 whole system under nitrogen to eliminate explosion 14 risk. 15 Q. Let's look at page -- your declaration -- 16 go back to your page 1023, please. 17 A. Yes. 18 Q. Paragraph 62. 19 A. 62. Uh-huh. 20 Q. What are you talking about here, what's 21 this concerning? 22 MR. ROBERTS: Objection. This is a 23 cross-examination. The document speaks for itself. 24 If you have a specific question, you can ask him 25 about that.	Page 80 1 Q. Yes. If you like, I can do the German 2 version, which may help you as well. Would you like 3 to see that? 4 A. Let's try it with the English version 5 first. 6 Q. Okay. 7 MR. ROBERTS: Is there a question pending? 8 I'm sorry. I think multiple ones of ours may have 9 gotten lost. 10 MR. CARLSON: Yeah, I think you're 11 probably right. 12 BY MR. CARLSON: 13 Q. Mr. Spies -- 14 MR. ROBERTS: That's two. 15 BY MR. CARLSON: 16 Q. -- have you had a chance to familiarize 17 yourself with the English version that's marked as 18 Exhibit 1020? 19 A. Yeah, a little bit. So, please, what's 20 your question? 21 Q. Okay. So let's go back to your 22 declaration now, which is Exhibit 1023. And we're 23 looking at paragraph 62 of your declaration. Do you 24 see that, paragraph 62? 25 A. Uh-huh.
Page 79 1 MR. CARLSON: Thank you, Jonathan. I'll 2 handle this. 3 BY MR. CARLSON: 4 Q. Are you familiar with the Hanisch 5 reference? 6 A. Yes. 7 Q. What's the Hanisch reference talk about? 8 A. The Hanisch reference, this is the patent 9 we are talking about. That's what you're referring 10 to? 11 Q. Correct. 12 A. The patent '097, that's what's Hanisch 13 references. 14 Q. Well, no, '097 is the patent that you're 15 challenging. There's another patent document by 16 Mr. Hanisch. And the English version -- let me 17 introduce the English version, 1020. 18 (Exhibit 1020 marked for identification.) 19 MR. CARLSON: And if you want, I can 20 introduce the German version. Okay. 21 BY MR. CARLSON: 22 Q. Do you see that, the exhibit that's been 23 introduced? You may have to refresh your screen. 24 A. Hanisch translation. That's what you 25 mean?	Page 81 1 Q. All right. Why don't you read it to 2 yourself. 3 A. Uh-huh. 4 Q. Okay. So you see the middle of your -- of 5 that paragraph 62, you say that, "Hanisch further 6 discloses that the evaporation can be achieved at 7 temperatures below 100 degrees Celsius and 8 particularly below 80 degrees Celsius"? Do you see 9 that? 10 A. Yes. 11 Q. What do you mean by that? 12 A. In the electrolyte, we have low-boiling 13 components inside, and they have boiling points 14 below 100 degrees C. So that's what is meant by 15 that. And -- if you keep the drying temperature 16 low, and these are evaporated. 17 Q. And is that -- and this is the pre-dryer, 18 right? 19 A. Pre-dryer? What do you mean by 20 "pre-dryer"? 21 Q. Well, yeah, there's the -- I believe the 22 instrumentality you're referring to is what Hanisch 23 calls the pre-dryer. Do you recall that? 24 A. Give me a moment. 25 Q. Okay. Let's go back to Hanisch. So

Page 82 1 please pull up Exhibit 1020. 2 So look at page 6 of Exhibit 1020. 3 There's a paragraph toward the bottom. It's four 4 paragraphs up from the bottom. And it says, quote, 5 "The active material separation installation 6 preferably has a pre-dryer." 7 Do you see that? 8 A. Yes, I see that. 9 Q. So Hanisch is talking about a pre-dryer. 10 Do you know what that's referring to? 11 A. No, at the moment, I don't know. 12 Q. When's the last time you saw Exhibit 1020, 13 or the German equivalent thereof? 14 A. I don't remember that. I remember there 15 was also a flow sheet inside, if I wasn't remember 16 correctly. 17 Q. There is the German version. It might 18 help you to see the German version. Would you like 19 me to introduce that? 20 A. Yes, please. 21 Q. Okay. Let's see if I can do that. I'm 22 going to introduce Exhibit 1013. 23 (Exhibit 1013 marked for identification.) 24 THE WITNESS: Did you already introduce it 25 or --	Page 84 1 A. 38, yes. 2 Q. And you understand that that's the 3 pre-dryer? 4 A. 38. I have to refresh my memory a little 5 bit. 38. Okay. Pre-dryer is called 28? 6 Q. It's 38. Maybe it is 28. Pardon me. Let 7 me get my other copy. Pardon me. 8 A. 28. 28 is called pre-dryer. 9 Q. Okay, you're right. I stand corrected. 10 A. 38 is a separator. 11 Q. You are right. I stand corrected. 12 Correct, it's absolutely -- the pre-dryer is 28. 13 And do you understand that the pre-dryer 14 can operate below 100 degrees Celsius and maybe 15 below 80 degrees Celsius? 16 A. That's what's mentioned over there, yes. 17 Q. Okay. So, is your opinion, in paragraph 18 62 Hanisch further discloses that the evaporation 19 can be achieved at temperatures below 100 degrees 20 Celsius and particularly below 80 degrees Celsius, 21 is that referring to the pre-dryer? 22 A. Uh-huh, yes. 23 Q. Okay. So are you -- is it your opinion 24 that the pre-dryer inactivates the battery material? 25 A. The pre-dryer removes the low-boiling
Page 83 1 BY MR. CARLSON: 2 Q. I'm doing it right now, so you may have to 3 refresh your screen. 4 A. 1013. 5 Q. Do you see it now? 6 A. No, it's downloading. 7 Q. Okay. 8 A. At the moment, my screen is still white. 9 Q. Yeah, give it a minute. 10 A. It's not coming. 11 Q. Try to refresh again, please. 12 A. Yes, now I've got it. 13 Q. You got it? 14 A. Yes. 15 Q. All right. So when you're ready, you can 16 click through, and then there's a picture shown. 17 Figure 1 is on page 22 of 29 on the counter. 18 A. Yeah. 19 Q. Do you see the figure? 20 A. I see the figure, yes. 21 Q. Okay. And have you ever seen this figure 22 before? 23 A. I've seen this figure before, yes. 24 Q. Okay. And do you see the item marked 25 Number 38 down in the bottom left?	Page 85 1 components of the electrolyte and, therefore, 2 inactivates it, yes. 3 Q. Okay. And what's that based on? How do 4 you know how much that pre-dryer actually removes? 5 MR. ROBERTS: Objection. Form, compound 6 question. 7 THE WITNESS: The way it's written over 8 here, yeah, the whole sense of this pre-dryer is to 9 remove components from the electrolyte, and I assume 10 that they do it properly and long enough so that the 11 component is away from the electrolyte, and then 12 it's inactivated. 13 BY MR. CARLSON: 14 Q. Okay. Well, how do you know that? How do 15 you know it's in there long enough to inactivate? 16 MR. ROBERTS: Objection. Form, compound 17 question. 18 THE WITNESS: I mean, from what is -- what 19 is written over here, there's no specific time 20 mentioned, and drying time is always dependent on 21 the capacity of such a plant. I mean this is 22 only -- not "only" -- this is a functional 23 description, it's no design of a plant. 24 BY MR. CARLSON: 25 Q. Right. You see there's an oven back in

Page 86 1 Figure 1, oven 400 to 600 degrees Celsius? 2 A. Uh-huh. 3 Q. What's the purpose of the oven? 4 A. The purpose of the oven -- the purpose of 5 the oven is to, let's say, destroy the separating 6 foil within the battery -- 7 Q. Right. 8 A. -- which separates the cathode from the 9 anode. 10 Q. And what's the temperature in the oven? 11 A. I don't know -- 400 to 600 degree. 12 Q. And that's enough for pyrolysis? 13 A. Pyrolysis is something different. 14 Pyrolysis takes place when there is no atmosphere 15 of -- no oxygen presence. It's, let's say, 16 destruction or destroying of the PVD, polyvinylidene 17 fluid, PVDF -- 18 Q. Yeah. 19 A. -- without -- or without presence of 20 oxygen. 21 Q. Okay. But the oven's at least 400 degrees 22 Celsius. Is that right? 23 A. That's what it says, yes. 24 Q. Would that evaporate away all the solvent? 25 A. Some remaining solvents would be left.	Page 88 1 Q. All right. How dry do things have to be 2 to go through the zigzag classifier? 3 A. If they are still sticky, your zigzag 4 dryer will not work for long. It has to be dry. 5 Q. Okay. Do -- 6 A. The material has to be free flowing. 7 Q. Free flowing. Okay. 8 Do zigzag classifiers process things like 9 flour? 10 A. Sorry? 11 Q. Are zigzag classifiers used in other 12 industries? 13 A. Yes, they are. 14 Q. Are they used to separate flour? 15 A. Flour -- I think, yes. 16 Q. What's the moisture content of flour? 17 A. Depending. That's why I say I don't know 18 exactly the moisture content of ordinary flour. 19 That's why I said it must be free flowing. This 20 content of the material can be, let's say, .5 or .5 21 percent, and 5 percent can be free flowing -- 22 Q. Okay. 23 A. -- material -- 24 Q. Okay. But if flour has -- do you think 25 it's right that flour has got a moisture content of
Page 87 1 For sure, they would be alter. 2 Q. Okay. So if they're evaporating all the 3 solvents in the oven, why would they try to 4 inactivate material in the -- in the pre-dryer? 5 A. Separated up front, regain the material 6 for further use, for example. 7 Q. How do you know it's actually inactivated? 8 How do you know it's dry enough to be inactivated 9 through the pre-dryer? 10 A. This is something you determine by trial 11 and error. That's how you select your drying time. 12 That's the optimization process you have to do. 13 Q. So it might be inactivated, it might not 14 be inactivated. Is that right? 15 A. I mean, the whole thing makes no sense -- 16 if you choose a dryer which is too small and then 17 bring everything into the -- into the hot dryer, so 18 the engineering practice you do. 19 Q. Between the zigzag -- between the 20 pre-dryer and the oven, there's a zigzag classifier. 21 Do you see that? 22 A. Yep. 23 Q. What do zigzag classifiers do? 24 A. Zigzag classifier separate according to 25 size.	Page 89 1 about 10 to 15 percent? 2 MR. ROBERTS: Objection. Scope, 3 relevance. 4 THE WITNESS: I mean, for the zigzag 5 sifter, it's important that the material is free 6 flowing. If it's sticky and wet, it will not work 7 or it will block, very quickly, the zigzag sifter. 8 BY MR. CARLSON: 9 Q. Okay. But do you know roughly the 10 moisture content of flour? 11 A. No. I don't know. 12 Q. Does 10 to 15 percent sound right? 13 A. Sorry? 14 Q. Does 10 to 15 percent sound right? 15 MR. ROBERTS: Yeah, objection. 16 THE WITNESS: Maybe. But I don't know the 17 exact value of ordinary flour. Not from my memory. 18 I don't know. 19 BY MR. CARLSON: 20 Q. What other materials get separated in 21 zigzag classifiers? 22 MR. ROBERTS: Objection. Scope, 23 relevance. 24 THE WITNESS: In zigzag classifiers, you 25 normally separate material which have, let's say,

Page 90 1 equal particle size, and then they are accelerated 2 through this zigzag area, yeah, that's how it works. 3 BY MR. CARLSON: 4 Q. Okay. How do you know then the material 5 coming out of the pre-dryer is actually inactivated? 6 MR. ROBERTS: Objection. Asked and 7 answered. 8 THE WITNESS: If the material coming out 9 of the pre-dryer is too wet, the zigzag sifter will 10 not work, for long. 11 BY MR. CARLSON: 12 Q. Okay. But it just has to be dry enough to 13 move through the zigzag classifier, right? 14 A. You need free-flowing material, yes. 15 Q. So the requirement is that it be free 16 flowing, not that it be completely dry. Is that 17 correct? 18 MR. ROBERTS: Objection. Form, scope. 19 THE WITNESS: Free flowing is enough, yes. 20 BY MR. CARLSON: 21 Q. So are you aware of prior art that said 22 that it's enough to -- let me back up. Let me back 23 up. 24 Are you aware of prior art that said you 25 need to add additives, like fire retardant, before	Page 92 1 Q. Which ones? 2 A. Well, we have this -- let me have a look 3 at the list of my -- they refer to the Mitsubishi 4 patent. That's the one I'm referring to, yes. 5 Q. Mitsubishi. Where does Mitsubishi say you 6 could inactivate by vacuum drying alone? 7 A. I don't have the full patent on my memory. 8 Q. You say Mitsubishi. I want to make sure I 9 get the right -- 10 A. Mitsubishi -- 11 Q. All right. I'm going to introduce what I 12 believe to be the Mitsubishi patent, 1032. 13 (Exhibit 1032 marked for identification.) 14 BY MR. CARLSON: 15 Q. All right. You may need to refresh your 16 screen. 17 A. If you go to page -- that's page 1. I 18 think there is this Figure 1 that says "Vacuum 19 Drying." 20 Q. Yes, but that's on the whole battery, 21 correct? 22 A. This charging perforating vacuum drying. 23 Q. That shows the whole battery, correct? 24 A. Yep. 25 Q. Okay. So Mitsubishi is doing vacuum
Page 91 1 you process and grind up, comminute, the batteries? 2 MR. ROBERTS: Objection. Scope, 3 foundation, relevance. 4 THE WITNESS: I don't recall at the 5 moment, no, I'm not aware of that. 6 BY MR. CARLSON: 7 Q. Okay. Are you aware of prior art that 8 said you needed to remove the toxins that -- 9 particularly the LiPF6 before further processing the 10 battery? 11 MR. ROBERTS: Objection. Form. 12 THE WITNESS: At the moment, I don't 13 recall. Maybe I've seen something or read 14 something. 15 BY MR. CARLSON: 16 Q. Remember the Hayashi reference? 17 A. I would need to have a look at it. 18 Q. Okay. Did you read Mr. Dantam's 19 declaration? 20 A. I scanned it across, yes, yeah. 21 Q. Okay. So are you aware of any prior art 22 that recognized that you could inactivate shredded 23 battery material by vacuum drying alone? 24 A. There are patents existing, yes, I've 25 stated them in my declaration, which states so, yes.	Page 93 1 drying on a whole battery, right? 2 A. Yeah, battery by perforation, evaporation, 3 and nonaqueous electrolyte injected into the open 4 lithium-ion battery. That's what it says. 5 Q. Okay. 6 A. So it removes the electrolyte by opening 7 the battery, and then it's dried out under vacuum. 8 Q. Okay. But that's on a whole battery, 9 right? 10 A. That's on a whole battery, yes. 11 Q. So let me come back to my question, which 12 is: Are you aware of any prior art that recognized 13 that you could inactivate shredded battery material 14 by vacuum drying alone? 15 A. I've read this, yes, somewhere, but I 16 don't recall at the moment which it was, where was 17 it. 18 Can we have a look at Exhibit 1026? 19 Q. 1026. You may absolutely look at 1026. 20 Give me one second, please. 21 (Exhibit 1026 marked for identification.) 22 BY MR. CARLSON: 23 Q. There you go. Coming in. You'll have it 24 in a minute. Let me know when you've got that 25 document up.

Page 94 1 A. I've got the document, yes. 2 Q. Look at Figure 1. 3 A. I am looking there. 4 Q. Okay. Do you see near the top, it's entry 5 S232? 6 A. S232? 7 Q. Yeah, it says -- you see it says "Cut 8 Battery Container"? 9 A. Uh-huh. 10 Q. And then it says -- there's an arrow that 11 says "Battery Case Battery Lid"? 12 A. Where is that? "Battery Case Battery 13 Lid," yeah. 14 Q. It says "S233." Do you see that? 15 A. Uh-huh, yeah. 16 Q. Would you refer to the removal of the 17 battery case and the battery lid to be comminuting? 18 A. Not necessarily. It can also be done 19 manually. 20 Q. What's that? 21 A. Also manual operations sometimes is used. 22 Q. Okay. But it says under "232," it says 23 "Cut Battery Container." 24 Do you see that? 25 A. Uh-huh.	Page 96 1 Q. Does anything come to mind? 2 A. Not at the moment, no. Maybe it's too 3 late already for me. 4 Q. Well, on that, let's take a break. I know 5 it's getting late out there, so let's take a short 6 break, and then we'll resume and keep moving, okay? 7 MR. ROBERTS: How much of a break do we 8 want to do? 9 MR. CARLSON: I may be done. I may be 10 done, and I want to confer with my colleague, and 11 then we can pass to Matt. 12 MR. ROBERTS: Okay. 13 THE VIDEOGRAPHER: Okay. Stand by. This 14 marks the end of Media Number 2. Going off the 15 record at 7:28 p.m. Central European. 16 (Recess.) 17 THE VIDEOGRAPHER: We are back on the 18 record at 7:38 Central European time, and this marks 19 the beginning of Media Number 2 in the deposition of 20 Volker Spies. 21 Please proceed, Counsel. 22 MR. CARLSON: Thank you, Mr. Spies. I 23 have no further questions. I'm going to pass the 24 examination to co-counsel, Matt Smith. 25 ///
Page 95 1 Q. And then it says -- below that, it says 2 "Remove Electrode Body." 3 A. Yep. 4 Q. Would you refer to that process as 5 comminution? 6 A. Cut could be comminution, but not 7 necessarily. Electrolyte removal, 224 -- 8 Q. I'm just trying to see if it says in here 9 that the batteries are comminuted. Can you point me 10 to that, please? 11 A. I don't see it at the moment. 12 Q. So you agree, this does not disclose 13 comminution? 14 MR. ROBERTS: Objection. Misstates 15 testimony. 16 THE WITNESS: I don't find it. 17 BY MR. CARLSON: 18 Q. So I'm going to come back to my earlier 19 question, which is: Are you aware of any prior art 20 that recognized that you could inactivate shredded 21 battery material by vacuum drying alone? 22 A. At the moment, I can't mention it, that 23 one. 24 Q. Did any come to mind? 25 A. Sorry?	Page 97 1 THE WITNESS: Okay, thank you. 2 3 EXAMINATION 4 BY MR. SMITH: 5 Q. Thank you, Mr. Spies. 6 I'm Matt Smith. I have a few questions 7 for you that will, hopefully, be easier than 8 Mr. Carlson's questions, but I think thank you for 9 pushing through tonight. 10 First of all, do you have any documents 11 with you in that room that you're using today? 12 A. Yes, I have a copy of the patent here and 13 a printout of my declarations. 14 Q. Okay. And there's nobody in the room with 15 you, correct? 16 A. No, I'm alone over here. 17 Q. And are you in communication with anyone 18 electronically during your testimony? 19 A. No, no. That was a no. 20 Q. Have you communicated with anyone about 21 your testimony today -- I mean, in a way that 22 wouldn't be apparent to everybody on this call? 23 A. No, no. 24 Q. Okay. Sir, what is the relevant timeframe 25 for determining obviousness of the claims of the

25 (Pages 94 - 97)

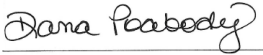
Page 98 1 '097 patent? 2 MR. ROBERTS: Objection. Scope. This is 3 one of those issues from his original declarations. 4 His original declaration, sorry. 5 BY MR. SMITH: 6 Q. You can answer. 7 A. I did not understand the question, I have 8 to confess. This was too fast for me. 9 Q. Okay. What is the relevant timeframe for 10 determining obviousness of claims of the '097 11 patent? 12 MR. ROBERTS: Same objection. 13 THE WITNESS: The timeframe is prior to, 14 let's say, getting this document public, prior to 15 2015. 16 BY MR. SMITH: 17 Q. Okay. And just so I'm not repeating the 18 timeframe with every question, can we refer to that 19 as "the relevant timeframe," and you'll know what I 20 mean? 21 A. Yeah, yes. 22 Q. Okay. And do you know how many 23 declarations you've submitted in this matter? 24 A. Three. 25 Q. Okay. I'm going to ask you some questions	Page 100 1 of drying" is the amount of solvent removed 2 essentially. 3 So when designing -- when designing a 4 drying process in the relevant timeframe, would the 5 extent of drying be an important consideration? 6 A. Absolutely, yes, the amount of electrolyte 7 to be evaporated is essential, sure. 8 Q. And when designing a drying process in the 9 relevant timeframe, would the energy consumption be 10 an important consideration? 11 A. Energy consumption as well, yes. 12 Q. When designing a drying process in the 13 relevant timeframe, would the maintenance 14 requirements of the dryer and related systems be an 15 important consideration? 16 A. That's also one important factor, yes. 17 Q. When designing a drying process in the 18 relevant timeframe, would environmental impact be an 19 important consideration? 20 A. Of course, yes. 21 Q. When designing a drying process in the 22 relevant timeframe, would the ability to recover the 23 electrolyte be an important consideration? 24 A. Yes. 25 Q. And we talked a lot about safety and
Page 99 1 about designing a drying process for lithium battery 2 recycling, okay? 3 A. Uh-huh. 4 Q. And one of the things I want to ask you is 5 what is important to be considered when you're 6 drying or -- you're designing one of these drying 7 processes, okay? 8 So when designing a drying process in the 9 relevant timeframe, would the process throughput be 10 an important consideration for the drying? 11 A. Yes, throughput is one of the key 12 components you need to know. 13 Q. Okay. And what is process throughput? 14 A. Process throughput can either be the 15 amount of material per hour put into the system. 16 Sometimes it's also defined as the throughput of, 17 let's say, target product you would like to achieve, 18 and then you have to count backwards. 19 Q. A drying process in the relevant 20 timeframe, would the extent of drying be an 21 important consideration? 22 A. You mean the time of drying? That's what 23 you mean, drying time or -- 24 Q. Well, I'll ask the question again, but 25 I'll just define the term. What I mean by "extent	Page 101 1 hazards during Mr. Carlson's questioning, and I 2 don't want to rehash that rather extensive 3 discussion, but I do want to make sure it applies 4 here as well. 5 When designing a drying process for 6 battery recycling in the relevant timeframe, safety 7 would be an important consideration, correct? 8 A. Yes. 9 Q. And is it fair to say that the safety 10 considerations include the potential flammability of 11 the solvent, the toxicity of the solvent, and 12 potential hydrogen fluoride formation? 13 A. Yes. 14 Q. Now, I want to discuss the rate of drying. 15 By that I just mean how quickly the battery material 16 can be dried. 17 Does the type of solvent being dried 18 affect the rate of drying? 19 A. The type of solvent, yes, sure, of course, 20 it does. 21 Q. And why is that, sir? 22 A. Because the type of solvent goes in line 23 with the vapor pressure of the solvent, and that is 24 relevant. There's not only one electrolyte, there 25 are thousands, so it's relevant, yes.

Page 102 1 Q. You say there are thousands of 2 electrolytes. By that do you mean thousands of 3 potential solvent components in the electrolyte or 4 something else? 5 A. The composition of the electrolyte in a 6 battery is the best-kept secret. And only the 7 producers of the battery know the exact composition. 8 Q. Okay. 9 A. So even with batteries of the same 10 construction type, the composition of the 11 electrolyte might vary. 12 Q. So it's complicated. 13 A. It's really complicated, yes. 14 Q. Okay. Are there typical solvent 15 components that are usually seen across different 16 electrolytes? 17 A. Yes, you see a lot of those carbonates are 18 being evaporated, yes. And what you also see is 19 components -- a different type of carbonates. And 20 what you see normally is conductive salt as being 21 part of the electrolyte. It's a mix of 22 fluorophosphate, for example. 23 Q. During the drying process, as solvent is 24 evaporated, does it become more difficult to 25 evaporate more solvent, all other things being	Page 104 1 the amount of solvent in the gas atmosphere of the 2 dryer affect the rate of drying? 3 A. The rate of drying you mean? 4 Q. Yes. 5 A. The drying is faster in the beginning, 6 yes. Then you remove the vapor by condensation from 7 the gas stream, and in the end, the high boiling 8 components are in the gas stream, so there is an 9 influence from that, yes. 10 Q. Is that because the partial pressure of 11 the solvent in the gas atmosphere is higher, making 12 it more difficult for the liquid component to 13 evaporate? 14 A. It has -- it's a question of the -- the 15 vapor pressure of this individual component, and if 16 the boiling temperature is higher, then it's more 17 difficult to evaporate. 18 Q. Okay. If the -- if there is a component, 19 a solvent component, in an electrolyte, and it 20 begins to evaporate, essentially filling the drying 21 chamber, does that mean the rate of evaporation will 22 go down, all other things being equal? 23 A. Can you please repeat the question? I 24 didn't get -- 25 Q. Yeah, I can say it in a slightly different
Page 103 1 equal? 2 A. With the -- I mean, what is in the first 3 step, let's say, the low-boiling components will be 4 evaporated. And the longer it takes, the higher the 5 evaporation temperature of the, let's say, more 6 difficult evaporating components will become 7 effective. 8 Q. That makes sense. 9 There's another aspect of this I wanted to 10 ask you about, though. 11 For a single solvent, as the concentration 12 of that solvent goes down in the electrolyte 13 mixture, does it become more difficult to evaporate? 14 A. Might be, yes, because there are 15 components which forms so-called azeotropes, and the 16 components of the electrolyte might influence each 17 other. 18 Q. Do components of the electrolyte have some 19 parts that are easier to evaporate and some parts 20 that are more difficult to evaporate because of 21 where they are in the material being dried? 22 A. It's not -- it's not the question where 23 they are in the material, it's more the type of -- 24 type of components which needs to be evaporated. 25 Q. When a drying process is going on, does	Page 105 1 way too. 2 Does the rate of the transformation of a 3 solvent from the liquid phase to the gas phase 4 depend on how much of the solvent is already in the 5 gas phase? 6 A. I mean, what you do by evaporation, you 7 always take care that the atmosphere above the 8 solids -- or solid liquid is always undersaturated, 9 and you constantly take out vapor from the gas 10 stream, so -- and that is why it's always 11 undersaturated. If you have, let's say, simple 12 boiling or easily boiling solvent, then it 13 evaporates, and you -- 14 Q. What would happen in a closed system if 15 it's saturated? 16 A. Pressure would rise. You heat the thing 17 over a boiling temperature, and then your pressure 18 in your system should go up, and this is something 19 you should -- which should not happen in a vacuum 20 dryer. It's not good. 21 Q. Does the surface area of the material 22 being dried affect the rate of drying? 23 A. The surface area of the -- yes, it does. 24 Q. If the shredding happens before drying, 25 does the nature of the shredding operation have an

Page 106 1 effect on the rate of drying? 2 A. The shredding, yes, the way how shredding 3 is done has an effect, yes. 4 Q. And why is that? 5 A. If particles are to cause the excess to -- 6 to the particles is more difficult, and then the 7 rate of drying is longer -- or smaller, drying time 8 is longer, is longer. 9 Q. Okay. This is a simple question, but I 10 have to ask. Does the temperature affect the rate 11 of drying? 12 A. Sure. 13 Q. And in what way? 14 A. It does. 15 Q. Does the temperature affect the rate of 16 drying? 17 A. Normally if the temperature difference 18 between your heating media and your drying area is 19 larger, then the rate of evaporation is higher. The 20 Delta T between product and heating, if it's larger, 21 the rate of drying is higher. 22 Q. And by "Delta T," do you mean between the 23 boiling point of the solvent and the temperature of 24 the drying or -- 25 A. No, Delta T means product temperature	Page 108 1 difference is one part of it. Evaporation enthalpy 2 is necessary to evaporate. So there are quite a 3 number of factors which are necessary to determine 4 the rate of evaporation. 5 So it's always a balancing, always a 6 balancing between, let's say, the evaporation 7 pressure, temperature, and drying time. 8 Q. And the evaporation enthalpy depends on 9 the particular substance being evaporated, correct? 10 A. Yes, it's a material characteristic. 11 Q. And you also said that there may be 12 interactions between the different solvent 13 components that affect the drying time? 14 A. Yes. 15 Q. And they affect the -- sorry. There may 16 be interactions between different solvent components 17 that affect the relationship of temperature to 18 drying time? 19 A. This can also happen, yes, yes. 20 Q. Does the temperature affect the safety of 21 the drying process? 22 A. The temperature. It might affect the 23 safety of a drying process. For example, if you -- 24 if there's a certain -- it's a maximum temperature, 25 maximum permissible temperature, where, for example,
Page 107 1 versus heating temperature, I would say, in a vacuum 2 dryer, the inner temper -- the temperature of the 3 inner surface. 4 Q. Okay. Do you have an idea how the 5 temperature of the material relates to the speed of 6 the drying? 7 A. There is a relation because there's a 8 certain amount of heat necessary to convert from 9 liquid to solid, and it's called enthalpy, 10 evaporation enthalpy, and you have to bring this 11 into the product, and this enthalpy also is related 12 to your product temperature. 13 Q. Is there any rule of thumb, for example, 14 you increase the temperature by 10 degrees Celsius, 15 and the rate of drying doubles? 16 A. No, if it would be that easy, then it 17 would be fine. Our job would be much more easy. 18 Q. And what -- 19 A. Unfortunately, it's not like that. 20 Q. What makes it not that easy? 21 A. There are many more factors you have to 22 see. It's also the rate of, let's say, movement of 23 the material. This defines the heat transfer 24 coefficient, or it has an influence on the heat 25 transfer coefficient. Yeah, a temperature	Page 109 1 some decomposition reaction take place. Then it's 2 affecting the drying -- the temperature is affecting 3 the drying procedure. 4 Q. Are you speaking specifically about the 5 decomposition of lithium salt? 6 A. No, that's only one example. There are 7 other applications where this takes place as well. 8 I mean, if you take, for example, some drying -- 9 let's take the example of pharmaceutical industry. 10 If you are drying some active pharmaceutical 11 ingredients, they might decompose typically above 60 12 degree, so, and then you have to keep your 13 temperature low. 14 It's not only -- it's not only -- this 15 lithium hexafluorophosphate. That's only one 16 example, but it happens regularly. There's nothing 17 special. 18 Q. In the context of lithium battery 19 recycling, were there other decomposition reactions 20 that you might be worried about when designing a 21 drying process? 22 A. I mean, the major component that is known 23 is the lithium hexafluorophosphate. Nowadays, 24 other, let's say, components pop up where you don't 25 exactly know what they are, so the major -- the

Page 110 1 major one, but it can be -- there can be different 2 components as well. 3 Q. You said "nowadays." Was that also true 4 in the relevant timeframe? 5 A. At the relevant timeframe, I don't know. 6 I don't know. 7 Q. Okay. 8 A. It's more to the present state where 9 develop -- where batteries are developing further. 10 In the relevant timeframe, I don't know. 11 Q. In the drying process, how are the 12 elevated temperatures achieved? 13 A. Basically there are four different ways 14 how to achieve the elevated temperature. One 15 possibility is hot water, oil, steam, or electric, 16 electric heating. These are, I would say the major. 17 There are some others -- other possibilities, but 18 these are the major ones which are used. 19 Q. There are, I think you said, thousands of 20 different dryers? 21 A. Thousands of dryers. A large number of 22 dryers. 23 Q. A large number of dryers. Okay. 24 And I wanted to check with you, is it true 25 that in the relevant timeframe, there would have	Page 112 1 A. Exactly. 2 Q. And at lower pressure, is it also harder 3 for the solvent to condense back into the liquid 4 phase? 5 A. This is more a question of the heat 6 exchanger afterwards. And yeah, let's say, the 7 inlet temperature of the cooling media of the -- of 8 the heat exchanger. So if there is a difference 9 between the vapor temperature and the cooling media, 10 then it's fine. 11 Q. Does the level of drying that one wants to 12 achieve affect the speed of the drying process? 13 A. I think -- are you referring to the batch 14 time or -- what's the background of the question? 15 Because -- 16 Q. You said "because." Did you have a -- 17 A. No, no, is that what you mean? 18 Q. Not necessarily. 19 A. I did not completely understand your 20 question. 21 Q. My question was, in fact, ambiguous. 22 So the first question is: Does the level 23 of drying that you want to achieve affect the 24 instantaneous rate of the drying process? 25 A. No.
Page 111 1 been a large number of dryers that could have been 2 used for lithium battery recycling drying? 3 A. Yes. 4 Q. Okay. That makes my next question more 5 difficult. How is heat generally transferred from 6 the four sources of heat that you mentioned to the 7 material? 8 A. Regardless which media you take, the 9 principle is always the same. You have three -- 10 let's say, three factors which influence that. 11 There is heat transfer from the heating media to the 12 wall of the dryer, then you have heat conduction 13 through the wall, and then you have heat transfer 14 from the inner wall to the product, and regardless 15 which type of heating media you use, this principle 16 is always the same. Has always been like that. 17 Q. Okay. Does the pressure of the drying 18 atmosphere affect the rate of drying? 19 A. Yes. 20 Q. And why is that, sir? 21 A. In vacuum drying, the lower the pressure 22 is, the easier you are able to dry, remove solvents 23 from your -- from your media to dry. 24 Q. So, at lower pressures, it's generally 25 easier for solvents to evaporate?	Page 113 1 Q. Okay. 2 A. No. 3 Q. And does the level of drying you want to 4 achieve affect the overall time of the drying 5 process? 6 A. That's the case, yes. 7 Q. We talked about a lot of factors that 8 influence the rate of drying for solvents. Do those 9 factors also apply to the evaporation of water as 10 well? 11 A. Evaporation of water is the same, yes. 12 Q. In your opinion, would a drying operation 13 performed at 80 degrees Celsius or lower produce 14 almost no hydrogen fluoride? 15 A. Especially I think you're referring to 16 lithium-ion batteries? 17 Q. Yes, correct. 18 A. Because, otherwise -- it will certainly 19 reduce the risk of HF formation, yes. I mean, it 20 will not be zero because also there's a temperature 21 range of the decomposition, but the -- the effect 22 would be certainly lower, yes. 23 Q. Do you know what the temperature range is 24 for the decomposition? 25 A. Decomposition of lithium

Page 114 1 hexafluorophosphate starts typically at a hundred 2 degrees. 3 Q. And do you know which chemical reactions 4 in -- during the drying of lithium batteries produce 5 hydrogen fluoride? 6 A. Yes, this decomposition reaction. 7 Q. Do you generally know what that reaction 8 is? 9 A. Yes, I know. 10 Q. Do you know the reactants and the reaction 11 products? 12 A. There's -- yes, yes. 13 Q. And what are they, sir? 14 A. That's the lithium hexafluorophosphate. 15 This might decompose -- 16 (Reporter clarification.) 17 BY MR. SMITH: 18 Q. Slow, slow, for all of us. 19 A. Okay. One equation could be that lithium 20 hexafluorophosphate decomposes releasing tetrafluoro 21 phosphate and HF, for example. Or if there's a 22 little -- little amount of water present, then also 23 it decomposes into HF. 24 Q. And just for the court reporter, you began 25 that with "lithium hexafluorophosphate," correct?	Page 116 1 avoid HF formation in such a system. 2 Q. Does the breakdown of lithium 3 hexafluorophosphate with water -- is that called 4 hydrolysis? 5 A. That's a kind of hydrolysis, yeah. 6 Hydrolysis means that it's separated, separated 7 under water atmosphere, yes. 8 Q. Is phospho pentafluoride an intermediate 9 product of that reaction? 10 A. It's one -- it's one product out of this 11 decomposition, yes. 12 Q. And is phosphorus pentafluoride, PF5, 13 volatile? 14 A. PF4, PF4. 15 It's -- it can -- it's gas type, yes. 16 Q. Does the speed of the hydrolysis reaction 17 depend on the amount of water present? 18 A. Yes, if there's more water present, it's 19 easier for the molecules of the lithium 20 hexafluorophosphate to find a partner and decompose. 21 Q. And in the hydrolysis of lithium 22 hexafluorophosphate, where does the water come from 23 in a typical battery recycling process? 24 A. The water comes from, I would say, 25 impurities from sources you don't want to have them.
Page 115 1 A. Hexafluorophosphate, yes, LiPF6. That's 2 the chemical formula. 3 Q. Is the decomposition of lithium 4 hexafluorophosphate a reaction that occurs in liquid 5 phase? 6 A. Yes, certainly, the decomposition is 7 facilitated by water presence. 8 Q. Are the reaction products volatile? 9 A. They are, yes. HF is transferred into the 10 gas phase. It's a gas, for example. 11 Q. And, so, in a vacuum apparatus, that would 12 presumably be removed from the driving atmosphere, 13 correct? 14 A. That's the pity. It's not condensed. 15 Because it passes, it passes the installation, and 16 you have to remove it by other means later on. So, 17 normally, after the vacuum installation, you need -- 18 you need a scrubber to remove it. 19 Q. And can you explain why that is? 20 A. Because HF is not condensable so easily. 21 It's a very volatile or very easy-to-flow material. 22 It's not -- yeah. And it goes through the complete 23 vacuum installation you need for a vacuum drying, 24 and, therefore, you need a special gas cleaning 25 afterwards in order to remove the HF. So better	Page 117 1 Might even be that it's the humidity. If there's 2 some -- let's say, a little bit of remaining air 3 somewhere in the system, sometimes the batteries are 4 not completely dry once they're comminuted. So 5 these are potential sources of water in the system. 6 Q. And can there be water absorbed into the 7 battery materials themselves? 8 A. Not that I know. Every battery producer 9 avoids water like hell. And that's why, let's say, 10 the boundary conditions for water in the components 11 of a battery are zero. They don't want to have it. 12 Water is poison to the battery. 13 Q. So if water is in the battery material, is 14 it fair to say that it would come after opening the 15 battery or after comminution? 16 A. If it's -- sure, if it's inside the 17 battery, it will be released, or set free, after 18 comminution. 19 Q. Does water enter the battery during 20 comminution? 21 A. Difficult to say. There are different 22 technologies. Some through comminution under water 23 presence, so wet comminution. Then, of course, they 24 are in touch with water. 25 But comminution -- dry comminution, there,

Page 118 1 you try to avoid water as quick as you can, so. 2 Q. You said a few moments ago that if there's 3 more water, the rate of the hydrolysis reaction 4 would be faster, I think. 5 Does that apply generally, that the rate 6 of a reaction depends on the concentration of the 7 reactants? 8 MR. SMITH: I think we may have lost 9 Mr. Spies. 10 THE VIDEOGRAPHER: Give me one second. 11 Maybe the Zoom will -- 12 MR. ROBERTS: I've heard of some people 13 freezing under pressure, but jeez. He's retired for 14 the evening. 15 THE VIDEOGRAPHER: He's still there. 16 Maybe the video will catch up. Just one second. 17 We'll go off the record in five seconds if not. One 18 second. 19 Mr. Spies, can you hear me? 20 Okay. We're going to go off the record. 21 Stand by. 22 This marks the end of Media Number 4 -- 23 excuse me -- Media Number 3. Going off the record 24 at 8:11 p.m. Central European. 25 (Recess.)	Page 120 1 and they have a due date which will be extended to 2 the 23rd. 3 THE WITNESS: Okay. Okay. So Monday, 4 16th just that I don't miss anything. 5 MR. ROBERTS: Yes. Thank you. 6 MR. CARLSON: While we're still on the 7 record, how are we going to get a stipulation on 8 file? Jonathan, will you do the honors on that? 9 MR. ROBERTS: Okay, fine. I'll do it if 10 you want. Typically it would be your guy's 11 extension, so you'd do it, but, like I said, I'll 12 handle it for you. 13 MR. CARLSON: Thank you very much. Thank 14 you very much. Appreciate it. 15 THE VIDEOGRAPHER: Okay. Thank you. 16 Is there anything else from the court 17 reporter only or counsel before I conclude the 18 record today? 19 This concludes today's deposition of 20 Volker Spies, Volume 1. Total number of media used 21 is four, going off the record at 8:32 p.m. Central 22 European Summertime. 23 (At 8:32 p.m., the deposition was 24 concluded.) 25
Page 119 1 THE VIDEOGRAPHER: We are back on the 2 record at 8:30 p.m. Central European standard time, 3 and this marks the beginning of Media Number 4, the 4 deposition of Volker Spies. 5 Please proceed, counsel. 6 MR. SMITH: Thank you. 7 The parties have agreed that due to the 8 late hour, cross-examination will resume on Monday 9 morning at 7:30 Pacific time, 10:30 Eastern Time in 10 the U.S., and that the relevant due dates for the 11 patent owner's surreply and the patent owner's reply 12 to the opposition to the motion to amend will be 13 extended until Monday by stipulation. 14 Is that correct, Jonathan? 15 MR. ROBERTS: Yes, and -- 16 MR. SMITH: Sorry, Monday, the 23rd. 17 MR. ROBERTS: That's right. 18 MR. SMITH: Correct. Okay. 19 MR. ROBERTS: Right. And apologies for 20 the technical difficulties, and thank you all for 21 the globally odd start times. 22 MR. SMITH: Yes, thank you. 23 THE WITNESS: Did I hear Monday, 23? I 24 think it's next Monday. 25 MR. ROBERTS: So we'll resume on the 16th,	Page 121 1 2 CERTIFICATE 3 I, Dana Peabody, a California Certified 4 Shorthand Reporter, do hereby certify: 5 That prior to being examined, the witness in 6 the foregoing proceedings was by me duly sworn to 7 testify to the truth, the whole truth, and nothing but 8 the truth; 9 That said proceedings were taken before me at 10 the time and place therein set forth and were taken 11 down by me in shorthand and thereafter transcribed into 12 typewriting under my direction and supervision; 13 I further certify that I am neither counsel 14 for, nor related to, any party to said proceedings, nor 15 in any way interested in the outcome thereof. 16 17 In witness whereof, I have hereunto 18 subscribed my name at Yuma, Arizona, this 14th day of 19 June, 2025. 20 21  22 Dana Peabody 23 CSR No. 6332 24 25

Page 122 1 Veritext Legal Solutions 2 1100 Superior Ave 3 Suite 1820 4 Cleveland, Ohio 44114 5 Phone: 216-523-1313 6 7 June 15, 2025 8 9 To: Jonathan Roberts, Esq. 10 11 Case Name: URT Umwelt Und Recyclingtechnik Gmbh v. Duesenfeld GmbH 12 13 Veritext Reference Number: 7408338 14 15 Witness: Volker Spies Deposition Date: 6/13/2025 16 17 Dear Sir/Madam: 18 19 Enclosed please find a deposition transcript. Please have the witness 20 review the transcript and note any changes or corrections on the 21 included errata sheet, indicating the page, line number, change, and 22 the reason for the change. Have the witness' signature notarized and 23 forward the completed page(s) back to us at the Production address 24 shown 25 above, or email to production-midwest@veritext.com. If the errata is not returned within thirty days of your receipt of this letter, the reading and signing will be deemed waived. Sincerely, Production Department NO NOTARY REQUIRED IN CA	Page 124 1 DEPOSITION REVIEW 2 CERTIFICATION OF WITNESS 3 4 ASSIGNMENT REFERENCE NO: 7408338 5 CASE NAME: URT Umwelt Und Recyclingtechnik Gmbh v. Duesenfeld 6 GmbH 7 DATE OF DEPOSITION: 6/13/2025 8 WITNESS' NAME: Volker Spies 9 In accordance with the Rules of Civil 10 Procedure, I have read the entire transcript of 11 my testimony or it has been read to me. 12 I have listed my changes on the attached 13 Errata Sheet, listing page and line numbers as 14 well as the reason(s) for the change(s). 15 I request that these changes be entered 16 as part of the record of my testimony. 17 18 I have executed the Errata Sheet, as well 19 as this Certificate, and request and authorize 20 that both be appended to the transcript of my 21 testimony and be incorporated therein. 22 23 Date _____ Volker Spies 24 25 Sworn to and subscribed before me, a Notary Public in and for the State and County, the referenced witness did personally appear and acknowledge that: They have read the transcript; They have listed all of their corrections in the appended Errata Sheet; They signed the foregoing Sworn Statement; and Their execution of this Statement is of their free act and deed. I have affixed my name and official seal this _____ day of _____, 20____. _____ Notary Public _____ Commission Expiration Date
Page 123 1 DEPOSITION REVIEW 2 CERTIFICATION OF WITNESS 3 4 ASSIGNMENT REFERENCE NO: 7408338 5 CASE NAME: URT Umwelt Und Recyclingtechnik Gmbh v. Duesenfeld 6 GmbH 7 DATE OF DEPOSITION: 6/13/2025 8 WITNESS' NAME: Volker Spies 9 In accordance with the Rules of Civil 10 Procedure, I have read the entire transcript of 11 my testimony or it has been read to me. 12 I have made no changes to the testimony 13 as transcribed by the court reporter. 14 15 Date _____ Volker Spies 16 Sworn to and subscribed before me, a 17 Notary Public in and for the State and County, 18 the referenced witness did personally appear 19 and acknowledge that: 20 21 They have read the transcript; 22 They signed the foregoing Sworn 23 Statement; and 24 Their execution of this Statement is of 25 their free act and deed. I have affixed my name and official seal this _____ day of _____, 20____. _____ Notary Public _____ Commission Expiration Date	Page 125 1 ERRATA SHEET 2 VERITEXT LEGAL SOLUTIONS MIDWEST 3 ASSIGNMENT NO: 7408338 4 PAGE/LINE(S) / CHANGE /REASON 5 _____ 6 _____ 7 _____ 8 _____ 9 _____ 10 _____ 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ 16 _____ 17 _____ 18 _____ 19 _____ 20 _____ 21 Date _____ Volker Spies 22 SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ 23 DAY OF _____, 20____. 24 _____ 25 Notary Public _____ Commission Expiration Date

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Minnesota Rules of Civil Procedure

Part V. Depositions and Discovery

Rule 30

Rule 30.05 Review by Witness; Changes; Signing

If requested by the deponent or a party before completion of the deposition, the deponent shall have 30 days after being notified by the officer that the transcript or recording is available in which to review the transcript or recording and, if there are changes in form or substance, to sign a statement reciting such changes and the reasons given by the deponent for making them. The officer shall indicate in the certificate prescribed by Rule 30.06(1) whether any review was requested and, if so, shall append any changes made by the deponent during the period allowed.

DISCLAIMER: THE FOREGOING CIVIL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE STATE RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted

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