

UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION



In the Matter of)
)
ECM BioFilms, Inc.,)
a corporation, also d/b/a)
Envioplastics International)
_____)

Docket No. 9358

ORIGINAL

PUBLIC DOCUMENT

**COMPLAINT COUNSEL’S OPPOSITION
TO RESPONDENT’S MOTION FOR LEAVE TO SERVE
SUBPOENA DUCES TECUM ON DR. STEPHEN MCCARTHY**

Complaint Counsel respectfully opposes Respondent’s Motion for Leave to Serve Subpoena *Duces Tecum* on Dr. Stephen McCarthy (the “Motion”) because Respondent’s Motion fails to establish cause for additional document discovery beyond that already voluntarily provided. ECM’s 21 Specifications are not narrowly drawn to produce information that would show bias. Instead, these redundant, unfounded, and overly-broad requests serve to harass the witness.

FACTUAL BACKGROUND

On June 4, 2014, Dr. McCarthy produced his expert report, along with over 150 documents that formed the basis of his opinions in this case. On June 27, ECM elicited approximately six hours of deposition testimony further exploring Dr. McCarthy’s basis of opinions and possible biases. Shortly after the conclusion of the deposition, Complaint Counsel provided additional documents identified and discussed during the course of the deposition, including UMass’ policy concerning commercialized intellectually property; two patents concerning biodegradable polymers that were licensed by UMass; and a copy of the standard assignment agreement. CCX-A, Email from K. Johnson to respondent’s counsel dated July 7, 2014.

Despite this discovery, including Dr. McCarthy's deposition testimony that:

- he had no contact with Steve Mojo of BPI at least in the past year;¹
- he had done no consulting work for BPI for at least two years;²
- he has no other contact with BPI members;³
- he has no knowledge that either BPI⁴ or Metabolix⁵ had any contact with the FTC;
- his earnings related to BPI and Metabolix are limited;⁶
- over 20 years, Metabolix has only funded about \$1.7 million in research at UMass;⁷
- he has no knowledge of the specific products made by Metabolix under the licensed patent, he has never seen a finished product, nor any marketing;⁸
- he had seen no document prior to this case related to ECM;⁹
- he receives no personal financial remuneration from project funding accounts where he is principal investigator;¹⁰ and
- he does not have the written assignment agreements regarding the patents—the university has them;¹¹

¹ CCX-B, McCarthy Dep. Transcript (June 27, 2014), at 96:16-17.

² *Id.* at 97:23-25.

³ *Id.* at 96:18.

⁴ *Id.* at 100.

⁵ *Id.* at 67-68.

⁶ Dr. McCarthy testified that the only income he presently earns from biodegradable plastics is through the Metabolix patent, for which he has only earned approximately \$28,000 in 12 years, *id.* at 60:13. Moreover, he testified that his income through his certification work at BPI was only about \$30,000 over 10 years, *id.* at 97:14-20, not the \$40,000 claimed by ECM in its filings. He also identified another approximately \$5,000 as an expert witness for Metabolix in two patent infringement cases (in 2002 and 2005), *id.* at 62.

⁷ *Id.* at 66.

⁸ *Id.* at 66.

⁹ *Id.* at 66:18-24.

¹⁰ *Id.* at 54. Dr. McCarthy also explained that, until this year, the research funding he brings into UMass had no bearing on his ability to get an increase in pay. *Id.* at 55:7-12. And, now, at most, he could obtain a ½% increase in his salary for merit. *Id.* 55:13-22.

¹¹ *Id.* at 58:17-20.

ECM still argues that there must be some documents left uncovered that support its bias theory. The additional document requests are completely untethered from the discovery obtained during the deposition or the course of the case.¹² Without any foundation for additional discovery, there is no cause to warrant Dr. McCarthy scouring his files for additional documents.

LEGAL STANDARD

Respondent is not *entitled* to the additional discovery it requests. Instead, the expert discovery procedures set forth in Rule 3.31A, confirmed in this Court’s Order, require Respondent to apply to the Court and *show cause* to expand expert discovery beyond the report and deposition. 16 C.F.R. § 3.31A; Order Denying Without Prejudice Respondent’s Motion for Leave to Serve Subpoenas *Duces Tecum* (June 10, 2014), at 3. Rule 3.31A— like its Federal analogue, Fed. R. Civ. P. 26(b)(4)—makes clear that litigants’ primary tools for expert discovery must be the expert report and deposition. These limitations are in place to strike a “balance between sufficient expert disclosures and unfettered expert discovery . . . [and] were adopted to limit the undue burden and cost of expert discovery.” *Morriss v. BNSF Ry. Co.*, No. 8:13CV24, 2014 U.S. Dist. LEXIS 3757, at *17 (D. Neb. Jan. 13, 2014) (denying certain requests to expand expert discovery beyond that permitted in Rule 26 because defendant failed to show a “compelling reason” for its requests). To justify use of extraordinary expert discovery, therefore, Respondent must show that it lacks information “relevant to the allegations of the complaint, to the proposed relief, or to the defenses” that it could not or did not obtain through the expert report and deposition. *See In the Matter of Basic Research, LLC, et al.*, No. 9318, Order on

¹² During this case, ECM has also issued broad subpoenas to BPI, Dr. Narayan, and Dr. Michel, and yet has not identified a single document demonstrating that Dr. McCarthy had any connection with these entities beyond what it has identified so far.

Complaint Counsel's Second Motion for Protective Order (Dec. 9, 2004), at 4. In this case, Respondent has not made the requisite showing.

ARGUMENT

I. Respondent Has Not Shown Cause for Additional Discovery.

Respondent requests leave to serve a 21-Specification subpoena *duces tecum* on Dr. McCarthy to "assess the full extent of Dr. McCarthy's bias." Motion, at 10. While ECM tries to paint these requests as narrowly tailored, they are not. This additional document discovery lacks cause for three reasons: (1) Complaint Counsel has voluntarily produced responsive documents to many of the specifications already, making those requests redundant; (2) Dr. McCarthy specifically testified he does not have several categories of documents sought in their proposed subpoena; and (3) ECM already has all of the arguably relevant evidence it seeks for the remaining specifications.

a. Responsive Documents Have Already Been Produced

Several of the Specifications in the proposed subpoena call for information and documents that have been in ECM's possession for months. For example, Specification 2 calls for "All documents, materials, correspondence, forms, marketing material, and testing used or reference to form any and all opinions you may offer in this case." Motion, Ex. RX-I, at 3. Similarly, Specification 14 calls for communications with the FTC concerning biodegradable plastics. Of course, pursuant to Rule 3.31A(c), Complaint Counsel already produced a comprehensive set of documents and materials relied upon by Dr. McCarthy in forming the basis for his expert opinion in this matter, including communications with Complaint Counsel.¹⁴ 16

¹⁴ Complaint Counsel also agreed to produce additional documents responsive to Specifications (1), (7), (9), (11), and (18) when it produced its report on June 4, 2014. *See* CCX-C, Complaint Counsel's Response and Objs. to ECM Subpoena.

C.F.R. § 3.31A(c). Respondent has not argued that Complaint Counsel failed to make the required production; indeed, Respondent provides no basis or explanation for these redundant requests.

Additionally, after Dr. McCarthy's deposition, we provided additional documents in Dr. McCarthy's possession that were specifically discussed and identified during his deposition. CCX-A. ECM makes no showing or even suggests that Complaint Counsel's production was incomplete, or that Dr. McCarthy did not adequately search his records for responsive materials.

b. ECM Continues to Request Information Dr. McCarthy Does Not Have.

In addition to calling for documents already in Respondent's possession, ECM's proposed subpoena requests documents that Dr. McCarthy has repeatedly stated he does not have. For example, Specification 10 calls for "All pleadings, expert reports, documents, and correspondence related to any law suit, administrative proceeding, or arbitration in which you served as a consulting witness or expert witness concerning biodegradable polymers and plastics." Motion, Ex. RX-I, at 5. Specification 21 similarly requests, "Regardless of date, if you have ever served as an expert in any other proceeding, copies of all expert reports and testimony given by you in those proceedings." *Id.* at 7.

During Dr. McCarthy's deposition, Respondent thoroughly covered the extent to which Dr. McCarthy possessed documents related to other matters in which he served as an expert witness. CCX-B, Tr. at 7:5-15:11. Dr. McCarthy testified that counsel in all matters except for the Display Technologies matter requested that he destroy the documents in his possession. *Id.* at 14:22-15:4. In light of this testimony, Specification 21 lacks cause. Dr. McCarthy testified under oath that he has no responsive documents except for those related to Display Technologies. Asking him to go back and double-check is a waste of time and resources.

c. ECM Already Has the Evidence It Seeks

Respondent has not shown a need for the information it requests in its proposed subpoena. Indeed, Respondent spends four pages of its eleven-page Motion laying out “substantial” evidence of Dr. McCarthy’s alleged bias.¹⁶ Motion at 6-10. Nonetheless, Respondent identifies several categories of documents that it purportedly requires to complete its “bias analysis.” At least three of these categories, including “documents and correspondence between Dr. McCarthy and Metabolix, Inc.; Dr. McCarthy’s financial interests in his patents that were assigned to UMass; [and] Dr. McCarthy’s financial interests in grant or research money paid to him from ECM competitors” were thoroughly explored at Dr. McCarthy’s deposition. CCX-B, Tr. at 51:20-69:7. Despite ECM’s lengthy and detailed questioning of Dr. McCarthy, ECM does not posit that during the deposition Dr. McCarthy was elusive, or evasive; nor does it identify testimony supporting the existence of additional, responsive documents. ECM provides no basis grounded in the deposition that supports further discovery. ECM motion fails to show cause for its additional discovery requests. *See Behler v. Hanlon*, 199 F.R.D. 553, 562-563 (D. Md. 2001) (allowing additional discovery only after deposition, if it appeared expert witness had been elusive or did not make a good faith effort produce documents in his possession).

CONCLUSION

ECM’s Motion articulates no cause for the subpoena to Dr. McCarthy other than a fishing expedition to bolster its flimsy “bias” argument, and to impose time and cost burdens on Dr. McCarthy and complaint counsel on the eve of trial. Respondent has not demonstrated it

¹⁶ ECM dramatically claims that its “effort will not be complete unless and until this Court ensures that ECM’s right to document discovery is not denied through administrative action.” Motion at 10. Respondent has no such “right,” as this Court made it very clear that “issuance of subpoenas by a litigant, *sua sponte*,” is not a right afforded by Rule 3.31A. Order Denying Without Prejudice Respondent’s Motion for Leave to Serve Subpoenas *Duces Tecum* (June 10, 2014), at 3.

requires additional discovery on this point. Therefore, for the foregoing reasons, the Court should deny ECM's for Leave to Serve Subpoena *Duces Tecum* on Dr. Stephen McCarthy.

Dated: July 17, 2014

Respectfully submitted,

/s/ Katherine Johnson

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Phone: 202-326-2185; -2551; -2747; -3001

Fax: 202-326-2551

CERTIFICATE OF SERVICE

I hereby certify that on July 17, 2014, I caused a true and correct copy of the foregoing to be served as follows:

One electronic copy to the **Office of the Secretary**, and one copy through the FTC's e-filing system (although Complaint Counsel received an error message when attempting to file):

Donald S. Clark, Secretary
Federal Trade Commission
600 Pennsylvania Ave., NW, Room H-159
Washington, DC 20580
Email: secretary@ftc.gov

One electronic copy and one hard copy to the **Office of the Administrative Law Judge**:

The Honorable D. Michael Chappell
Administrative Law Judge
600 Pennsylvania Ave., NW, Room H-110
Washington, DC 20580

One electronic copy to **Counsel for the Respondent**:

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I further certify that I possess a paper copy of the signed original of the foregoing document that is available for review by the parties and the adjudicator.

Date: July 17, 2014

/s/ Katherine Johnson
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Complaint Counsel
Exhibit A
CCX-A

From: [Johnson, Katherine](#)
To: [Peter Arhangelsky \(PArhangelsky@emord.com\)](#); [Jonathan Emord \(JEmord@emord.com\)](#); [Eric Awerbuch \(EAwerbuch@emord.com\)](#)
Cc: [Cohen, Jonathan](#); [Jillson, Elisa](#); [Decastro, Arturo](#)
Subject: ECM Dkt 9358, Subpoena to Dr. McCarthy
Date: Monday, July 07, 2014 11:36:00 AM
Attachments: [US20110020227\[1\].pdf](#)
[US20080234754\[1\].pdf](#)
[Easstar Bio.mht](#)
[IntellecPropertyUML.pdf](#)
[assignment.pdf](#)

Peter:

Based on the exploration of most of the various topics that are the basis of your subpoena at Dr. McCarthy's deposition, here are the responsive documents that Dr. McCarthy has in his possession. If there were other specific requests for documents made during the deposition, please let me know. I believe it was limited to (1) biodegradable patents that had been licensed; (2) assignment agreements; and (3) the C-14 testing report for Easstar bio. Dr. McCarthy has requested the executed assignment agreements from the University, but is awaiting a response.

For many of the remaining requests in your subpoena, Dr. McCarthy reported he had no responsive information. If you believe that there is good cause for additional discovery based on the information provided in his report or his deposition, please identify the specific requests and what the basis is for the request. My understanding of the rules and the court's order is that no additional discovery will be provided without good cause.

Katherine

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Complaint Counsel
Exhibit B
CCX-B

In the Matter of:

ECM BioFilms, Inc., et al.

June 27, 2014
Stephen McCarthy, Ph.D.

Condensed Transcript with Word Index



For The Record, Inc.
(301) 870-8025 - www.ftrinc.net - (800) 921-5555

FEDERAL TRADE COMMISSION
I N D E X

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By Ms. Johnson 193

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FEDERAL TRADE COMMISSION
In the Matter of:)
ECM BioFilms, Inc.) Docket No. 9358
)

Friday, June 27, 2014
Federal Trade Commission
Constitution Center
400 7th Street, S.W.
Washington, D.C. 20024

The above-entitled matter came on for investigation hearing, pursuant to notice, at 9:00 a.m.

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APPEARANCES:
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ON BEHALF OF ECM BIOFILMS, INC.
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Clifton, Virginia 20124

1 PROCEEDINGS

2 -----

3 STEPHEN McCARTHY, Ph.D.,
4 being first duly sworn to tell the truth, the
5 whole truth, and nothing but the truth, testified
6 as follows:

7 MR. EMORD: This is before the Federal
8 Trade Commission in the matter of ECM Biofilms,
9 Inc., Public Docket 9358. This is the deposition
10 of Dr. Stephen T. McCarthy. Shall we take the
11 appearances of counsel?

12 MS. JOHNSON: Katherine Johnson for
13 complaint counsel.

14 MR. EMORD: Jonathan Emord for ECM
15 Biofilms.

16 EXAMINATION BY MR. EMORD:

17 **Q. Now, Professor McCarthy, have you ever**
18 **been deposed before?**

19 A. Yes.

20 **Q. How many times have you been deposed?**

21 A. I would say approximately ten.

22 **Q. Ten times?**

23 A. Yes.

24 **Q. Have you ever been deposed in a**
25 **proceeding involving the Federal Trade Commission?**

1 A. No.

2 **Q. You understand then probably from your**
3 **experience as a deponent that you are required to**
4 **testify truthfully, and the understanding is that**
5 **truth is not only the avoidance of a false**
6 **statement, but also ensuring that you don't omit a**
7 **material statement that is material to your**
8 **answer. Do you understand that?**

9 A. Yes.

10 **Q. Now, if at any point during this**
11 **deposition you wish to take a break, just indicate**
12 **to me and we'll do it. The only requirement that**
13 **I have for that is that if it's during the**
14 **pendency of a question, you answer the question**
15 **first before we take a break. But you should feel**
16 **free at any point in time, if you need to use the**
17 **restroom or replenish the water supply that you**
18 **have, or anything else, you can certainly do that.**

19 **Are you on any medication that could**
20 **affect your cognitive function?**

21 A. No.

22 **Q. And you have no physical disability that**
23 **might in any way affect your cognitive function?**

24 A. No.

25 **Q. So you do not have a physical disability**

1 **or mental disability that would affect your**
2 **ability to testify here today?**

3 MS. JOHNSON: Objection. Compound.

4 A. That's correct.

5 **Q. Have you ever testified as an expert**
6 **before?**

7 A. Yes.

8 **Q. And in how many proceedings have you**
9 **testified as an expert before?**

10 A. I'd say about seven.

11 **Q. In those proceedings, were you appearing**
12 **on behalf of specific corporations?**

13 A. Do you mean was I representing some
14 corporations?

15 **Q. Actually, whether counsel for one of the**
16 **parties happened to -- that called you happened to**
17 **represent a corporation?**

18 MS. JOHNSON: Objection. Vague.

19 **Q. You can answer.**

20 A. Yes.

21 **Q. We'll get into the names of those**
22 **corporations in just a second. When objections**
23 **are made in the course of a deposition, it's**
24 **routine. If an objection goes to privilege, you**
25 **may be instructed not to answer. I don't want you**

1 **to answer a question if your counsel objects on**
2 **the basis of privilege.**

3 **If she objects on other bases, under the**
4 **Federal Rules, you are required to answer, unless**
5 **she specifically instructs you otherwise, and we**
6 **might discuss that. So if she registers an**
7 **objection, you can continue to respond. Okay?**

8 A. Okay.

9 **Q. Now, can you name for me the corporations**
10 **that were parties to the case, upon whose behalf**
11 **you appeared?**

12 A. I don't remember all of them.

13 **Q. Can you tell me the ones you do remember?**

14 A. One of them was EarthShell.

15 **Q. EarthShell?**

16 A. Yes. One of them was Lifetime. One of
17 them was Hasbro. One of them was Metabolix. One
18 of them was Biotech, I believe. One of them was
19 Hasbro. One of them was National Starch. One of
20 them was Evenflo. One of them was Display
21 Technologies. I think that's all I can remember
22 right now.

23 **Q. Of the ones that you remember, which ones**
24 **are in the business of selling products that are**
25 **biodegradable?**

1 A. EarthShell, Metabolix, Biotech, National
2 Starch.
3 **Q. Now, how many times did you appear as an**
4 **expert witness for Metabolix?**
5 A. Twice.
6 **Q. Do you remember the names of those cases?**
7 A. The names of the --
8 **Q. Parties.**
9 A. Procter & Gamble.
10 **Q. In both cases, it was Procter & Gamble?**
11 A. Yes.
12 **Q. You testified as an expert there. Did**
13 **you testify as to issues related to**
14 **biodegradability?**
15 A. It was a biodegradable polymer, but the
16 matter was composition -- it was a patent
17 invalidity proceeding in Europe.
18 **Q. And what patent did that involve?**
19 A. It was a patent by Procter & Gamble.
20 **Q. Have you produced the complaint, answer,**
21 **other material related to that proceeding to**
22 **complaint counsel?**
23 A. No.
24 **Q. Do you possess any of that material?**
25 A. No.

1 **Q. So you have no written material**
2 **whatsoever related to the Procter & Gamble suits**
3 **that you just mentioned?**
4 A. No. I was asked to destroy it.
5 **Q. Do you have an expert report that you**
6 **retained from those proceedings?**
7 A. No.
8 **Q. Do you remember what you testified about**
9 **in those proceedings?**
10 A. Again, it was a claim that, my testimony
11 was that it was not novel.
12 **Q. Did you testify as an expert on the issue**
13 **of biodegradability in the EarthShell proceeding?**
14 A. That was a biodegradable polymer, and it
15 was a patent infringement case.
16 **Q. Did it involve your patent?**
17 A. No.
18 **Q. Or one of your patents? Did you testify**
19 **as to biodegradability?**
20 A. It involved a biodegradable polymer, but
21 the basis of the case was on the composition
22 matter patent infringement.
23 **Q. But did you testify as to**
24 **biodegradability in the case?**
25 MS. JOHNSON: Objection. Vague.

1 A. I don't think so.
2 **Q. You again testified as to novelty and**
3 **that sort of thing?**
4 A. Yes.
5 **Q. Do you have copies of those case**
6 **documents, complaint, answer?**
7 A. No.
8 **Q. Do you have a copy of your expert report**
9 **in that proceeding?**
10 A. No.
11 **Q. Were you asked in that proceeding as well**
12 **to destroy the documents?**
13 A. Yes.
14 **Q. Concerning the Biotech case, did that**
15 **deal with biodegradability?**
16 A. It was a biodegradable polymer.
17 **Q. Did you testify as to biodegradability in**
18 **that case?**
19 A. I don't believe so.
20 **Q. Did you produce an expert report in that**
21 **case?**
22 A. Yes.
23 **Q. Do you still possess the expert report?**
24 A. No.
25 **Q. Were you asked to destroy the report?**

1 A. Yes.
2 **Q. Do you have any documents related to the**
3 **case?**
4 A. No.
5 **Q. Were you asked to destroy those**
6 **documents?**
7 A. Yes.
8 **Q. In the National Starch case, did you**
9 **testify concerning the biodegradability of a**
10 **polymer?**
11 A. I don't believe so.
12 **Q. What did you testify about in the**
13 **National Starch case?**
14 A. In the National Starch case, it was a,
15 sort of a production damages lawsuit.
16 **Q. Do you have any of the paperwork**
17 **associated with that case?**
18 A. No.
19 **Q. And you don't have your expert report?**
20 A. No.
21 **Q. And in this case as well, you were asked**
22 **to destroy them?**
23 A. Yes.
24 **Q. Were the same lawyers representing all of**
25 **these parties?**

13

1 A. No.
 2 **Q. All different law firms?**
 3 A. The Biotech and the EarthShell were the
 4 same lawyers.
 5 **Q. Who were the lawyers who represented the**
 6 **party that you testified on behalf of in those two**
 7 **cases, EarthShell and Biotech?**
 8 A. Workman Nydegger.
 9 **Q. N-i-d-e-g-g-e-r?**
 10 A. I think there's a Y.
 11 **Q. N-Y-G?**
 12 A. N-Y-D.
 13 MS. JOHNSON: Can we go off the record
 14 for a second, so I can let my law clerk in?
 15 MR. EMORD: Sure. Off the record.
 16 (Off the record.)
 17 BY MR. EMORD:
 18 **Q. So you said that Workman Nydegger**
 19 **represented EarthShell and who else?**
 20 A. Biotech.
 21 **Q. And then for Metabolix, who represents**
 22 **them?**
 23 A. I don't recall.
 24 **Q. You don't recall?**
 25 A. I don't recall. It was someone from

14

1 England.
 2 **Q. And then with regard to National Starch?**
 3 A. It was Dan Guadalupe, I believe.
 4 **Q. Do you remember the firm?**
 5 A. I don't remember the firm. It was
 6 something Harris. It was in New Jersey.
 7 **Q. And then Evenflo, did that involve issues**
 8 **of biodegradation?**
 9 A. No.
 10 **Q. What was that about?**
 11 A. That involved a product liability case.
 12 **Q. Dealing with what kind of a product?**
 13 A. It was a child's car seat.
 14 **Q. And then the Display Technologies case,**
 15 **did that deal with biodegradable polymers?**
 16 A. No.
 17 **Q. What was that about?**
 18 A. That was about a patent infringement.
 19 **Q. What product?**
 20 A. It was a molded carrier of soda to be
 21 used for displaying in convenience stores.
 22 **Q. In any of these cases that we've**
 23 **discussed, EarthShell, Lifetime, Hasbro,**
 24 **Metabolix, Biotech, National Starch, Evenflo and**
 25 **Display Technologies, do you possess the expert**

15

1 **reports that you produced in those proceedings?**
 2 A. For Display Technologies.
 3 **Q. That's the only one?**
 4 A. That is the only one.
 5 **Q. In all other instances, were you asked by**
 6 **counsel to destroy the documents?**
 7 A. Yes.
 8 **Q. Including all of the case documents**
 9 **related to the complaint, the answer, and any**
 10 **other documents in the proceeding?**
 11 A. Except for the Display Technologies.
 12 **Q. Let's take a look at your CV and your**
 13 **expert report. Your CV is attached to your expert**
 14 **report. We're going to mark it for identification**
 15 **as Respondent's Exhibit 1, and I'll give you a**
 16 **copy.**
 17 (Whereupon, Respondent's Deposition
 18 Exhibit No. 1, expert report and attached CV,
 19 marked.)
 20 BY MR. EMORD:
 21 **Q. Keep it next to you, because we'll be**
 22 **referring to it throughout the deposition. Now,**
 23 **you're a professor of plastics engineering at the**
 24 **University of Massachusetts Lowell, correct?**
 25 A. Yes.

16

1 **Q. And you're a tenured professor, right?**
 2 A. Yes.
 3 **Q. When did you become tenured?**
 4 A. I believe it was 1987 or '88.
 5 **Q. Are you a biochemist?**
 6 A. No.
 7 **Q. Are you a polymer material chemist?**
 8 A. I have training in polymer chemistry.
 9 **Q. Would you consider yourself a polymer**
 10 **material chemist?**
 11 A. I'm not sure what that means.
 12 **Q. Okay. But you have training in polymer**
 13 **chemistry?**
 14 A. Polymer chemistry, yes.
 15 **Q. Academic training?**
 16 A. Yes.
 17 **Q. Explain it to me, if you will.**
 18 A. I have a -- during my Ph.D., I took
 19 courses in polymer chemistry.
 20 **Q. Do you remember what those courses are,**
 21 **by any chance?**
 22 A. Polymer synthesis.
 23 **Q. What university?**
 24 A. Case Western Reserve University.
 25 **Q. Was this for -- this you said was for**

1 **your Ph.D. Any other courses?**

2 A. Yes. There was a course in polymer
3 characterization.

4 **Q. Material --**

5 A. No. Polymer characterization.

6 **Q. Any others?**

7 A. There was a course in polymer physics. I
8 also took two polymer courses for my master's
9 degree.

10 **Q. What were those?**

11 A. One was mechanical properties of
12 polymers. One was a polymer chemistry course.

13 **Q. Any others?**

14 A. Specifically in polymer chemistry?

15 **Q. Correct.**

16 A. In my undergrad, I took a course in
17 polymer chemistry.

18 **Q. What university?**

19 A. Southeastern Massachusetts University.

20 **Q. Any other courses?**

21 A. In my undergrad, I took a course in
22 textile chemistry.

23 **Q. Any other courses?**

24 A. Possibly.

25 **Q. You can't remember at this point?**

1 A. It's been a while.

2 **Q. I appreciate it. It's hard to remember**
3 **all of these things over a long period of time.**

4 **Are you a microbiologist?**

5 A. No.

6 **Q. Do you consider yourself an expert in the**
7 **types of microorganisms that exist in landfills?**

8 A. No.

9 **Q. Do you consider yourself an expert in the**
10 **formation of microorganism colonies in landfills?**

11 A. No.

12 **Q. Do you consider yourself an expert in the**
13 **types and kinds of biochemical reactions produced**
14 **by microorganisms in landfills?**

15 A. I've done research in enzymatic
16 degradation.

17 **Q. Do you consider yourself an expert in**
18 **enzymatic degradation?**

19 A. I consider myself knowledgeable.

20 **Q. But an expert?**

21 A. Possibly.

22 **Q. Now, the document that we've marked for**
23 **identification as Exhibit 1, which appears to be**
24 **your expert report, is that your expert report in**
25 **this proceeding? You can take a look and make**

1 **sure it's not missing pages.**

2 A. Do you want me to go through this too?

3 **Q. Just skim through it. Make sure it's**
4 **your list of publications. You've completed your**
5 **review of the document?**

6 A. Yes.

7 **Q. Is it a true and correct and complete**
8 **copy of your expert report in this proceeding, to**
9 **the best of your knowledge?**

10 A. Yes.

11 **Q. Now, did you draft every sentence in**
12 **Exhibit 1?**

13 MS. JOHNSON: Objection. You can answer.

14 A. The report was a collaborative effort
15 between myself and complaint counsel.

16 **Q. Can you show me content that was not**
17 **drafted by you in the document? Can you go**
18 **through and help me see which content was not your**
19 **draftsmanship?**

20 MS. JOHNSON: Objection. Asked and
21 answered.

22 A. It was a collaborative effort that took
23 place over many drafts, and so I agree -- I've
24 reviewed it. I agree with the wording. And I
25 don't know which ones I didn't draft.

1 **Q. So you don't -- even if you were to look**
2 **at sentence by sentence, you're telling me that**
3 **you could not tell whether it was content you**
4 **drafted that -- excuse me -- content you drafted**
5 **versus content that was drafted by someone else**
6 **that you reviewed? Can you distinguish those two**
7 **as we go through piece by piece or not?**

8 A. I can say that I drafted a lot of this,
9 and that there were multiple revisions, and that I
10 agree with everything in here.

11 **Q. Take, for example, footnote 1 in the**
12 **document, which is on page 5. Who drafted**
13 **footnote 1?**

14 MS. JOHNSON: Objection.

15 A. This would have been a collaborative
16 effort between myself and complaint counsel.

17 **Q. Can you identify the content in footnote**
18 **1 that you drafted, to the best of your**
19 **recollection?**

20 A. No.

21 **Q. Now, I'm going to have the court reporter**
22 **excerpt the text of footnote 1 from page 14 --**
23 **excuse me -- from page 5 of the expert report, and**
24 **place it in the transcript at this point for**
25 **reference.**

1 "Complaint Counsel asked me to assume
2 that the unqualified marketing claim
3 'biodegradable' means that the entire treated
4 plastic will completely break down and return to
5 nature (i.e., decompose into elements found in
6 nature) within one year after customary disposal
7 (i.e., incinerator, landfill, or recycling). I
8 use this definition and the scientific definition
9 of biodegradable interchangeably in this Expert
10 Report, because there is no substantive difference
11 between the two that affects my analysis or my
12 opinions."

13 Before complaint counsel asked you to use
14 the definition of biodegradable -- first let me
15 ask you, did complaint counsel ask you to use the
16 definition of biodegradable that appears in
17 footnote 1?

18 MS. JOHNSON: Objection. You can answer
19 to the extent it doesn't get into our privileged
20 communications.

21 A. This was the definition that I used with
22 respect to this case.

23 Q. Let me understand that. You're saying
24 this is the definition in footnote 1 that you used
25 in this case. You did say in this case. You

1 don't use this in the outside world?

2 MS. JOHNSON: Objection.
3 Mischaracterizes his testimony.

4 A. This was a specific marketing claim.

5 Q. That's not my question. My question is
6 whether the definition of biodegradable that you
7 include in footnote 1 of your expert report is a
8 definition that you use only in this case, or that
9 you use commonly or elsewhere outside of the case?

10 MS. JOHNSON: Objection.

11 Q. Do you know the distinction I'm drawing
12 here? Do you understand?

13 A. No.

14 Q. Have you used the definition of
15 biodegradable in footnote 1 anywhere else other
16 than in this expert report?

17 A. Yes, I could use it in other cases.

18 Q. I didn't ask you whether you could. I
19 asked you whether you have. Have you ever used
20 the definition of biodegradable in footnote 1 in
21 any other matter than this case, this report?

22 A. Any other legal case?

23 Q. No, any other matter, legal case or
24 publication, anywhere. I'm asking you anywhere,
25 other than in this case, can you cite for me proof

1 that you have used the definition of biodegradable
2 that is contained in this expert report at
3 footnote 1?

4 A. Perhaps.

5 Q. Perhaps. Okay, go ahead. Tell me where
6 else you used the definition.

7 A. It may have been used in one of my
8 papers.

9 Q. One of your papers?

10 A. Yes.

11 Q. What paper?

12 A. I'm just saying that -- of the
13 publications.

14 Q. Do you know whether you used it in
15 another paper?

16 A. It's possible.

17 Q. If I told you that I've read the papers
18 that are appended to your CV and your Exhibit 1,
19 and I did not see the definition contained in
20 footnote 1 replicated there anywhere, do you think
21 I'm mistaken?

22 A. Are you saying word for word the exact
23 definition?

24 Q. Yes.

25 A. Or just the one here?

1 Q. Let's start word for word first.

2 A. Word for word, it's possible you're not
3 mistaken.

4 Q. It's possible I'm not mistaken. And then
5 let's take it up with the one year, the one-year
6 limitation that exists in footnote 1, did you ever
7 put a one-year limitation on the definition of
8 biodegradation in any other instance in which you
9 define the term in any publications?

10 A. Possibly.

11 Q. If I told you I've read your publications
12 and I did not see a one-year limitation in
13 association with the definition of biodegradation,
14 would I be incorrect?

15 A. Possibly.

16 Q. You don't know?

17 A. I don't know.

18 Q. How about the limitation that exists
19 there phrased in the terminology completely break
20 down and return to nature, that is, decompose into
21 elements found in nature, did you ever use that
22 language or comparable language, complete
23 breakdown, in any other definition of the term
24 biodegradable that you've used in any context
25 other than this report?

1 MS. JOHNSON: Objection.
 2 A. Again, possibly.
 3 **Q. Now, if I told you that I've read all of**
 4 **your papers that are listed in your listing of**
 5 **publications and I did not see a single instance**
 6 **in which the term biodegradable or biodegradation**
 7 **or biodegrade has been defined using language that**
 8 **includes the caveat within one year after**
 9 **customary disposal -- excuse me, uses the caveat**
 10 **will completely break down and return to nature,**
 11 **that is, decompose into elements found in nature,**
 12 **within one year after customary disposal, that is,**
 13 **incinerator, landfill or recycling, but I have not**
 14 **seen that language in any instance in which you**
 15 **have used the term biodegradation or biodegradable**
 16 **or biodegrade in any of your publications, would I**
 17 **be mistaken?**

18 MS. JOHNSON: Objection.
 19 A. You asked me just about the completely
 20 break down.

21 **Q. Let's back up. We'll break it into**
 22 **elements. We talked about one year. Now, let's**
 23 **take the other part, will completely break down**
 24 **and return to nature, that is, decompose into**
 25 **elements found in nature.**

1 MS. JOHNSON: Objection. What's the
 2 question?
 3 **Q. Using that language, have you used that**
 4 **very language in the definition of the term**
 5 **biodegrade, biodegradation, biodegradable, in any**
 6 **definition appearing in any publication other than**
 7 **in this expert report?**

8 A. And you're including all of the theses
 9 and dissertations?

10 **Q. Yes.**

11 A. I believe that similar language is in
 12 there.

13 **Q. But the exact language is not?**

14 A. Possibly.

15 **Q. If I told that you I've read the papers**
 16 **that you have listed in your CV and that I did not**
 17 **see in any of those papers the use of that**
 18 **language, will completely break down and return to**
 19 **nature, that is, decompose into elements found in**
 20 **nature, would I be mistaken?**

21 A. The exact language or similar language?

22 **Q. Let's start with the exact language.**

23 A. Possibly.

24 **Q. Similar language?**

25 A. Similar language, I would say probably

1 you're mistaken.

2 **Q. We'll get into this a little more. With**
 3 **regard to the last part of it, within -- after**
 4 **customary disposal, that is, incinerator, landfill**
 5 **or recycling, have you ever used that language in**
 6 **the definition of biodegrade, biodegradable or**
 7 **biodegradation, in any publication, other than in**
 8 **this expert report?**

9 A. Exact or similar?

10 **Q. Exact.**

11 A. Possibly.

12 **Q. And if I told you that I've read all of**
 13 **your publications, and I do not see that language**
 14 **in any definition of the term, would I be**
 15 **mistaken?**

16 A. Possibly.

17 **Q. Now, in this expert report at footnote 1,**
 18 **the first sentence reads: Complaint counsel asked**
 19 **me to assume that the unqualified marketing claim**
 20 **"biodegradable" means, and so on. Is that a true**
 21 **and correct statement?**

22 A. Yes.

23 **Q. And do you stand by the definition in**
 24 **footnote 1?**

25 MS. JOHNSON: Objection.

1 A. Yes.

2 **Q. You would not today have any basis or**
 3 **reason to change it in any way?**

4 MS. JOHNSON: Objection.

5 A. Not right now.

6 **Q. Now, if we start with the assumption that**
 7 **biodegradable means that the entire treated**
 8 **plastic will completely break down and return to**
 9 **nature, that is, decompose into elements found in**
 10 **nature, within one year after customary disposal.**
 11 **We'll start with that, just stated here. Is it**
 12 **true that if only 95 percent of a treated plastic**
 13 **breaks down and returns to nature, that plastic is**
 14 **not biodegradable?**

15 MS. JOHNSON: Objection.

16 A. In what time frame?

17 **Q. Let's say it happens within a year, but**
 18 **it's only 95 percent.**

19 A. So it could be that if it's say six
 20 months at 95 percent, that --

21 **Q. Let's say 364 days, and it's 95 percent,**
 22 **does it satisfy your definition of complete --**
 23 **excuse me -- of biodegradable in footnote 1?**

24 A. That would not satisfy the definition.

25 **Q. Let's say that it biodegraded to 95**

1 percent on 364 days, but on 366 days it went to
2 100 percent, would that satisfy the definition in
3 footnote 1?

4 A. Possibly.

5 Q. Assuming that on day 365 it was only 95
6 percent still, but on day 366 it became 100
7 percent, would that satisfy the definition of
8 biodegradable in footnote 1?

9 A. That wouldn't satisfy the exact
10 definition.

11 Q. Now, can you cite for me today any
12 peer-reviewed journal article that takes the
13 position that if 100 percent of a treated plastic
14 breaks down and returns to nature after a year,
15 the treated plastic is not biodegradable?

16 A. Are you talking about a -- talking about
17 a marketing claim?

18 Q. No. We're talking about a peer-reviewed
19 journal. I'm asking if you are aware, can you
20 cite for me today, any peer-reviewed journal
21 article that takes the position that if 100
22 percent of a treated plastic breaks down and
23 returns to nature after a year, the treated
24 plastic is not biodegradable?

25 MS. JOHNSON: Objection.

1 down and returns to nature?

2 Q. Correct.

3 A. Within one year?

4 Q. No. Ever. 100 percent. In the
5 peer-reviewed literature, can you cite me a
6 publication that stands for the proposition that
7 100 percent of any treated plastic breaks down and
8 returns to nature, 100 percent?

9 A. I know of tests that have shown that.

10 Q. Wasn't there always some residual that
11 doesn't break down?

12 A. I mean, there's biomass, and biomass is
13 found in nature.

14 Q. But isn't there some residual, some
15 residual, that doesn't break down completely --

16 MS. JOHNSON: Objection. Asked and
17 answered.

18 Q. -- and return to nature?

19 A. Not for something like polylactic acid.

20 There would be publications concerning --

21 THE REPORTER: I didn't hear the
22 beginning of your answer.

23 A. I'm sorry. I don't remember the --

24 Q. You said polylactic acid could break down
25 100 percent with no residual, right?

1 A. I know of limitations concerning
2 combustibility.

3 Q. That's not the question. My question is
4 whether you know and can cite for me today a
5 peer-reviewed journal article that takes the
6 position that if 100 percent of a treated plastic
7 breaks down and returns to nature after a year,
8 the treated plastic is not biodegradable?

9 A. I don't know.

10 Q. Is there any evidence in the
11 peer-reviewed journals that 100 percent of any
12 treated plastic, including plastics made with your
13 own patent '199, breaks down and returns to nature
14 100 percent?

15 A. What do you mean by my own patent?

16 Q. Your own patent, the '199 patent.

17 MS. JOHNSON: Objection. Foundation.

18 Q. We're going to get into that in a little
19 bit. Let's exclude that. Let me rephrase the
20 question for you and make it simple.

21 Is there any evidence in the
22 peer-reviewed journals that 100 percent of any
23 treated plastic breaks down and returns to nature?

24 MS. JOHNSON: Objection.

25 A. Any evidence that if 100 percent breaks

1 MS. JOHNSON: Objection.

2 Mischaracterizes his testimony.

3 Q. What form of plastic did you just mention
4 that you said could break down 100 percent and
5 return to nature?

6 A. Polylactic acid.

7 Q. Any other plastic that can break down 100
8 percent and return to nature?

9 MS. JOHNSON: Objection. Vague as to
10 plastic.

11 A. I would say probably amylose.

12 Q. Any others?

13 A. Probably polydioxanone.

14 Q. How about PET?

15 A. I don't know of any publication that
16 would say PET would.

17 Q. Now, in footnote 1 you write, and I'll
18 quote from it, the last sentence, I use this
19 definition and the scientific definition of
20 biodegradable interchangeably in this expert
21 report, because there is no substantive difference
22 between the two that affects my analysis or my
23 opinions, right? That's what you wrote?

24 A. That is correct.

25 Q. And what is the scientific definition of

1 biodegradable?

2 A. With respect to this marketing claim?

3 Q. No. What is the scientific definition of
4 biodegradable that you use in your publications?

5 A. I'm using this one based on the marketing
6 claim.

7 Q. That's not my question. My question is:
8 What is the scientific definition of biodegradable
9 you use in your scientific publications?

10 A. It would be probably the breakdown of the
11 polymer chain by microorganisms.

12 Q. Is that it, full definition?

13 A. I probably use other parts.

14 Q. Did you use completely break down into --
15 completely break down and return to nature in your
16 definitions that you published?

17 MS. JOHNSON: Objection.

18 A. Possibly.

19 Q. You don't remember?

20 A. I don't remember every word I wrote in
21 all of my publications at this time.

22 Q. We'll get to that. Let's take a look at
23 what we'll mark for identification as Exhibit 2,
24 which is one of those publications, a chapter in a
25 book called Biodegradable Polymers?

1 greatly?

2 A. Are you referring to this book?

3 Q. I'm asking you, the universe of all the
4 books and publications you've written, have you
5 ever stated that the definition of the term
6 biodegradable varies greatly?

7 A. Without the peer-reviewed? This one says
8 that, but this was not peer-reviewed.

9 Q. Did you write this?

10 A. Yes.

11 Q. And it says, does it not, in the first
12 sentence, the definition of biodegradable polymer
13 varies greatly among scientists, manufacturers,
14 and consumers, right?

15 A. Yes.

16 Q. You wrote that?

17 A. Yes.

18 Q. You wrote that in 2003?

19 A. This was published in 2003. I might have
20 written it earlier than that. I'm not sure.

21 Q. And then in that same first paragraph,
22 you give an ASTM definition for biodegradable,
23 right?

24 A. Yes.

25 Q. And, as I see it here, there is no

1 (Whereupon, Respondent's Deposition
2 Exhibit No. 2, chapter 9 in Plastics and the
3 Environment, marked.)

4 MR. EMORD: Off the record.

5 (Off the record.)

6 BY MR. EMORD:

7 Q. We've placed before the witness a
8 document that we've marked as Respondent's Exhibit
9 2 from a book called Plastics and the Environment,
10 and it is a chapter 9 entitled Biodegradable
11 Polymers. It says the author, Stephen P.

12 McCarthy, Department of Plastics Engineering,
13 University of Massachusetts at Lowell. Is that
14 your article, sir?

15 A. Yes, I believe so.

16 Q. Have you ever written in a peer-reviewed
17 article or chapter in a book that biodegradable --
18 that the definition of biodegradable varies
19 greatly?

20 MS. JOHNSON: Are you referring to
21 something specific in here?

22 Q. Just generally now, starting out with a
23 general question. Did you ever write in an
24 article in a peer-reviewed publication or a book
25 that the definition of biodegradable varies

1 reference to a one-year limit in that definition;
2 is that true?

3 A. That's true.

4 Q. And in this definition that you list here
5 from ASTM, there is no language in the definition
6 that says completely break down and return to
7 nature, that is, decompose into elements found in
8 nature, right?

9 A. It says complete mineralization.

10 Q. Now, the quoted language from the ASTM,
11 does that include the language complete
12 mineralization in this page?

13 A. I don't see it in this portion of the
14 definition.

15 Q. Now, do you know whether other scientists
16 share the view you wrote in Exhibit 2, that the
17 definition of biodegradable varies greatly among
18 scientists, manufacturers, and consumers?

19 A. You're saying, do I know of any other
20 scientists who share this?

21 Q. I'm sorry. I'll rephrase the question
22 for you. Do you know whether other scientists
23 share the view you wrote in Exhibit 2 here, that
24 the definition of biodegradable varies greatly
25 among scientists, manufacturers, and consumers?

1 A. As of --
 2 **Q. Today.**
 3 A. As of today?
 4 **Q. Yes.**
 5 A. Possibly.
 6 **Q. Let's go back a little bit to your CV.**
 7 **Now, if you look at just page 4 of your report --**
 8 A. Of my report or my CV?
 9 **Q. Sorry. Let's look at your report first,**
 10 **page 4 of your report, Exhibit 1. You list there**
 11 **that you are the editor of the Journal of Polymers**
 12 **and the Environment, right?**
 13 A. Yes.
 14 **Q. How long have you been the editor of The**
 15 **Journal of Polymers and the Environment?**
 16 A. The journal started out with a different
 17 name.
 18 **Q. What name was that?**
 19 A. I believe it was Journal of Polymer
 20 Degradation.
 21 **Q. When was that?**
 22 A. I'm not sure exactly.
 23 **Q. Approximately when?**
 24 A. The name change?
 25 **Q. No. Let's back up. When you first**

1 **became the editor of The Journal of Polymer**
 2 **Degradation.**
 3 A. Can I look at my CV?
 4 **Q. Sure.**
 5 A. 1991.
 6 **Q. Have you been the editor of The Journal**
 7 **of Polymer Degradation or The Journal of Polymer**
 8 **and the Environment consistently since 1991?**
 9 A. Yes.
 10 **Q. To the present?**
 11 A. Yes.
 12 **Q. What do you do as editor?**
 13 A. Currently?
 14 **Q. Let's say since 2000.**
 15 A. So there is roughly 30, around 30
 16 submissions of publications that are submitted
 17 every week. And I review them and narrow it down
 18 to the best ones, which are probably around five
 19 or six. And then those are sent out to reviewers
 20 to review under the peer-review system. And then
 21 the reviewers' critiques come back, and it's
 22 either accepted for publication, rejected for
 23 publication, or sent back for modification.
 24 **Q. Who makes the determination of whether**
 25 **it's accepted for publication?**

1 A. It would be my decision, but it would be
 2 based on the reviews.
 3 **Q. I understand. I'm going to show you an**
 4 **article that we copied from the journal published**
 5 **on June 29, 2011. We'll mark this as Exhibit 3.**
 6 **(Whereupon, Respondent's Deposition**
 7 **Exhibit No. 3, Biodegradable Polymers - A Review**
 8 **on Recent Trends and Emerging Perspectives,**
 9 **marked.)**
 10 BY MR. EMORD:
 11 **Q. Do you recognize this article?**
 12 A. I recognize it as being an article in the
 13 journal.
 14 **Q. This is the journal that you edit?**
 15 A. That's correct.
 16 **Q. You would have seen the manuscript of**
 17 **this publication?**
 18 A. Yes.
 19 **Q. You would have approved it for**
 20 **publication in the journal?**
 21 A. Again, based on the peer review.
 22 **Q. But it wouldn't appear in the journal**
 23 **without your approval?**
 24 A. That's correct.
 25 **Q. If you'll turn to page 638, under the**

1 **heading definition of biodegradation in the**
 2 **left-hand column. Do you see that?**
 3 A. Yes.
 4 **Q. I'm going to have the court reporter**
 5 **excerpt from this page, under the title Definition**
 6 **of Biodegradation, the first two -- excuse me --**
 7 **the entire paragraph, the first entire paragraph**
 8 **under the heading Definition of Biodegradation,**
 9 **and place it at this point in the deposition**
 10 **transcript.**
 11 "The various definitions of
 12 biodegradation depend on the field of application
 13 of the polymers (biomedical area or natural
 14 environment). Many different definitions have
 15 officially been adopted, depending on the
 16 background of the defining standard organizations
 17 and their particular interests. Van der Zee and
 18 Seal (11, 12) review all of the definitions found
 19 in different standards. Albertsson and Karlsson
 20 (13) defined biodegradation as an event that takes
 21 place through the action of enzymes and/or
 22 chemical decomposition associated with living
 23 organisms and their secretion products. It is
 24 also necessary to consider abiotic reactions like
 25 photodegradation, oxidation and hydrolysis, which

1 may alter the polymer before, during or instead of
2 biodegradation because of environmental factors.
3 So, strictly speaking, 'biodegradation of a
4 polymer' is defined as the deterioration of its
5 physical and chemical properties and a decrease of
6 its molecular mass down to the formation of CO₂,
7 H₂O, CH₄, and other low molecular-weight products
8 under the influence of microorganisms in both
9 aerobic and anaerobic conditions aided by abiotic
10 chemical reactions like photodegradation,
11 oxidation and hydrolysis (14)."

12 Now, as editor of the journal, did you
13 ever tell the authors that you thought the section
14 entitled Definition of Biodegradation should be
15 changed in any way?

16 A. No, because I was not a reviewer.

17 **Q. But you approved the article for
18 publication, I think you said?**

19 A. Based on the reviews.

20 **Q. Now, did you tell the authors that they
21 ought to alter the section entitled Definition of
22 Biodegradation to specify that the term required
23 complete breakdown and return to nature within one
24 year of customary disposal?**

25 MS. JOHNSON: Objection.

1 A. If any of the reviewers had changes that
2 they wanted made, I would have then relayed that
3 to the -- and in order for it to be accepted, I
4 would have relayed that back to the author. So
5 that could be construed as me asking the author to
6 make changes.

7 **Q. But did you specifically ask either the
8 authors or any of the reviewers to include within
9 the definition of biodegradation the requirement
10 that there be a complete breakdown and return to
11 nature within one year of customary disposal?**

12 A. No.

13 **Q. Let's take look at another article of
14 yours that is entitled Biodegradability and
15 Miscibility of Blends Containing
16 Poly(Hydroxybutyrate-co-Hydroxyvalerate) in the
17 ANTEC 90 journal at 1439.**

18 MR. EMORD: We'll mark this as Exhibit
19 Number 4.

20 BY MR. EMORD:

21 **Q. We're going to skip that for the moment.
22 What is PET?**

23 A. Do you mean what does the abbreviation
24 PET stand for with respect to a polymer?

25 **Q. Right.**

1 A. Polyethylene terephthalate.

2 **Q. In your report, as I understand it, you
3 say that PET is not biodegradable, correct?**

4 A. Do you want me to check?

5 MS. JOHNSON: Are you referring to
6 something specific?

7 **Q. Do you consider PET biodegradable?**

8 A. I do not consider PET to be biodegradable
9 in normal composting.

10 **Q. Is there any additive that you know, made
11 by any company, that causes PET to become
12 biodegradable?**

13 MS. JOHNSON: Objection. What do you
14 mean by biodegradable? What definition are you
15 using?

16 A. I don't think so.

17 **Q. Now, how much have you been paid by the
18 FTC in this proceeding?**

19 A. So far?

20 **Q. Yes.**

21 A. \$7500.

22 **Q. And what is your financial arrangement
23 with the FTC?**

24 A. It is \$100 per hour, plus the deposition,
25 which is something higher.

1 **Q. You're the director of the U Mass Lowell
2 Bioplastics Institute and Medical Plastic Research
3 Center, right?**

4 A. Bioplastics and Medical Plastic Research
5 Center, yes.

6 **Q. With your permission, so I don't have to
7 say that entire name and all of its parts every
8 time I'm referring to it, shorten that to
9 Bioplastics Research Center or Research Center.
10 Is that okay?**

11 A. Yes.

12 **Q. So that we're both on the same page, if I
13 use the term Bioplastics Research Center or
14 Research Center, I'm referring to the U Mass
15 Lowell Bioplastics Institute and Medical Plastics
16 Research Center, okay?**

17 A. Okay.

18 **Q. Now, when was the Bioplastics Research
19 Center established?**

20 A. You're talking the bioplastics and
21 medical plastics?

22 **Q. Yes.**

23 A. Do you want me to go through the
24 history of --

25 **Q. No.**

1 A. I would say two and a half years ago.
 2 **Q. 2011?**
 3 A. Yes.
 4 **Q. Now, you created it, right?**
 5 A. Yes.
 6 **Q. Does the Research Center include members?**
 7 A. Yes.
 8 **Q. What companies are industry members?**
 9 A. Metabolix, Echo Verde -- let me back up.
 10 There aren't really members.
 11 **Q. What are there?**
 12 A. There are companies that sponsor
 13 research.
 14 **Q. So these are the companies that sponsor**
 15 **research, Metabolix, Echo Verde. Who else?**
 16 A. MMM, Densified Solutions. Are you
 17 talking about just the bioplastics and medical
 18 plastics?
 19 **Q. Correct.**
 20 A. There might be some others.
 21 **Q. What's the annual operating budget of the**
 22 **center?**
 23 A. I'm not sure exactly.
 24 **Q. That's all right. A close approximation.**
 25 A. About \$70,000 a year. I mean, that's

1 total. That's what the university gets.
 2 **Q. I'm going to have you take a look at a**
 3 **document from Mass Lowell.**
 4 MR. EMORD: We'll mark this as exhibit.
 5 (Whereupon, Respondent's Deposition
 6 Exhibit No. 4, document entitled Center for
 7 Biogradable Polymer Research at UML, marked.)
 8 BY MR. EMORD:
 9 **Q. Now, do you recognize this document?**
 10 A. Yes.
 11 **Q. To your knowledge, is it accurate in its**
 12 **description of the Research Center?**
 13 A. No.
 14 **Q. It's not accurate. Where is it**
 15 **inaccurate?**
 16 A. This is not the Research Center.
 17 **Q. This is another center, Biodegradable**
 18 **Polymer Research Center is not the same as the**
 19 **center we were just talking about?**
 20 A. Right. That's why I asked you if you
 21 wanted me to go through the history.
 22 **Q. I appreciate that. This is a predecessor**
 23 **to it?**
 24 A. This is a predecessor to it.
 25 **Q. Now the history. When was the**

1 **Biodegradable Polymer Research Center established?**
 2 A. I believe it was '93.
 3 **Q. 1993. Did you establish the center?**
 4 A. I established it with a colleague.
 5 **Q. Who is the colleague?**
 6 A. Richard Gross.
 7 **Q. He was your mentor?**
 8 A. Is that a question?
 9 **Q. Yes.**
 10 A. No.
 11 **Q. You studied in collaboration with him?**
 12 A. No.
 13 **Q. He has a background in biochemistry,**
 14 **right?**
 15 A. In chemistry.
 16 **Q. And he wrote articles in which you were**
 17 **also the co-author, right?**
 18 A. Yes.
 19 **Q. He did research on polymers, right?**
 20 A. Yes.
 21 **Q. And you worked with him on that research**
 22 **and published with him on that research. Were you**
 23 **the more junior person in that association?**
 24 MS. JOHNSON: Objection.
 25 A. No.

1 **Q. You were the senior person?**
 2 A. Yes.
 3 **Q. When did he retire?**
 4 MS. JOHNSON: Objection. That assumes
 5 facts not in evidence.
 6 **Q. Has he not retired? Is he still at**
 7 **U Mass?**
 8 A. No, he's not at U Mass.
 9 **Q. But he's at another institution now?**
 10 A. Yes.
 11 **Q. What institution is that?**
 12 A. Rensselaer Polytechnic Institute.
 13 **Q. In France?**
 14 A. In Troy, New York.
 15 **Q. How much was the annual budget of the**
 16 **Biodegradable Polymer Research Center?**
 17 A. In what year?
 18 **Q. '93 to 2011?**
 19 MS. JOHNSON: Objection.
 20 **Q. Annual operating budget.**
 21 A. It varied.
 22 **Q. Give me the range.**
 23 A. I would say it varied from \$30,000 to
 24 possibly maybe close to \$200,000.
 25 **Q. A year?**

1 A. Per year.
 2 **Q. Is Exhibit 4 a complete and accurate**
 3 **description of the Biodegradable Polymer Research**
 4 **Center, do you think?**
 5 A. It looks like this was a description as
 6 of 2008.
 7 **Q. And as of that year, is it accurate?**
 8 MS. JOHNSON: Objection.
 9 A. I believe so.
 10 **Q. Let's take a look at another one of**
 11 **these. This one is an updated version. No. This**
 12 **one is the preceding version. We'll find out.**
 13 **We'll mark this as Exhibit 5.**
 14 **(Whereupon, Respondent's Deposition**
 15 **Exhibit No. 5, document entitled Center for**
 16 **Biogradable Polymer Research at UML, marked.)**
 17 BY MR. EMORD:
 18 **Q. Can you tell me what is the, if you know,**
 19 **what is the year, this one, of this document? The**
 20 **other one was 2008.**
 21 MS. JOHNSON: Is this an excerpt of
 22 something? Where is the rest of the document?
 23 MR. EMORD: He can tell us.
 24 MS. JOHNSON: It's your exhibit.
 25 MR. EMORD: This is all we have. I

1 don't -- I have these two documents. Whether
 2 there are other documents related to it, I'm sure
 3 there probably are.
 4 MS. JOHNSON: Did you pull this off the
 5 website?
 6 MR. EMORD: It's in our discovery
 7 materials. That's all I know.
 8 MS. JOHNSON: There's no Bates number on
 9 it.
 10 MR. EMORD: Right.
 11 A. I'm not sure what this is.
 12 **Q. You don't know what year it is?**
 13 A. I mean, there is an indication that it's
 14 2007.
 15 **Q. Is this an accurate description of the**
 16 **functioning and purpose of the center, that is,**
 17 **Exhibit 5?**
 18 A. At that time?
 19 **Q. At that time, roughly 2007/2008.**
 20 A. I'm not sure.
 21 **Q. You say in 2011 the center changed its**
 22 **name?**
 23 A. Yes.
 24 **Q. And is the purpose of the center since**
 25 **2011 the same as it had been previously, or has it**

1 **changed?**
 2 A. In 2011, we expanded it to include
 3 medical plastics.
 4 **Q. So prior to that time, it didn't include**
 5 **medical plastics?**
 6 A. Not officially.
 7 **Q. Any other change of note in 2011 from the**
 8 **prior functioning of the organization?**
 9 A. Yes. It was a new location.
 10 **Q. Previously, it was located where?**
 11 A. 333 Aiken Street.
 12 **Q. And now it's located?**
 13 A. 1001 Pawtucket.
 14 **Q. Did you expand the size of the facility?**
 15 A. No.
 16 **Q. Roughly the same size?**
 17 A. No.
 18 **Q. Smaller?**
 19 A. Yes.
 20 **Q. What is your salary as a professor at**
 21 **U Mass?**
 22 A. Approximately \$150,000.
 23 **Q. Do you have any other income related to**
 24 **biodegradable plastics?**
 25 A. In terms of anything?

1 **Q. Anything.**
 2 A. The royalty.
 3 **Q. Royalty income from?**
 4 A. From a patent that's owned by the
 5 university.
 6 **Q. Now, you have been responsible for**
 7 **bringing several research grants to U Mass Lowell,**
 8 **right?**
 9 A. Yes.
 10 **Q. And as I understand it, it is the policy**
 11 **of U Mass Lowell, when a professor brings in a**
 12 **grant, to assign a portion of that grant money to**
 13 **do the research. That's the vast majority of it?**
 14 MS. JOHNSON: Objection. What's the
 15 foundation?
 16 MR. EMORD: He can answer.
 17 **Q. The vast majority of it goes to the**
 18 **Research Center or whatever, the fund for the**
 19 **research. And then a portion goes to the**
 20 **university. Do I have that right? Correct me if**
 21 **I'm mistaken.**
 22 A. Let me maybe recharacterize the statement
 23 so that it's more factual.
 24 **Q. Thank you.**
 25 A. So there is, the total amount of the

1 money is split between direct costs and indirect
2 costs. So there's an overhead rate of 54 percent
3 that's applied to the research monies on the
4 majority of grants.

5 **Q. Now, the overhead rate, that goes to the**
6 **university?**

7 A. The university.

8 **Q. And the remainder of the 100 percent,**
9 **the --**

10 **MS. JOHNSON: 46.**

11 **Q. The 46 percent.**

12 A. The remainder is spent on the research.

13 **Q. Now, it goes into a research fund, right?**

14 A. No.

15 **Q. What account receives that 46 percent?**

16 A. The project account.

17 **Q. Who controls the project account?**

18 A. The principal investigator or principal
19 investigators.

20 **Q. And are you in control of that account**
21 **for research that you bring into the university?**

22 **MS. JOHNSON: Objection. What account?**

23 **Q. The project account you just mentioned.**

24 A. So for projects in which I'm one the
25 principal investigators, I have some control over

1 that.

2 **Q. Do you have signatory authority over the**
3 **account?**

4 A. In some cases.

5 **Q. Do you receive a salary out of funds that**
6 **go into that account?**

7 A. No.

8 **Q. Do you receive any personal financial**
9 **remuneration whatsoever from the funds that go**
10 **into that account?**

11 A. No.

12 **Q. Now, in connection with the research**
13 **money that you are able to land as grants from an**
14 **institution, does the university ever give you an**
15 **increase in salary based on its review of those**
16 **grants?**

17 A. So there are two promotions where there
18 are raises. One is for associate professor and
19 one is for full professor. And there are three
20 areas that are important to achieve in order to
21 get that promotion. One is teaching, one is
22 service, and one is research. And in the research
23 part, that would be where the sponsored research
24 would be important.

25 **Q. I see. So it's a factor taken into**

1 **account in determining salary?**

2 **MS. JOHNSON: Objection.**

3 **Mischaracterizes his testimony.**

4 A. Not in determining salary. In
5 determining the promotion to associate or full
6 professor.

7 **Q. I see. Now, once you become a full**
8 **professor, if you continue to get grant monies**
9 **brought into the university, does that in any way**
10 **affect the determination of whether to increase**
11 **your pay?**

12 A. No.

13 **Q. It has no effect whatsoever?**

14 A. Up until like this last year, it didn't
15 really have an effect. It's not a good thing.

16 It's because the union was -- it's a faculty
17 union. Up to two years ago, I think there's .5
18 percent increase in salary. I'm just guessing.

19 I'm not sure exactly. But I think right now
20 there's .5 percent increase in salary that's
21 possible from merit. And merit, that would enter
22 into merit.

23 **Q. Now, the university has a policy about**
24 **professors inventing something and getting a**
25 **patent for it, don't they?**

1 **MS. JOHNSON: Objection. Vague.**

2 A. They encourage it.

3 **Q. They have a policy related to patents?**

4 A. They have many policies related to
5 patents.

6 **Q. If you invent something at the lab at the**
7 **university, and you wanted to secure a patent for**
8 **the invention, what would the university require?**

9 A. If I wanted to secure a patent, it would
10 probably have to not be done in the lab, and it
11 would have to be something that's not related to
12 any of my research.

13 **Q. But if you did discover something in the**
14 **lab, what would the university do? Would they**
15 **say -- under the policy that exists -- would they**
16 **say we'll get the patent, you can be co-owner of**
17 **the patent, or how does that relationship work?**

18 A. If it was something in the lab related to
19 my research, I would not be allowed to get a
20 patent on it.

21 **Q. The university would get the patent?**

22 A. The university -- if there was a patent
23 to be issued, the university would own it. Or if
24 I did get a patent, they would probably take me to
25 court or something.

1 **Q. Let's take a look at Patent Number**
 2 **5,833,199 (sic), which we'll mark as Exhibit 6.**
 3 **(Whereupon, Respondent's Deposition**
 4 **Exhibit No. 6, Patent Number 5,883,199, marked.)**
 5 BY MR. EMORD:
 6 **Q. Do you recognize this patent?**
 7 A. Do you want me to go through the whole
 8 thing?
 9 **Q. Go through each page and make sure it's a**
 10 **true and correct copy of your patent.**
 11 A. The question is -- I forgot.
 12 **Q. Is this your patent?**
 13 A. No, it's not my patent.
 14 **Q. Whose patent is it?**
 15 A. The University of Massachusetts.
 16 **Q. You're listed as one of the inventors?**
 17 A. Yes.
 18 **Q. The University of Massachusetts is listed**
 19 **as the assignee on the patent?**
 20 A. The assignee?
 21 **Q. Who assigned the patent to the assignee?**
 22 A. The university.
 23 **Q. The university assigned the patent to**
 24 **itself?**
 25 A. Again, the policy is if it's something

1 that's invented at the lab and it's related to
 2 research, the university owns the rights to that.
 3 **Q. Is there an agreement between you and the**
 4 **university concerning this patent?**
 5 A. Yes.
 6 **Q. Is it in writing?**
 7 A. Yes.
 8 MR. EMORD: May we have a copy of the
 9 agreement?
 10 MS. JOHNSON: I think he's referring to
 11 the general policy. I don't think there's a
 12 written signed agreement between the parties.
 13 **Q. Is there a written signed agreement**
 14 **between you and the university?**
 15 MS. JOHNSON: Not that I'm aware of.
 16 A. You mean regarding the patent?
 17 **Q. Assignment of the patent, yes.**
 18 A. Yes.
 19 MR. EMORD: Could we have that.
 20 A. The university has it.
 21 **Q. And in addition, there are written**
 22 **policies that the university has that pertain to**
 23 **patents such as this?**
 24 A. Yes.
 25 **Q. And do you have access to those policies?**

1 A. Yes.
 2 MR. EMORD: May we have copies of those
 3 written policies?
 4 MS. JOHNSON: Sure.
 5 **Q. What are the terms of the assignment**
 6 **agreement, as best you can remember, between you**
 7 **and the university?**
 8 A. That they have exclusive rights to it, to
 9 do whatever they want.
 10 **Q. Now, you receive royalties under the**
 11 **patent, right?**
 12 A. I receive a portion of the royalties.
 13 **Q. So the royalties are assigned to the**
 14 **university?**
 15 A. The royalties are paid to the university.
 16 **Q. And the university pays you a portion of**
 17 **the royalties?**
 18 A. The university pays a portion of the
 19 royalties to me.
 20 **Q. Is there a percentage breakdown? What**
 21 **percentage royalty, do you know, does the**
 22 **university get?**
 23 A. The university gets 70 percent of the
 24 royalties, and 30 percent is split between the
 25 inventors. And that is only on the profit. So

1 there's a long time where you're paying back the
 2 lawyer's fees, the prosecution, the maintenance
 3 fees, before you see a penny.
 4 **Q. I see. And the three people who split**
 5 **the 30 percent are the inventors listed in the**
 6 **patent?**
 7 A. That's correct.
 8 **Q. And they each receive what, 10 percent?**
 9 A. About that.
 10 **Q. How much money did you receive, let's**
 11 **say, in 2011, from your patent royalties? Let's**
 12 **make it a little easier, 2013. Closer in time.**
 13 A. Altogether it's been about \$28,000.
 14 **Q. And in two-thousand --**
 15 A. No, for all time.
 16 **Q. All time. Okay. So approximately how**
 17 **much do you get a year, the range?**
 18 A. It varies. One year, I didn't get any,
 19 because it was a challenge and lawyers got
 20 involved. Nothing against lawyers. I think I got
 21 in the range of 4 to \$5,000 this year.
 22 **Q. How much has Metabolix given to U Mass**
 23 **Lowell in grants for sponsored research that you**
 24 **did? Is the name Metabolix?**
 25 A. Yes, Metabolix.

1 **Q. What did I say? As in metabolic**
2 **function.**

3 A. Yes. That's exactly why they chose the
4 name.

5 **Q. Approximately how much money has**
6 **Metabolix given to the center?**

7 A. I'd say approximately 1.7 million
8 dollars.

9 **Q. And are they committed --**

10 A. I mean, that's in sponsored research.

11 **Q. Yes.**

12 A. Okay.

13 **Q. Is there another form of support they**
14 **give?**

15 A. Royalties.

16 **Q. And any other form?**

17 A. There was a -- there was also a grant
18 that was written whereby they paid the university
19 for equipment that was purchased by the
20 university. So it was sort of a repayment for
21 equipment that the university purchased.

22 **Q. Are you paid as a consultant by**
23 **Metabolix?**

24 A. I was paid for the expert witness
25 testimony.

1 **Q. How much were you paid?**

2 A. For the two cases, approximately \$5,000.

3 **Q. For both cases or independently?**

4 A. Both cases.

5 **Q. And are you paid in any other way by**
6 **Metabolix?**

7 A. No.

8 **Q. Are you paid by any other company**
9 **personally?**

10 A. Well, I'm compensated for the expert
11 witness.

12 **Q. Yes. But as a consultant to any other**
13 **company, are you paid?**

14 A. I don't think so.

15 **Q. With Metabolix, are they going to**
16 **continue to supply research grants to the center?**

17 A. Honestly, I don't think so.

18 **Q. Do you know today?**

19 A. I don't know today.

20 **Q. How many years have they supplied**
21 **research grants to the center?**

22 A. I don't know specifically, but I would
23 estimate it to be over 20 years.

24 **Q. And have they given funding annually over**
25 **that 20 years?**

1 A. There may have been some years when they
2 didn't fund anything.

3 **Q. When you mentioned the 1.7 million,**
4 **that's the total over that 20-year period?**

5 A. Over the 20 years, yes.

6 **Q. Now, this patent that we've marked for**
7 **identification as Exhibit 6, is Metabolix the**
8 **exclusive license holder?**

9 A. Yes. They are the exclusive licensee
10 with the option to sublicense.

11 **Q. Have they sublicensed?**

12 A. Yes.

13 **Q. To which parties?**

14 A. The ones I know about are the ASF,
15 NatureWorks. Those are the ones that I definitely
16 know about. I know they were talking to
17 Georgia-Pacific, and to the Dixie people.

18 **Q. Solo Cup?**

19 A. If it's Solo.

20 **Q. Maybe it's Dixie Cup.**

21 A. International Paper.

22 **Q. Are there biodegradable products on the**
23 **market made under the '199 patent, Exhibit 6?**

24 A. I believe so.

25 **Q. What products are on the market?**

1 A. I don't know specifically.

2 **Q. Do you have a general idea?**

3 A. I believe it's mainly compostable --
4 plastic compost bags.

5 **Q. Any other products?**

6 A. I don't know. That's all Metabolix.

7 **Q. Do you know whether those products are --**
8 **have labels or labeling associated with them that**
9 **identifies them as compostable or biodegradable?**

10 A. I do not.

11 **Q. You've never seen the finished product?**

12 A. No.

13 **Q. And Metabolix has never supplied you with**
14 **samples of finished product?**

15 A. No.

16 **Q. Have you ever seen advertising by**
17 **Metabolix related to your patent?**

18 A. No.

19 **Q. Or products that are made under your**
20 **patent?**

21 A. No.

22 **Q. Now, customers in the market for**
23 **biodegradable plastics, compostable products, have**
24 **a lot of choices out there?**

25 MS. JOHNSON: Objection. Lacks

1 foundation.

2 **Q. Do you know?**

3 A. They have -- I mean, there are more than
4 a couple choices. It's not a huge amount.

5 **Q. So you're not saying there's a monopoly
6 associated with your '199 patent, it's a
7 competitive marketplace, right?**

8 MS. JOHNSON: Objection.
9 Mischaracterizes his testimony.

10 **Q. To your knowledge.**

11 A. I mean, the '199 patent is primarily
12 based on NatureWorks' product. And so if -- it
13 would be a monopoly -- I mean, there could be
14 other people who may produce polylactic acid, but
15 they're minor compared to NatureWorks.

16 **Q. But that particular product is in
17 competition with other compostable and
18 biodegradable products in the market, right?**

19 A. Sure.

20 **Q. So you wouldn't have to buy plastic bags
21 that were compostable from NatureWorks, you could
22 go to another company that uses another invention?**

23 A. Yes.

24 **Q. And you could get biodegradable plastic
25 bags, you could get compostable plastic bags, you**

1 **could get recyclable plastic bags, you have quite
2 an array of products to choose from?**

3 MS. JOHNSON: You mean products that are
4 being marketed biodegradable/compostable, not that
5 they are in fact biodegradable/compostable?

6 **Q. That are marketed as biodegradable,
7 compostable, recyclable, there's quite an array
8 that you can choose from, right, if you're a
9 manufacturer interested in making those products
10 available?**

11 A. Yes.

12 **Q. In other words, it's a competitive
13 marketplace?**

14 A. Yes.

15 MR. EMORD: Let's go off the record.
16 (Off the record.)

17 BY MR. EMORD:

18 **Q. Now, have you seen any complaint or -- by
19 complaint, I'm using that term broadly, not just a
20 legal complaint in a court. I'm using the term
21 really as a letter or an objecting document. Have
22 you ever seen such a document before this case was
23 filed that related to ECM Biofilms?**

24 A. Before this case was filed, no.

25 **Q. For example, you did not see an e-mail to**

1 **Janice Frankel, an FTC attorney, from Brian Igoe?**

2 MS. JOHNSON: Objection. Lacks
3 foundation.

4 **Q. Do you know Brian Igoe?**

5 A. Yes.

6 **Q. Is he with Metabolix?**

7 A. No.

8 **Q. Is he a lawyer?**

9 A. He was with Mirel, when they first spun
10 out Mirel, for a short time.

11 **Q. When they first what?**

12 A. When Metabolix first spun out Mirel.

13 **Q. Before that, was he with Metabolix?**

14 A. No.

15 **Q. Are you familiar with or have you ever
16 seen an e-mail to Janice Frankel from Brian Igoe
17 complaining about ECM's claims and urging FTC to
18 take action against ECM?**

19 A. No, I don't believe so.

20 **Q. Have you ever seen any other document,
21 for example, any communication from Metabolix to
22 the Federal Trade Commission concerning ECM?**

23 A. I've seen the documents that were
24 provided to me by complaint counsel. So I don't
25 believe anything was from Metabolix.

1 **Q. Have you ever seen a document complaining
2 about ECM Biofilms or its claims from Metabolix to
3 the Federal Trade Commission?**

4 MS. JOHNSON: Objection. Asked and
5 answered.

6 A. Again, if it was in the documents
7 supplied to me by complaint counsel.

8 **Q. Do you have any specific recollection of
9 a document from Metabolix to the FTC complaining
10 about ECM BioFilms?**

11 A. No.

12 **Q. Do you know that Metabolix filed a
13 complaint with the FTC about ECM BioFilms?**

14 A. No.

15 **Q. You haven't had any discussion with
16 Metabolix about the filing of such a complaint?**

17 A. No.

18 **Q. They didn't ask you to review any content
19 of the complaint or consult with you at all
20 concerning the complaint?**

21 A. No.

22 **Q. What is Solutia?**

23 A. I believe it's a spin-out from Monsanto.

24 **Q. And has Solutia -- forgive me if I'm
25 mispronouncing it -- has Solutia given grants to**

1 **your center?**

2 A. I'm not sure. Under the original
3 incarnation of the center, Monsanto was a member
4 of the center. They might have changed. I think
5 the portion -- I don't think Solutia ever gave
6 anything to the center. They donated a patent to
7 the university.

8 **Q. Now, in your '199 patent --**

9 A. You mean the university's?

10 **Q. Yes. When I use that term, we'll**
11 **understand, however I refer to Exhibit 6, that**
12 **actually it is held by the university.**

13 **Now, let me back up just a little bit**
14 **here. Have you ever informed any of the parties**
15 **that give grants to your center that you don't**
16 **consider plastics biodegradable unless they**
17 **completely break down and return to nature?**

18 A. I don't believe so.

19 **Q. Have you ever told them that you don't**
20 **consider plastics biodegradable unless they do**
21 **that, completely break down and return to nature**
22 **within one year after customary disposal?**

23 A. I don't believe so.

24 **Q. Have you ever informed any of the**
25 **corporate funders for the center that additives to**

1 **plastics won't cause biodegradation?**

2 MS. JOHNSON: Objection. Vague.
3 Plastics?

4 A. So we did a lot of work on additives, and
5 typically we wanted them to be biodegradable to
6 maintain the biodegradability of the total system.

7 **Q. And in each of those instances, did you**
8 **establish with proof that the additive caused the**
9 **plastics to completely break down and return to**
10 **nature, that is, decompose into elements found in**
11 **nature, within one year after customary disposal?**

12 A. I don't believe so.

13 **Q. Let's take a look at paragraphs 17 and 37**
14 **of your expert report. Paragraph 17 is on page 7.**
15 **Go ahead and read 17 and 37, if you will, first,**
16 **17 and 37 to yourself.**

17 A. Okay.

18 **Q. Now, is it the case that if we take a**
19 **look at 17 and 37, it's your position that the**
20 **additive in the ECM product is no more susceptible**
21 **to a microbial -- excuse me, the plastic is no**
22 **more susceptible, conventional plastic, no more**
23 **susceptible to microbial attack after it's blended**
24 **with the ECM additive than before?**

25 A. As long as it's added to a

1 nonbiodegradable polymer.

2 **Q. So if it's a nonbiodegradable polymer**
3 **under what you've identified in the report and the**
4 **additive is added to it, it's no more**
5 **biodegradable after it's been added than it is**
6 **before; that's your opinion?**

7 A. Yes.

8 **Q. Now, can I be -- is this an accurate**
9 **statement, that conventional plastics are not**
10 **biodegradable?**

11 A. That would be an accurate statement.

12 **Q. What are conventional plastics?**

13 A. Well, the majority of plastics,
14 polyethylene, polypropylene, PVC, Teflon, PET,
15 Azdel.

16 **Q. And for all of those, is it your position**
17 **that they're no more -- that they are not**
18 **susceptible, any more susceptible to microbial**
19 **attack after the ECM additive is added to them**
20 **than before?**

21 A. Yes.

22 **Q. Is it further your position that there is**
23 **no additive that you know of that could transform**
24 **a conventional plastic into a biodegradable**
25 **plastic?**

1 MS. JOHNSON: Objection.

2 Mischaracterizes his testimony. Assumes facts not
3 in evidence.

4 A. One that degrades completely in one year?

5 **Q. Right.**

6 A. I don't know of one.

7 **Q. Let's take a look at the patent again,**
8 **Exhibit 6. As I understand the invention, and you**
9 **can help me understand it better, or correct my**
10 **misunderstanding, you start with polylactic acid,**
11 **PLA, and you blend it with any other polyester,**
12 **and the result is a biodegradable polymer; is that**
13 **correct?**

14 A. No.

15 **Q. Tell me where I have that mistaken.**

16 A. Do you want me to explain to you what the
17 patent is?

18 **Q. Sure.**

19 A. The patent is a polylactic acid-based
20 polymer or copolymer, and the polyester is an
21 aliphatic diacid. So the first one is polylactic
22 acid, and the second one is -- a number of them,
23 could be C2 to C20 diacid with two more different
24 aliphatic diacids. The group --

25 **Q. I might draw your attention to paragraph**

1 **12 of the patent, under other embodiments, that**
2 **might help.**

3 A. Column 12?

4 **Q. Yes. Under other embodiments. You see**
5 **there are a listing that proceeds from 1 through**
6 **10?**

7 A. Yes.

8 **Q. Actually proceeding onto the next page to**
9 **25. Does that give an accurate summation of the**
10 **claims --**

11 A. Yes.

12 **Q. -- and of the blends?**

13 A. Yes.

14 **Q. So that would be a complete and accurate**
15 **summation of the blends?**

16 A. This would be the -- what is claimed in
17 the invention.

18 **Q. In particular, if you look at column 6,**
19 **lines 9 to 12. There it is stated, an example of**
20 **an aromatic polyester that can be used (in up to**
21 **50 percent by weight) in the copolyester is**
22 **polyethylene terephthalate. Other aromatic**
23 **polyesters can be used.**

24 **That polyethylene terephthalate, that's**
25 **PET, right?**

1 A. It would be co-PET.

2 **Q. Does it say that there?**

3 A. It's a copolyester.

4 **Q. Yes, copolyester is biodegradable and**
5 **imparts --**

6 A. So it would be something like
7 polyethylene butyrate co-polyethylene
8 terephthalate.

9 **Q. As I understand it, the protocol that**
10 **you've used -- let me back up just a little bit.**
11 **The protocol that you used here, that is described**
12 **in the patent to establish the biodegradability of**
13 **the blend, blends, five blends, is your own**
14 **testing methodology that you developed at U Mass**
15 **Lowell, right?**

16 MS. JOHNSON: Objection.

17 **Q. It was your own testing methodology that**
18 **you developed?**

19 A. It was developed within the center, yes.

20 **Q. And as I understand it, under column 10**
21 **of the patent, you have a description of that**
22 **testing methodology, is that correct, example 3?**

23 A. Yes.

24 **Q. And that testing methodology is described**
25 **as UML-7645, right?**

1 A. Yes.

2 **Q. And the results of your testing are shown**
3 **at figure 11; is that right?**

4 A. Yes.

5 **Q. As I have read through this, I don't see**
6 **any proof of biodegradation being supplied through**
7 **use of 14C radiological testing; is that correct?**

8 A. That's correct.

9 **Q. Also, I do not see any representation in**
10 **the patent that you established that the product,**
11 **the blends, would completely break down and return**
12 **to nature, that is, decompose into elements found**
13 **in nature within one year after customary**
14 **disposal; is that right?**

15 A. This was not intended to -- yes, that's
16 right.

17 **Q. So your claim for this biodegradable**
18 **plastic in the patent doesn't depend on proof of**
19 **satisfaction of the definition of biodegradation**
20 **or biodegrade in footnote 1 of your expert report;**
21 **is that right?**

22 MS. JOHNSON: Objection.

23 A. So one of these is polylactic acid, and I
24 think I responded earlier to say that polylactic
25 acid I believe would completely degrade in one

1 year in the correct environment.

2 **Q. One of them is, but not all of them?**

3 A. The Bionolle goes to 100 percent within
4 50 days.

5 **Q. Right, but all five of the ones that are**
6 **listed under figure 11 you have established would**
7 **biodegrade within one year completely?**

8 A. I believe they would.

9 **Q. You believe so. But did you prove that?**
10 **Did you test them to establish that?**

11 MS. JOHNSON: Objection.

12 A. If the Bionolle goes by itself and the
13 PLA goes, then any blend would go.

14 **Q. But my question is more specific. Did**
15 **you test your product to establish within a year**
16 **that it would completely biodegrade?**

17 A. No.

18 **Q. You're extrapolating then from the 50**
19 **days in the study to the conclusion that they will**
20 **eventually completely biodegrade; is that correct?**

21 MS. JOHNSON: Objection.

22 Mischaracterizes his testimony.

23 A. No. I'm using the pure Bionolle to
24 establish that that goes to a hundred percent.

25 **Q. The pure Bionolle. But as far as the**

1 remaining blends are concerned -- let me back up a
2 little bit. There are a total of five blends,
3 right?

4 A. Yes.

5 **Q. For those five blends, you did not**
6 **perform a test to determine if they would**
7 **completely biodegrade within a year, right?**

8 MS. JOHNSON: Objection, relevance.

9 A. I did not.

10 **Q. If you look at Claim 1 of the patent, you**
11 **can read along with me and correct me if I'm**
12 **wrong, a biodegradable blend comprising of a first**
13 **polylactic acid-based polymer or copolymer, and a**
14 **second polymer consisting essentially of one or**
15 **more polyesters, wherein said first and second**
16 **polymers are present in a ratio of 9 to 1 to 1 to**
17 **9, right?**

18 A. Yes.

19 **Q. So your claim is directed at a**
20 **biodegradable blend of polylactic acid polymer or**
21 **copolymer with one or more polyesters, right?**

22 A. Right.

23 **Q. Now, you don't specify in the patent a**
24 **limit on the kind of polyesters that can be used,**
25 **as best I can tell. So any polyester under the**

1 patent could be used, right?

2 MS. JOHNSON: Objection.

3 A. There are patents that are listed -- I
4 mean blends that are listed.

5 **Q. The patent itself does not restrict**
6 **itself to the listed polyesters, right? It**
7 **doesn't restrict itself to biodegradable**
8 **polyesters, right?**

9 A. I think -- I'm pretty sure that if you
10 said biodegradable blend and you then blended
11 polylactic acid with say PET and the blend was not
12 biodegradable, then that probably would not be
13 covered by this patent.

14 **Q. Now, when you look at column 11 of the**
15 **patent, and look under that paragraph that begins,**
16 **the soil degradation testing of the two polymers;**
17 **do you see that?**

18 A. Yes.

19 **Q. As I understand it, the PLA degraded by**
20 **about 14 percent after 45 days; is that right?**

21 A. Yes.

22 **Q. Now, if you look at figure 11, there you**
23 **say that the polylactic acid biodegrades in soil**
24 **but just not quickly, right? Let's see, where did**
25 **it say that? If you see a reference to that part,**

1 holler, and we'll cut to the question.

2 **If we go back to where we were at that**
3 **paragraph, that probably will suffice. So what**
4 **you're doing here, correct me if I'm wrong, is**
5 **based on the 14 percent after 45 days, you're**
6 **extrapolating to say that the thing is**
7 **biodegradable, right, from the 14 percent after**
8 **the 45 days?**

9 MS. JOHNSON: Objection.

10 A. No. You really shouldn't extrapolate.

11 **Q. You shouldn't. But, in this case, the**
12 **only testing that is supplied by the patent is**
13 **this test that you have identified in the patent**
14 **by the code -- I can't remember the number**
15 **offhand. But the test you used for the patent,**
16 **which is revealed in figure 11, is for a period of**
17 **45 days, right?**

18 MS. JOHNSON: Objection.

19 **Q. You didn't use a year-long test?**

20 A. In the patent specification, we relied on
21 the knowledge that polylactic acid is
22 biodegradable within a year.

23 **Q. Right. But all of these blends, the five**
24 **blends we're talking about, and the description**
25 **given of the universe of blends that you're**

1 claiming under the patent, you didn't test all of
2 those. You tested the five, right?

3 A. Right.

4 **Q. And you extrapolate from the five to all**
5 **of those, all those that you claim?**

6 MS. JOHNSON: Objection.

7 A. No.

8 **Q. To say they're biodegradable?**

9 MS. JOHNSON: Objection.

10 A. No.

11 **Q. So in other words, the patent is in error**
12 **when it lists as claims, under other embodiments**
13 **in paragraph 12, all of those different blends**
14 **that are in excess of the five blends that you**
15 **tested?**

16 A. So you're saying there was an
17 extrapolation in terms of composition of matter,
18 not in terms of biodegradation rate.

19 **Q. All right, let's start with that. There**
20 **was an extrapolation with regard to composition of**
21 **matter.**

22 A. Yes.

23 **Q. And you used the term, in reference to**
24 **this patent, biodegradable?**

25 A. Yes.

1 **Q. But the only testing you did, underlying**
 2 **this patent, is the testing that is described in**
 3 **figure 11 and in the patent?**

4 A. No.

5 **Q. You used testing to establish**
 6 **biodegradation for this patent other than what is**
 7 **described in the patent?**

8 MS. JOHNSON: Objection.

9 A. You said any other testing.

10 **Q. Is the testing, UML-7645, the testing you**
 11 **performed to support this patent?**

12 A. We did that, plus we did other testing.

13 **Q. In the patent you list UML-7645?**

14 A. Right.

15 **Q. And that test, UML-7645, was that test**
 16 **for a year?**

17 A. No.

18 **Q. It was for 45 days?**

19 A. Yes.

20 **Q. And the patent depends in figure 11 upon**
 21 **that testing, the 45-day testing?**

22 MS. JOHNSON: Objection.

23 A. I don't think the patent depends on that.

24 I don't think the -- I think the patent would
 25 still be as strong without that figure, because

1 the main testing for the strength of the patent
 2 was the tensile testing.

3 **Q. Tensile refers to strength?**

4 A. Strength would be one characterization.

5 The --

6 **Q. Malleability? You explain it to me,**
 7 **Doctor.**

8 A. The toughness is what it really gets at.

9 So the toughness is the area under the curve. You
 10 could have a very strong polymer that breaks at a
 11 low elongation, which would have some
 12 applications. However, there's a need for a
 13 polymer to yield and not break and to deform by a
 14 shear deformation, which is actually ideal for
 15 garbage bags, because people tend to put in more
 16 garbage than they should.

17 **Q. Now, if you look at page 15 of your**
 18 **expert report, if we go down to the bottom, F,**
 19 **test duration. There you say: The study must**
 20 **last long enough for the sample to reach at least**
 21 **60 percent biodegradation. Right?**

22 A. Yes.

23 **Q. If we go back to your '199 patent, in**
 24 **column 11, lines 9 to 19, figure 11, it says in**
 25 **the second full paragraph that begins, the soil**

1 **degradation testing. There you say: After**
 2 **degradation for 45 days, Bionolle#3000 degraded**
 3 **almost 100 percent. You didn't say 100 percent.**
 4 **But you said almost 100 percent. While polylactic**
 5 **acid degraded only about 14 percent by loss in**
 6 **weight. For blends with 70 and 50 percent**
 7 **Bionolle#3000, the degradation rate was relatively**
 8 **fast. After 45 days, the A30B70, A50B50 and**
 9 **A70B30 blends degraded about 77 percent, 65**
 10 **percent, and 25 percent respectively by loss in**
 11 **weight. Figure 11 shows the polylactic acid**
 12 **biodegrades in soil, but just not quickly. And**
 13 **the addition of the second aliphatic polymer such**
 14 **as Bionolle#3000 increases the biodegradation**
 15 **rate.**

16 **There you're saying the PLA biodegrades**
 17 **in soil under the test, based on a finding that it**
 18 **degraded by only 14 percent after 45 days, right?**

19 MS. JOHNSON: Objection.

20 A. When this patent was filed, we knew that
 21 polylactic acid biodegraded.

22 **Q. I understand. But in this patent, that's**
 23 **what you're saying, 14 percent after 45 days,**
 24 **right?**

25 A. We're saying the 14 percent is the rate

1 after 45 days. So it's not as fast as the
 2 Bionolle.

3 **Q. If you look at page 16 of your report,**
 4 **under proper controls. As I understand this,**
 5 **there you're saying that a polymer biodegradation**
 6 **test is invalid unless you use a negative control.**
 7 **Is that right, or am I misunderstanding what**
 8 **you're saying?**

9 A. So for the purposes of the patent --

10 **Q. No. I'm asking about the report now. In**
 11 **the report, under G, proper controls, there you're**
 12 **saying, are you not, that the absence of a**
 13 **negative control makes the biodegradation test**
 14 **invalid?**

15 MS. JOHNSON: Objection.

16 **Q. Is that what you're saying, or are you**
 17 **not saying that?**

18 A. What I'm saying there is to prove that a
 19 plastic is biodegradable, a test to prove it, then
 20 you would need a negative control.

21 **Q. When I look at the '199 patent, Exhibit**
 22 **6, I don't see any negative control listed.**

23 A. Well, our negative control was the PLA,
 24 and our positive control was the Bionolle.

25 Because those weren't covered by our patent. So

1 the negative was a PLA, the positive was Bionolle,
2 and we're looking at the mixture of those two,
3 which were covered by the patent.

4 **Q. I hear you. But in the patent itself --**

5 MS. JOHNSON: Objection. Let him finish
6 answering the question.

7 **Q. Do you have anything more to add?**

8 A. No.

9 **Q. But as I read that patent, I find no
10 reference in that patent to a negative control.
11 Is the language negative control in the patent at
12 all?**

13 MS. JOHNSON: Objection. He already
14 answered your question.

15 **Q. You can answer. My question is: In the
16 patent itself, do you specify anywhere in there by
17 name a negative control?**

18 A. I don't believe there's a negative
19 control mentioned in the patent.

20 **Q. Now, if you look at paragraph 55 of your
21 expert report. As I understand 55, and correct me
22 if I'm wrong, you're stating that extrapolation
23 from a short test to the conclusion a polymer is
24 biodegradable in the environment is improper; is
25 that right?**

1 A. Yes.

2 **Q. And in particular, the reason you give
3 is, for the prohibition on extrapolation, is that
4 there's no evidence that biodegradation is a
5 linear process, and in fact the rate of
6 biodegradation is likely to slow because of the
7 recalcitrants, right?**

8 A. That is correct.

9 **Q. Let's take a look at the '199 patent, in
10 that same column we've been looking at, which is
11 number 11, and the 45 days. Now, as I understand
12 it, the only test report that is given in the
13 patent is the one related to the test we
14 discussed, the UML -- help me now -- 7456. That
15 was the only test that you performed, that is
16 reported upon in the patent, right?**

17 A. No.

18 **Q. For the purpose of establishing that
19 biodegradation in figure 11?**

20 MS. JOHNSON: Objection.

21 A. No.

22 **Q. You used another test?**

23 A. Yes.

24 **Q. What was the other test?**

25 A. 7645.

1 **Q. That's it. Thank you. That's the one.**

2 **My numbers were wrong. Thank you. So that was
3 the test, UML-7645, that was the test that you
4 used in the patent, right?**

5 A. That's correct.

6 **Q. And that was a 45-day test?**

7 A. I really don't know whether -- we might
8 have gone further than 45 days. And maybe at the
9 time of the patent we only had the 45-day data.

10 **Q. At the time of the patent you only had
11 the 45-day data. You might have gone further.
12 How much further?**

13 A. I don't know. I'd have to look.

14 **Q. Was it a year?**

15 A. It could have been. I don't know.

16 **Q. Do you have documentation to establish
17 the amount of time that you tested?**

18 A. Possibly.

19 MR. EMORD: If he has any documentation
20 showing the length of that test, may we have it?

21 MS. JOHNSON: We'll talk about it after
22 this.

23 MR. EMORD: And may we have all the
24 empirical data underlying UML-7645?

25 MS. JOHNSON: We can talk about all of

1 these clean-up items after this deposition.

2 MR. EMORD: I just want to make it known
3 on record that we're requesting all of the
4 empirical data underlying UML-7645.

5 BY MR. EMORD:

6 **Q. Now, I didn't see in here, in the patent,
7 Exhibit 6, I don't see in there any reporting of
8 testing being done on the combination of the PLA
9 and the PET?**

10 MS. JOHNSON: Objection.

11 A. You mean the PET copolymer?

12 **Q. Yes. And it's not listed in figure 11,
13 and I can't see it anywhere else in the patent.
14 Is it in there?**

15 A. The test is not in here. The PET
16 copolymer is not in here. I know that it works.

17 **Q. I understand. Now, in the '199 patent,
18 you did not use ASTM D644 as the testing
19 methodology, right?**

20 MS. JOHNSON: Objection.

21 A. Which one?

22 **Q. ASTM D6400?**

23 A. No.

24 **Q. You used your own protocol which we
25 discussed, UML-7645?**

1 A. Yes.

2 **Q. In footnote 11 of your report, what do**
3 **you say there? Let's take a look at footnote 11.**
4 **If you look at the last sentence of footnote 11,**
5 **and I'll have the footnote 11, at this point in**
6 **the deposition transcript, I would like footnote**
7 **11 from his expert report which was marked as**
8 **Exhibit 1 excerpted and placed in the transcript**
9 **right at this point.**

10 "Each test protocol is conducted
11 inter-laboratory or intra-laboratory in order to
12 obtain the precision and bias of the test. If the
13 inter-laboratory tests obtain similar precision
14 and bias results under the test method, conducted
15 for the same duration, the test method is
16 considered validated for those factors. Tests
17 conducted outside of these validated parameters
18 cannot be considered reliable."

19 In that footnote 11 in the last sentence,
20 what does it say?

21 A. Do you want me to read it?

22 **Q. Sure.**

23 A. The tests conducted outside of these
24 validated parameters cannot be considered
25 reliable.

1 **Q. And the tests that you're referring to**
2 **are those that are contained in the paragraph 49,**
3 **is that right, ASTM D5210, ASTM D5511 and ASTM**
4 **D5526; is that right?**

5 A. That is correct.

6 **Q. Let's take a look at paragraph 60 of your**
7 **report at page 24. There you state, and correct**
8 **me if I'm wrong, that absent an approved ASTM**
9 **specification, 14C radiological testing should be**
10 **used, right?**

11 A. Can you say that again?

12 **Q. If you look at paragraph 60, absent --**
13 **your position is absent an approved ASTM**
14 **specification, it's your opinion that 14C**
15 **radiological testing should be used, right?**

16 MS. JOHNSON: Objection. For what?

17 A. So what I'm referring to is, if you have
18 an additive that you add to a plastic that has not
19 been proven to be biodegradable.

20 **Q. Okay. That's what I need to hear, a full**
21 **explanation. Now, I think we previously**
22 **established that regardless, in your '199 patent,**
23 **you didn't use 14C radiological testing, right?**

24 A. No.

25 **Q. In paragraph 24 of your report, you**

1 **explain that aerobic biodegradation -- let's look**
2 **at 24. You explain that aerobic biodegradation**
3 **leads to CO2 formation, right?**

4 A. That is correct.

5 **Q. Now, are you able to write out for me on**
6 **a sheet of paper the chemical structures and the**
7 **transformation of those structures that leads to**
8 **methane CH4 and CO2 and specifically how the**
9 **carbon in the polymer is converted to CH4 and CO2?**
10 **Can you write that out for me?**

11 MS. JOHNSON: Objection. What polymer?

12 **Q. It's described in paragraph 24.**

13 MS. JOHNSON: There's no polymer
14 described in paragraph 24.

15 **Q. Can you write out what takes place in**
16 **paragraph 24 for me using chemical structures?**

17 A. You mean in terms of the respiration of
18 microorganisms?

19 **Q. The chemical structures that lead, the**
20 **pathway that leads from -- that is aerobic**
21 **biodegradation, showing the chemical structures**
22 **and what it leads to and specifically how the**
23 **carbon in the polymer is converted to CH4 and CO2?**

24 MS. JOHNSON: Objection. What polymer?
25 Lacks foundation.

1 A. For which polymer?

2 **Q. In 24, are you referring to any polymer?**

3 A. No.

4 **Q. Can you identify this pathway for me and**
5 **write it out so I can see the process?**

6 A. I have references. I haven't memorized
7 it. But I've seen it, and I can find it for you.

8 **Q. Today, sitting here today?**

9 A. I haven't memorized it.

10 **Q. In your '199 patent for biodegradable**
11 **polymer blend, have you filed any amendments to it**
12 **with the USPTO?**

13 A. No.

14 **Q. Have you informed the USPTO of the**
15 **definition of biodegradation or biodegradable**
16 **contained in footnote 1 of your expert report?**

17 MS. JOHNSON: Objection.

18 A. Have I sent that -- just sent a letter --

19 **Q. Right, to the patent examiner.**

20 A. No, I haven't.

21 **Q. Do the '199 patent plastics, the ones**
22 **that are out there, do they biodegrade in**
23 **landfills?**

24 MS. JOHNSON: Objection.

25 A. Perhaps.

1 **Q. Let's shift to the Biodegradable Products**
 2 **Institute. What is the Biodegradable Products**
 3 **Institute?**

4 A. The portion of the Biodegradable Products
 5 Institute that I have been associated with is the
 6 certification of compostability for particular
 7 plastics.

8 **Q. How are you associated with them in that**
 9 **regard?**

10 A. I'm one of -- I was one of the examiners
 11 of the testing that took place at certified labs,
 12 such that the results would then meet the
 13 specifications of compostability.

14 **Q. The specifications of BPI for**
 15 **compostability?**

16 A. Of D6400.

17 **Q. And you would do that determination.**
 18 **Would your determination then result in either a**
 19 **certification or not certified determination?**

20 A. Yes.

21 **Q. And when a company receives the BPI**
 22 **certification, are they, to your knowledge,**
 23 **authorized then to place a logo or other form of**
 24 **certification on the products?**

25 A. I believe so.

1 **Q. What does that certification or logo**
 2 **provide; do you know?**

3 A. It provides a certification that it meets
 4 the standard of the D6400 -- that it has met.

5 **Q. And does it indicate that it's**
 6 **compostable or biodegradable?**

7 A. Compostable.

8 **Q. And is there any other, to your**
 9 **knowledge, information on the logo other than BPI**
 10 **certified and compostable?**

11 A. I don't know.

12 **Q. Earlier we had discussed Metabolix grants**
 13 **to the center. And I want to present you with a**
 14 **copy of a document that's from UML Education News.**

15 (Whereupon, Respondent's Deposition
 16 Exhibit No. 7, article dated 06/30/2010, marked.)

17 BY MR. EMORD:

18 **Q. What I would like to do is have you take**
 19 **a look at that. It's a short one-page document.**
 20 **And inform me if the content presents an accurate**
 21 **description or is inaccurate in any respect?**

22 A. Could I correct prior testimony?

23 **Q. Go ahead.**

24 A. I apparently misspoke when I said that
 25 Brian Igoe was an employee of Mirel. He was

1 actually an employee of Telles, which was a
 2 spinoff of Mirel into bioplastics.

3 **Q. Thank you for that.**

4 **Anything else about this -- anything**
 5 **about this that is an inaccurate representation,**
 6 **to your knowledge?**

7 A. I think the 2.5 million is wrong. It
 8 should be 1.5. That's about it.

9 **Q. So the figure is wrong. Any other change**
 10 **you would make to ensure its accuracy?**

11 A. No.

12 **Q. Let's look at another similar document.**
 13 (Whereupon, Respondent's Deposition
 14 Exhibit No. 8, UML.EDU News document dated
 15 3/14/12, marked.)

16 BY MR. EMORD:

17 **Q. Take a moment. This is a two-page**
 18 **document. It is a UML.EDU news document again.**
 19 **Take a moment and look at that and inform me if**
 20 **there's anything to your knowledge that's**
 21 **inaccurate about the content of that article.**

22 A. I don't see anything wrong. The patent
 23 holder is not me.

24 **Q. Other than that?**

25 A. No.

1 **Q. Who is Steve Mojo?**

2 A. Steve Mojo is the, I believe, the head of
 3 BPI.

4 **Q. Do you have a good relationship with**
 5 **Steve?**

6 A. Yes.

7 **Q. How frequently do you guys talk by phone,**
 8 **for example?**

9 A. Not often.

10 **Q. E-mail, how frequently do you exchange**
 11 **e-mails?**

12 A. Not often.

13 **Q. In the last month, how many times have**
 14 **you interacted with Steve Mojo?**

15 A. Zero.

16 **Q. Last year?**

17 A. Zero.

18 **Q. Is there anyone else at BPI that you**
 19 **interact with regularly?**

20 A. No.

21 **Q. Are you on BPI's international advisory**
 22 **board?**

23 A. I don't believe so.

24 **Q. If they list you on their international**
 25 **advisory board, that would be news to you?**

1 A. That would be news to me.
 2 **Q. Are you a member of BPI?**
 3 A. No.
 4 **Q. Are you or have you ever been an officer**
 5 **of BPI?**
 6 A. No.
 7 **Q. Previously you said you have not done**
 8 **consulting work for BPI?**
 9 A. I did certification that we went through.
 10 **Q. So that was consulting work?**
 11 A. That was --
 12 **Q. Were you paid?**
 13 A. I was reimbursed for that.
 14 **Q. How much were you paid?**
 15 A. For the whole certification of each
 16 company it was \$1,000.
 17 **Q. Per company or for every company?**
 18 A. Per company.
 19 **Q. How many companies did you certify?**
 20 A. About 30, over the ten years or so.
 21 **Q. Do you continue to perform that function?**
 22 A. No.
 23 **Q. When did you discontinue performing that**
 24 **function?**
 25 A. I believe it was two years ago.

1 **Q. So from what period to what period did**
 2 **you perform the certification for BPI?**
 3 A. Probably 2001 to 2011.
 4 **Q. Who did you interact with at BPI related**
 5 **to that?**
 6 A. Steve Mojo.
 7 **Q. How frequently did you interact with**
 8 **Steve concerning the certification issues?**
 9 A. It would be on average about three per
 10 year. So it would have been like probably four
 11 times per certification.
 12 **Q. Did you contact Steve or did Steve**
 13 **contact you first in relationship to this job?**
 14 A. Steve contacted me. He had a series, a
 15 whole list of reviewers.
 16 **Q. Do you know who recommended you for that**
 17 **position?**
 18 A. No.
 19 **Q. Steve didn't mention that?**
 20 A. No.
 21 **Q. Has Steve ever recommended you for other**
 22 **work?**
 23 A. I don't believe so.
 24 **Q. Has Steve ever been responsible for**
 25 **referring companies to give grants to your center?**

1 A. No.
 2 **Q. Have you ever referred companies to Steve**
 3 **for certification or for becoming a member of BPI?**
 4 A. No.
 5 **Q. Do you speak at BPI conferences?**
 6 A. No.
 7 **Q. Have you ever spoken at any event**
 8 **involving BPI?**
 9 A. I spoke at a conference in India that
 10 Steve Mojo also spoke at.
 11 **Q. Were you paid in association with that?**
 12 A. No.
 13 **Q. Did they pay for your transportation to**
 14 **and from?**
 15 MS. JOHNSON: Objection.
 16 A. BPI?
 17 **Q. BPI.**
 18 A. No.
 19 **Q. Anyone else, a corporation?**
 20 A. I think that I had to pay for the air
 21 fare to India, and then they covered the hotel,
 22 the Indian SIPIT they called it, sponsored the
 23 conference.
 24 **Q. What is BEPS?**
 25 A. BioEnvironmental Polymer Society. That's

1 a society for promoting biodegradable and
 2 environmentally degradable polymers. Not
 3 promoting them, but to discuss the science around
 4 biodegradable and environmentally degradable
 5 polymers.
 6 **Q. Did BPI create BEPS?**
 7 A. No.
 8 **Q. It's independent?**
 9 A. Independent.
 10 **Q. Are you a founding member of BEPS?**
 11 A. Yes.
 12 **Q. When was that created?**
 13 A. That's a good question. I think it was
 14 '93. No. '92 or '93.
 15 **Q. Is Metabolix a member or supporter of**
 16 **BEPS?**
 17 A. No.
 18 **Q. I think previously I asked you about**
 19 **complaints, with regard to your knowledge of**
 20 **whether BPI had filed complaints against ECM. Do**
 21 **you know whether BPI filed comments concerning the**
 22 **FTC's green guides?**
 23 A. Comments in -- no.
 24 **Q. You weren't involved with the filing of**
 25 **any comments by BPI, if it did file them, with the**

1 **FTC?**

2 A. That's correct.

3 **Q. Let's take a look at paragraph 22 of your**
4 **report. Now, there you refer to hydrolic**
5 **cleavages. What are hydrolic cleavages?**

6 A. Actually, it should be hydrolytic.

7 **Q. Okay, thank you. There you explain that**
8 **microorganisms secrete enzymes that adhere to the**
9 **surface of the organic materials and cause**
10 **fissures in the molecular chain known as hydrolic**
11 **cleavages, and you meant to say?**

12 A. Hydrolytic.

13 **Q. These cleavages make long-chain molecules**
14 **shorter, resulting in the release of carbon and**
15 **energy (heat). Now, assuming I'm a student or**
16 **whatever, I would like for you to do the same**
17 **thing, can you take a piece of paper for me and**
18 **draw the chemical reaction pathway with chemical**
19 **structures that would illustrate the chemical**
20 **process that you're defining here in paragraph 22?**

21 A. Yes.

22 **Q. Let's get a piece of paper. Can you draw**
23 **that for me?**

24 MS. JOHNSON: A specific polymer?

25 MR. EMORD: I'm looking for the chemical

1 reaction pathway with chemical structures that
2 illustrate the process defined in that paragraph.

3 MS. JOHNSON: He can choose whatever --

4 MR. EMORD: Yes.

5 **Q. Just go right ahead.**

6 A. So this is the polymer.

7 **Q. Can you, with appropriate detail, show me**
8 **how that chemical structure with identification of**
9 **specific enzymes leads to the hydrolytic cleavage**
10 **of the polymer chain, and also the release of the**
11 **elemental carbon and the energy.**

12 A. So this is the cleavage, and then if
13 this -- that was a chain, then this molecule would
14 then be metabolized by the microorganism and
15 converted, used as fuel for heat and release the
16 carbon dioxide.

17 **Q. Have you identified the specific enzymes**
18 **there?**

19 A. So this would be a lipase.

20 **Q. Can you write out the chemical structure**
21 **for the lipase, the chemical structure?**

22 A. Of the enzyme?

23 **Q. Yes.**

24 A. Seriously? Do you know how complex
25 enzymes are?

1 **Q. No, I don't. Let's make this an exhibit.**

2 **(Whereupon, Respondent's Deposition**
3 **Exhibit No. 9, hand-drawn document, marked.)**

4 BY MR. EMORD:

5 **Q. On page 9 of your report, in paragraph 25**
6 **you write that degradation and biodegradation are**
7 **not identical processes. As explained above,**
8 **biodegradation involves microorganisms breaking**
9 **down material into its constituent elements, that**
10 **is, elements found in nature. Degradation (or**
11 **disintegration) involves fragmenting of the**
12 **polymer chain due to mechanical stress or**
13 **chemicals.**

14 **Page 9, paragraph 27, you go on to state:**
15 **Notably, the critical difference between**
16 **degradation and biodegradation is significant to**
17 **my opinions herein, because ECM's testing**
18 **materials sometimes conflate these two distinct**
19 **concepts, and erroneously infer that**
20 **biodegradation has occurred merely because ECM**
21 **plastic has disintegrated.**

22 **If I understand you correctly, you're**
23 **saying that these two processes, one being biotic,**
24 **biodegradation, and the other being abiotic,**
25 **degradation, are understood in science to be**

1 **distinct and that a proper scientific analysis**
2 **would never conflate the two concepts and consider**
3 **the two part of biodegradation; is that a fair**
4 **summary?**

5 MS. JOHNSON: Objection.

6 A. They are two separate processes. They
7 may occur at the same time, but the
8 disintegration, the chemical and basically the
9 oxidation would occur abiotically, whereas the
10 biodegradation has to occur with microorganisms.

11 **Q. Would it be an error for a scientist to**
12 **characterize an abiotic process as part of**
13 **biodegradation?**

14 A. It would be more proper to separate the
15 two, but the abiotic process could lead to
16 degradation that may enhance biodegradation.

17 **Q. Are you aware within the last -- are you**
18 **aware of the existence of any article within the**
19 **Journal of Polymer Environment, which identifies**
20 **abiotic processes as a part of biodegradation?**

21 A. Not specifically, but you probably have
22 one.

23 **Q. And if you read an article that did do**
24 **that, would you consider it to be appropriate to**
25 **publish in the journal?**

1 A. Again, I don't censor the articles. So
2 if it's someone's opinion that abiotic -- I mean,
3 if they're calling it abiotic, then obviously it's
4 not biodegradation, because it's abiotic.

5 **Q. So if someone were to call something**
6 **abiotic, it would be an error to then include that**
7 **as a part of biodegradation, in your view?**

8 MS. JOHNSON: Objection. Asked and
9 answered.

10 A. Again, unless it promoted biodegradation.

11 **Q. Is it possible that a first stage process**
12 **of biodegradation would be depolymerization of the**
13 **macro molecules into shorter chains?**

14 A. Yes.

15 **Q. And does that normally occur outside the**
16 **organism due to the size of the polymer chain and**
17 **the insoluble nature of many polymers?**

18 A. Mostly.

19 **Q. Is it fair to say that extracellular**
20 **enzymes and/or exoenzymes and abiotic reactions**
21 **are responsible for the polymeric chain cleavage?**

22 A. Yes.

23 **Q. And what does abiotic mean?**

24 A. It does not involve microorganisms.

25 **Q. Nonbacterial?**

1 A. Right.

2 **Q. I notice in your expert report, in those**
3 **paragraphs that we've mentioned, that you did not**
4 **cite any peer-reviewed publication or any**
5 **publication at all in support of the descriptions**
6 **of degradation and biodegradation that you give in**
7 **paragraphs 25 and 27; is that right?**

8 A. I have my publications, which I have
9 attached to my CV.

10 **Q. Right. But as far as giving me a**
11 **specific citation in paragraph 25 and 27, you give**
12 **none, right?**

13 A. I give no specific one.

14 **Q. Can you name for me a single**
15 **peer-reviewed journal article that describes**
16 **degradation and biodegradation as you have in**
17 **paragraphs 25 and 27?**

18 A. So the biodegradation is very similar to
19 what I've described in the Andrady book.

20 **Q. You're pointing to Exhibit Number --**

21 A. 2.

22 **Q. So that's the definition for**
23 **biodegradation. Now let's take a look at**
24 **degradation. And we're specifically looking for**
25 **this concept of it being distinct from**

1 **biodegradation as you've described in paragraph 27**
2 **and 25.**

3 A. I would have to go through the
4 publications.

5 **Q. But as you sit here today, you can't**
6 **recall a specific publication?**

7 A. Not the specific one.

8 **Q. That's all right. Now, you have other --**
9 **perhaps U Mass Lowell has other patents that you**
10 **were an inventor on, right?**

11 A. Yes.

12 **Q. I have patent number 5,439,985 dated**
13 **1995. What is that patent for?**

14 A. Which one?

15 **Q. 5,439,985?**

16 A. That's biodegradable and hydrogradable
17 diblock copolymers composed of
18 poly(b-hydroxyalkanoates) and poly(lactones) or
19 poly(lactide) chain segments.

20 **Q. Is there an exclusive licensee for that?**

21 A. I don't think so.

22 **Q. Is it licensed at all?**

23 A. I don't think so.

24 **Q. How about patent 5,440,007, 1995.**

25 A. Composition of and method for forming

1 high molecular weight predominantly syndiotactic
2 substituted-poly(b-Propioesters).

3 **Q. Is there a licensee for that one?**

4 A. I don't believe so.

5 **Q. And patent number 6,093,792, dated 2006?**

6 A. That's bioresorbable copolymers.

7 **Q. Is that one licensed?**

8 A. I don't believe so.

9 **Q. Are there any other patents that you**
10 **have, that is, that you are the inventor or that**
11 **you hold?**

12 A. I don't hold any of them. There's a list
13 here.

14 **Q. Are any of those licensed? A list here,**
15 **you're pointing to the back of your report**
16 **document, which is publications, and you're**
17 **looking under patents issued in that appendix.**
18 **Are any of those, other than the '199, licensed?**

19 A. So the 7,763,663 is licensed.

20 **Q. To whom or to what?**

21 A. To Anterios.

22 **Q. What is that patent?**

23 A. That's Polysaccharide-containing block
24 copolymer particles and uses thereof.

25 **Q. What is it about?**

1 A. It's about a copolymer -- a block
 2 copolymer between pullulan and polycaprolactone.
 3 **Q. Is that for a compostable plastic?**
 4 A. It's not licensed for a compostable.
 5 That's not what the company is using it for.
 6 **Q. What is it for?**
 7 A. It's for transdermal delivery.
 8 **Q. Okay. Like a patch?**
 9 A. No, a cream. Do you want to know what
 10 the active ingredient is?
 11 **Q. Sure.**
 12 A. Botox.
 13 **Q. Any others that were licensed?**
 14 A. The second one down, Novel biodegradable
 15 bone plates and bonding systems, that one was
 16 licensed to a company, and that license has been
 17 discontinued, and it's currently being offered to
 18 another company.
 19 **Q. Who is it being offered to? Who had it**
 20 **and who is it being offered to?**
 21 A. Dartmouth Medical, and I can't remember
 22 the name of the company -- I don't know whether it
 23 has been licensed yet. But as soon as it is, I'll
 24 know.
 25 **Q. The 7,763,663 patent, who is the licensee**

1 **there?**
 2 A. 7,763,663?
 3 **Q. Yes.**
 4 A. I've already mentioned that, Anterios.
 5 **Q. Any others that are licensed?**
 6 A. So the ones that all say -- from surface
 7 finishing, to molded article, anything with Tom
 8 Ellison in it, were licensed to Valtech. But that
 9 company I don't think exists anymore.
 10 **Q. And are any of those biodegradable or**
 11 **compostable type products?**
 12 A. No.
 13 **Q. The novel plates were biodegradable?**
 14 A. Yes.
 15 **Q. And how about the 7,763,663?**
 16 A. Yes.
 17 **Q. Any others?**
 18 A. Any others that are biodegradable and
 19 licensed?
 20 **Q. Yes, or compostable.**
 21 A. And licensed.
 22 **Q. And licensed. You did mention 5,440,007,**
 23 **'95 patent, and the 5,439,985, but those are not**
 24 **licensed?**
 25 A. No.

1 **Q. And the 6,093,792, and that's not**
 2 **licensed either?**
 3 A. Right.
 4 **Q. So the two that are licensed are**
 5 **7,963,663, and what was the number for the novel**
 6 **biodegradable bone plates?**
 7 A. 0234754 A1.
 8 MR. EMORD: For those two, Counsel, I
 9 would like to ask that they be -- that the patents
 10 be produced and any underlying documentation that
 11 the witness has or can acquire be produced.
 12 **Q. Let's go on to a couple of questions**
 13 **about the report. Is it your contention that**
 14 **plastics are free of impurities, additives and**
 15 **processing aids?**
 16 A. You mean in terms of --
 17 **Q. In the real world, plastics have**
 18 **impurities, additives, processing aids in them,**
 19 **right?**
 20 A. There are some plastics used for medical
 21 applications that are free of those impurities.
 22 **Q. Are they completely free of impurities,**
 23 **additives and processing aids?**
 24 A. Some of them are.
 25 **Q. But for the rest of the market, the**

1 **plastics contain impurities and processing aids**
 2 **and additives?**
 3 A. To some degree.
 4 **Q. Do you contend that these impurities,**
 5 **additives, processing aids that are in plastics**
 6 **generally do not create hospitable environments**
 7 **for microorganisms?**
 8 A. There could be some additives that are
 9 degradable.
 10 **Q. Aside from that, just, not additives that**
 11 **specifically are for the purpose of degradation,**
 12 **but just in the normal processing of virtually all**
 13 **plastics, the impurities, the additives, the**
 14 **processing aids, generally, do those in your view**
 15 **create a hospitable environment for**
 16 **microorganisms?**
 17 MS. JOHNSON: Objection. Vague as to
 18 hospitable.
 19 **Q. You can answer.**
 20 A. I would say the vast majority would not
 21 fall into that category.
 22 **Q. And in paragraph 37 of your expert,**
 23 **report you describe there to be -- you use the**
 24 **language, overwhelming scientific consensus that**
 25 **conventional plastics are not biodegradable after**

1 customary disposal. I saw no specific citation
2 for that proposition in paragraph 37. Can you
3 cite for me a peer-reviewed scientific publication
4 that supports that proposition that there is an
5 overwhelming scientific consensus that
6 conventional plastics are not biodegradable after
7 customary disposal?

8 A. This article.

9 Q. Exhibit Number 2?

10 A. Yes.

11 Q. Where in Exhibit Number 2?

12 A. 9.2.

13 Q. And specifically where?

14 A. Page 360, 9.2.

15 MS. JOHNSON: Are you referring to the
16 whole section?

17 A. Yes. The justification section.

18 Q. And there you say that the specific --
19 the entire section then stands for the proposition
20 that there is an overwhelming scientific consensus
21 that conventional plastics are not biodegradable
22 after customary disposal?

23 A. Yes, and there's references too, number 2
24 in particular, environmental issues and
25 opportunities.

1 Q. Number 2, and the reference is on page
2 370 you're referring to?

3 A. Yes.

4 Q. Anything else?

5 A. There's probably more.

6 Q. Are you aware any of publications that
7 conclude that conventional plastics are
8 biodegradable?

9 A. By conventional plastics, do you mean the
10 biodegradable plastic subset?

11 Q. You tell me what conventional plastics,
12 what that term is generally understood to mean?

13 A. Typically, it is the inexpensive plastics
14 that we use every day, the vast majority of -- the
15 large quantity plastics.

16 Q. And as I say, you're not familiar with
17 any peer-reviewed journal articles that discuss
18 the biodegradability of conventional plastics?

19 MS. JOHNSON: Objection.

20 A. Within one year?

21 Q. No. I'm not using that definition. Just
22 the term biodegradability as it's used in the
23 scientific publications. As used in the
24 scientific publications, are you familiar with any
25 scientific publications peer-reviewed that stand

1 for the proposition that conventional plastics do
2 indeed biodegrade?

3 A. Yes.

4 Q. Now, what publications are you familiar
5 with that stand for the proposition that
6 conventional plastics biodegrade?

7 A. There are publications concerning
8 polyethylene.

9 Q. Any other plastic? In particular
10 polyethylene terephthalate, polyvinylchloride,
11 polystyrene, polypropylene?

12 A. I think there are some on polypropylene.
13 I think there's one on PET.

14 Q. And these stand for the proposition that
15 these plastics are biodegradable?

16 A. No. Some -- not completely, but there's
17 some degradation.

18 Q. There's some biodegradation taking place?

19 A. That's their assumption.

20 MR. EMORD: Let's mark for identification
21 Exhibit 10, a copy of an article in the
22 International Journal of Molecular Sciences dated
23 2009.

24 (Whereupon, Respondent's Deposition
25 Exhibit No. 10, Biodegradability of Plastics,

1 marked.)

2 BY MR. EMORD:

3 Q. My question is whether you have seen this
4 article before?

5 A. Yes.

6 Q. When did you first see this article?

7 A. I'm not sure.

8 Q. Was it only in connection with this
9 proceeding, or was it before this proceeding?

10 A. I believe it was in connection with this
11 proceeding.

12 Q. Prior to this proceeding, you had not
13 seen that article?

14 A. I don't believe so.

15 Q. If you look at paragraph 67 of your
16 report, in particular on page 27, the last -- the
17 second to the last statement. This is contrary to
18 widely accepted scientific knowledge regarding how
19 such microorganisms function with respect to
20 conventional plastic. Do you see that sentence?

21 A. Yes.

22 Q. There is no citation specifically listed
23 for that sentence, correct?

24 A. That is correct.

25 Q. Can you cite for me a peer-reviewed

1 **journal article which concludes that it is**
 2 **contrary to widely accepted scientific knowledge**
 3 **that microorganisms work synergistically to**
 4 **produce enzymes that metabolize plastic?**

5 A. Well, this one that you just handed me
 6 says that conventional plastics such as
 7 polyethylene, polypropylene, polystyrene,
 8 polyvinylchloride, and PET are nonbiodegradable.

9 **Q. However, does the article conclude that**
 10 **those plastics are entirely impervious to**
 11 **biodegradation?**

12 A. I mean, that's what it says, that they're
 13 nonbiodegradable.

14 **Q. Elsewhere in the article, does that it**
 15 **reveal any information that indicates that those**
 16 **plastics do biodegrade?**

17 MS. JOHNSON: Objection. Just the plain
 18 plastic or untreated conventional plastics?

19 MR. EMORD: Here the article is
 20 concerning untreated plastics.

21 A. I think that this author, the conclusion
 22 is that they're nonbiodegradable.

23 **Q. That's your view of that article. Does**
 24 **the author of the article indicate that the**
 25 **plastics undergo a conversion that makes them**

1 **biodegradable, that is, the nonbiodegradable**
 2 **plastics undergo a conversion that can make them**
 3 **biodegradable? In particular, there is an**
 4 **alteration from short-chain low-molecular weight**
 5 **to some other form as a result of interactivity**
 6 **with microorganisms between the microorganisms and**
 7 **plastics?**

8 MS. JOHNSON: Objection.

9 **Q. I don't want to lock you into 10 for a**
 10 **response to this question. Let me ask you this**
 11 **question.**

12 **Is it your opinion that short-chain**
 13 **low-molecular-weight polymers are metabolized by**
 14 **some microorganisms?**

15 A. I would say some short-chain
 16 low-molecular-weight polymers are metabolized by
 17 microorganisms.

18 **Q. If you look at footnote 20 of your report**
 19 **on page 29, you recite in footnote 20 that there**
 20 **has been one documented instance of a particular**
 21 **strain of fungi capable of biodegrading a**
 22 **petroleum-based plastic. And you do provide a**
 23 **citation for that.**

24 **Then you say, there's no evidence that**
 25 **any of these strains exist in the United States or**

1 **in landfills in the U.S. But you do not provide a**
 2 **citation for that.**

3 **First, let me ask you this, is it your**
 4 **proposition then that there is only one strain of**
 5 **fungi capable of biodegrading plastic?**

6 MS. JOHNSON: Objection.
 7 Mischaracterizes his testimony.

8 A. No.

9 **Q. What is your opinion as to whether fungi**
 10 **can biodegrade plastic?**

11 A. There are plastics that can be degraded
 12 by fungi. This here is a particular -- this is
 13 the only documented thing that I've seen, is that
 14 this strain lived totally on this polymer, which
 15 was unique.

16 **Q. And upon what evidentiary basis do you**
 17 **rely for the proposition that there is no evidence**
 18 **that any of these strains, you used the words**
 19 **these strains in reference to the fungi, you**
 20 **referred previously to a particular strain, but**
 21 **then you say these strains exist in the U.S. and**
 22 **landfills in the U.S. What is your evidentiary**
 23 **basis for the proposition that there is no**
 24 **evidence that any of these strains exist in the**
 25 **U.S. or in landfills?**

1 A. Because I haven't found any evidence of
 2 it.

3 **Q. But you have no affirmative evidence in**
 4 **the form of peer-reviewed literature in the area**
 5 **of biochemistry or microbiology that establishes**
 6 **that these strains are not extant in the**
 7 **continental confines of the United States?**

8 A. So --

9 **Q. In other words, do you have affirmative**
 10 **proof that these strains don't exist in the United**
 11 **States?**

12 A. That's my opinion.

13 **Q. But you have no specific proof?**

14 A. This is a biodegradable polymer anyway.

15 **Q. But you have no specific proof that those**
 16 **strains don't exist in the United States?**

17 A. My statement is I haven't seen evidence
 18 that they exist in the United States.

19 **Q. But you haven't seen evidence that they**
 20 **affirmatively do not exist in the United States?**

21 MS. JOHNSON: Objection. Asked and
 22 answered.

23 A. I haven't seen evidence that they do
 24 exist.

25 **Q. Or that they do not exist in the United**

1 States?

2 MS. JOHNSON: Objection.

3 A. I don't know what kind of evidence would
4 be that they do not exist.

5 **Q. Such as in a peer-reviewed journal
6 article related to this field of study, in which
7 there was a specific conclusion that these strains
8 do not exist in the United States?**

9 A. I have not seen that.

10 **Q. Now, if we turn to paragraph 86 of your
11 report.**

12 (Recess.)

13 BY MR. EMORD:

14 **Q. Is polycaprolactone a biodegradable
15 plastic?**

16 A. Yes.

17 **Q. Are polyolefins biodegradable?**

18 A. Most of the evidence says no. There is
19 some evidence, I think, from Ann-Christine
20 Albertsson that maybe one percent degrades in I
21 think it was a couple years from the carbon 14.
22 There are some other indications that possibly the
23 low-molecular-weight oxidized polyethylene may be
24 degradable.

25 **Q. Now, are you familiar with the**

1 **peer-reviewed works of Ying Zheng on plastic waste
2 biodegradation?**

3 A. I believe it's one of the papers that I
4 reviewed.

5 **Q. Did you know of the existence of that
6 article before the litigation in this case?**

7 A. I don't believe so.

8 **Q. Did you know of the existence of that
9 article before you wrote your expert report in the
10 case?**

11 A. I don't know.

12 **Q. You have no specific recollection?**

13 A. No.

14 (Whereupon, Respondent's Deposition
15 Exhibit No. 11, A Review of Plastic Waste
16 Biodegradation, marked.)

17 BY MR. EMORD:

18 **Q. Is this the article that you mentioned
19 you saw in connection with this litigation?**

20 A. Yes.

21 **Q. Now, does it refresh your recollection as
22 to whether you've seen it before you wrote your
23 expert report?**

24 A. I don't remember.

25 **Q. Now, in the abstract part of it, which is**

1 a summary, Dr. Zheng writes, this review looks at
2 the technological advancement made in the
3 development of more easily biodegradable plastics
4 and the biodegradation of conventional plastics by
5 microorganisms.

6 **Do you see that on the front page?**

7 A. Yes.

8 **Q. I know you said you've become familiar
9 with this through the course of the litigation,
10 but I'd like you to take moment before I ask you
11 questions and look at the article, and when you
12 have done that, just let me know. I want you to
13 refresh your recollection as to its content. If
14 you need to look at something in particular and
15 take more time, we can do that.**

16 A. Okay.

17 **Q. Now, I wanted to ask you whether you
18 agree with the author, and more particularly, is
19 there anything in this article with which you
20 disagree?**

21 A. This is a review of other work.

22 **Q. Right. My question is: As far as the
23 content of the article is concerned, is there any
24 specific aspect of it that you find to be in
25 error?**

1 A. I mean, there may be some of the work
2 that he's citing that may be in error.

3 **Q. But as far as his analysis and
4 conclusions are concerned, do you find anything
5 remiss?**

6 A. His statement about -- I'm not sure that
7 he has the thermoset plastics such as aliphatic
8 polyester.

9 **Q. Where are you looking at now?**

10 A. In the middle of the abstract.

11 **Q. What page?**

12 A. Page 243.

13 **Q. In particular what part?**

14 A. The middle.

15 **Q. Where he refers to thermoset plastics
16 such as and so forth?**

17 A. Yes.

18 **Q. What do you find in error?**

19 A. I think he might have meant thermoplastic
20 plastics.

21 **Q. Instead of thermoset plastics?**

22 A. Yes.

23 **Q. Anything else?**

24 A. Not that I've found.

25 **Q. Let me ask you this question: Can you**

1 **name for me the kinds of enzymes used by microbial**
2 **life to degrade plastics?**

3 MS. JOHNSON: Objection.

4 A. You mean the general classes?

5 **Q. The different classes of enzymes that are**
6 **used.**

7 A. There's basically hydrolases and
8 oxydases.

9 **Q. And can you give me some specific kinds**
10 **of hydrolases that are used by microorganisms to**
11 **degrade plastics?**

12 MS. JOHNSON: Objection to plastics.

13 A. Biodegradable plastics?

14 **Q. Well, yes.**

15 A. Lipases and proteinases and oxidases,
16 peroxidases.

17 **Q. Anything else in the hydrolase category?**

18 A. I've worked a lot with proteinase K. I'm
19 sure there's lots of them that I've seen. I don't
20 have them memorized.

21 **Q. Is it fair to say that your work has**
22 **focused on a subset of the universe of all of the**
23 **hydrolases?**

24 A. Sure.

25 **Q. And you mentioned proteinase K. Is there**

1 **another hydrolase that you've worked with?**

2 A. Possibly, but I don't recall at this
3 time.

4 **Q. The one you do distinctly recall is**
5 **proteinase K. How about in the oxidases, can you**
6 **name for me the oxidases?**

7 A. I haven't worked with any of the
8 oxidases.

9 **Q. You really can't name oxidases that might**
10 **be involved in --**

11 A. Well, there's horseradish peroxidase.
12 That's a common one.

13 **Q. Any others?**

14 A. I'm sure I've seen them, but I haven't
15 memorized them.

16 **Q. Now, have you read -- I have to spell out**
17 **his name, B-H-A-R-D-W-A-J -- Bhardwaj, perhaps,**
18 **his article on Microbial Population Associated**
19 **with Plastic Degradation?**

20 A. I believe I have.

21 **Q. Did you read that before you wrote your**
22 **expert report, or is that something that has come**
23 **to your attention since the drafting of your**
24 **expert report?**

25 A. If it wasn't provided to me by complaint

1 counsel, it probably would have been after.

2 MR. EMORD: So let's mark this as an
3 Exhibit 12.

4 (Whereupon, Respondent's Deposition
5 Exhibit No. 12, Microbial Population Associated
6 with Plastic Degradation, marked.)

7 BY MR. EMORD:

8 **Q. Go ahead and take a moment to read the**
9 **article. It's not that long.**

10 A. Okay.

11 **Q. If we look at paragraph 2 under the**
12 **introduction on the first page, a definition is**
13 **given for biodegradation. Did you agree with that**
14 **definition?**

15 A. Again, this is a review article that's
16 just reporting 7, 8, 9, 10 and 11.

17 **Q. It is a review article, and there are**
18 **many articles reviewed as a part of that. He**
19 **gives a definition for biodegradation in the**
20 **second paragraph. The question is whether that**
21 **definition, which is in the first sentence, is one**
22 **with which you agree or disagree?**

23 A. Well, I disagree with the polyethylene,
24 polystyrene.

25 **Q. Any other aspect of it?**

1 A. I think he's combining both

2 biodegradation and environmental degradation.

3 **Q. He is.**

4 A. Yes.

5 **Q. Thank you for pointing that out. When it**
6 **comes to this sentence, I want you to tell me**
7 **whether you agree or disagree with this statement.**
8 **Microorganisms degrade the polymers like**
9 **polyethylene, polyurethane by using it as a**
10 **substrate for their growth. Do you agree with**
11 **that?**

12 A. No.

13 **Q. What is your opinion as to that sentence?**

14 A. It doesn't indicate a mechanism. By
15 using it for their growth is not a mechanism for
16 degradation.

17 **Q. He explains the mechanism here shortly,**
18 **and we'll get into that. So you disagree with**
19 **that. Is there a specific source that you would**
20 **base your disagreement upon? I notice he lists a**
21 **source as footnote 8, and in footnote 8 he lists**
22 **Glass JE, Swift G, Agricultural and Synthetic**
23 **Polymers, Biodegradation and Utilization, ACS**
24 **Symposium Series 433, American Chemical Society,**
25 **Washington, D.C., for the proposition that you**

1 **just stated in challenging it. Do you have a**
 2 **source that you would rely upon?**
 3 A. The one you gave me from Tokiwa.
 4 **Q. You would use that as a source?**
 5 **Specifically what in Tokiwa would you rely upon?**
 6 A. Plastics such as polyethylene,
 7 polystyrene, polypropylene polyvinylchloride are
 8 nonbiodegradable.
 9 **Q. So as a general proposition, many**
 10 **scientists take the position that is articulated**
 11 **there. That is with regard to the, is it**
 12 **hydrophobic versus, the hydrophilic versus**
 13 **hydrophobic aspects, correct?**
 14 MS. JOHNSON: Objection.
 15 **Q. When you start off with PE and PP from a**
 16 **hydrophilic source to a hydrophobic source, does**
 17 **that enable -- that transformation enable**
 18 **otherwise nonbiodegradable polymers to become**
 19 **biodegradable?**
 20 A. No.
 21 **Q. So can microorganisms transform the**
 22 **surfaces of say PP and PE from hydrophilic to**
 23 **hydrophobic?**
 24 A. I don't believe so.
 25 **Q. You're not aware of any scientific**

1 **evidence on that transformation?**
 2 A. I am not.
 3 **Q. Now, if you look at page 2 of the article**
 4 **under the heading mechanism of enzymatic**
 5 **biodegradation. I'll have the court reporter**
 6 **insert into the transcript at this point the**
 7 **entire content of the paragraph under the heading**
 8 **mechanism of enzymatic biodegradation as a point**
 9 **of reference.**
 10 "Mechanism of Enzymatic Biodegradation.
 11 "The most attractive plastic waste
 12 treatment method is enzymatic degradation.
 13 Polyethylene degradation through microbial enzymes
 14 comprises two steps. Firstly enzyme adheres to
 15 the polyethylene substrate and then catalyzes a
 16 hydrolic cleavage. Intracellular and
 17 extracellular depolymerases in fungi and bacteria
 18 degrade the polyethylene. Endogenous carbon
 19 content by the accumulating bacteria themselves is
 20 hydrolyzed through intracellular degradation while
 21 the utilization of exogenous carbon source not
 22 necessarily by accumulating microorganisms is the
 23 extracellular degradation. Complex polymers
 24 disintegrate into short chains of oligomers,
 25 dimers, and monomers which can pass through the

1 **bacterial membranes and act as a source of carbon**
 2 **and energy. This process is referred as**
 3 **depolymerization. And mineralization is the**
 4 **degradation process in which the end products are**
 5 **carbon dioxide (CO₂), water (H₂O), or methane**
 6 **(CH₄) are produced. Temperature, pressure and**
 7 **moisture are the physical parameters which**
 8 **mechanically damage the polymers due to which the**
 9 **biological forces like enzymes and other**
 10 **metabolites produced by microbes induce the**
 11 **process. The mechanism of the biodegradation of**
 12 **plastics can be easily understood by following the**
 13 **flow chart (Figure 1)."**
 14 Now, there Dr. Bhardwaj describes in some
 15 detail his view of the mechanism of enzymatic
 16 degradation, and I want to go through it in parts.
 17 I want to take parts of it and get your opinion.
 18 He says, the most attractive plastic waste
 19 treatment method is enzymatic degradation. Would
 20 you agree with that?
 21 A. No.
 22 **Q. What is your opinion?**
 23 A. My opinion would be production of enzymes
 24 for treating waste would probably be very
 25 expensive.

1 **Q. Now, when you take a look at the next**
 2 **part of his analysis there, he starts off, he**
 3 **gives two parts, polyethylene degradation through**
 4 **microbial enzymes comprises two steps. First,**
 5 **enzyme adheres to the polyethylene substrate and**
 6 **then catalyzes a hydrolytic cleavage. Do you**
 7 **agree with that?**
 8 MS. JOHNSON: I think it says hydrolic
 9 cleavage.
 10 **Q. Okay. Do you agree with that?**
 11 A. No.
 12 **Q. And what is your opinion?**
 13 A. My opinion is that he's wrong.
 14 **Q. In what respect?**
 15 A. That this would be the mechanism for a
 16 polyester.
 17 **Q. Then he says, intracellular and**
 18 **extracellular depolymerases in fungi and bacteria**
 19 **degrade the polyethylene. Do you disagree with**
 20 **that?**
 21 A. Where is that?
 22 **Q. The very next sentence.**
 23 A. I disagree with that.
 24 **Q. In what respect do you disagree with**
 25 **that?**

1 A. He's referring to reference 31.
 2 **Q. Which is?**
 3 A. Which is degradation of microbial
 4 polyesters. I think he's talking about
 5 polyesters.
 6 **Q. It's your opinion that he did not mention**
 7 **but should have mentioned that he meant or should**
 8 **have meant polyesters?**
 9 A. I mean, that's what he gives as proof,
 10 and if he did say microbial polyesters, it would
 11 all make sense.
 12 **Q. But he doesn't limit it in that way?**
 13 A. He doesn't say it.
 14 **Q. Then he goes on to say, endogenous carbon**
 15 **content by the accumulating bacteria themselves is**
 16 **hydrolyzed through intracellular degradation,**
 17 **while the utilization of exogenous carbon source**
 18 **not necessarily by accumulating microorganisms is**
 19 **the extracellular degradation.**
 20 A. Again, that would be correct for
 21 microbial polyesters.
 22 **Q. But he is talking about extracellular**
 23 **degradation, and he is talking about an abiotic**
 24 **process there, no?**
 25 MS. JOHNSON: Objection.

1 **Q. Is that a biotic or an abiotic process?**
 2 A. This would be biotic.
 3 **Q. Complex polymers disintegrate into short**
 4 **chains of oligomers, dimers and monomers which can**
 5 **pass through the bacterial membranes and act as a**
 6 **source of carbon and energy.**
 7 **Do you agree with that or is it again in**
 8 **your view restricted to polyesters?**
 9 A. I think he's talking about polyesters.
 10 **Q. You wouldn't agree with that general**
 11 **proposition unless it was cabined with language**
 12 **referring to polyesters?**
 13 MS. JOHNSON: Objection.
 14 A. Yes. I think he's misquoted the
 15 reference.
 16 **Q. His own reference?**
 17 A. Not his own.
 18 **Q. Well, the one that he cites?**
 19 A. Yes.
 20 **Q. He says, this process is referred to as**
 21 **depolymerization, and then he says, and**
 22 **mineralization is the degradation process in which**
 23 **the end products are carbon dioxide, water or**
 24 **methane, that they are produced. Again is this**
 25 **the same thing, this occurs with polyesters but**

1 **not with others?**
 2 MS. JOHNSON: Objection.
 3 Mischaracterizes his testimony.
 4 A. That's my conclusion. This is enzymatic
 5 biodegradation of polyester.
 6 **Q. Then he refers to temperature, pressure**
 7 **and moisture are the physical parameters which**
 8 **mechanically damage the polymers due to which the**
 9 **biological forces like enzymes and other**
 10 **metabolites produced by microbes induce the**
 11 **process. Here it seems he's talking about a**
 12 **synergistic or a complementary circumstance**
 13 **between biotic and abiotic processes. Do you**
 14 **disagree with that characterization?**
 15 A. Yes.
 16 **Q. Because you would say that they have to**
 17 **be considered distinct, right?**
 18 A. No.
 19 **Q. Why would you disagree?**
 20 A. I wouldn't consider temperature, pressure
 21 and moisture to be a form of mechanical damage.
 22 **Q. What would you consider it?**
 23 A. It would be more of a chemical
 24 degradation due to the enzymes. Enzymes only
 25 catalyze the reaction.

1 **Q. And look at his figure 1. Is his figure**
 2 **1, in your judgment, remiss in any respect?**
 3 A. Figure 1 is, I think, a reasonable
 4 pathway for some degradation of biodegradable
 5 polymers.
 6 **Q. Which ones do you think it wouldn't apply**
 7 **to?**
 8 A. Polylactic acid.
 9 **Q. Any others?**
 10 A. Polydioxanone.
 11 **Q. Any others?**
 12 A. Polyglycolic acid.
 13 **Q. Any others?**
 14 A. Polyvinyl alcohol.
 15 **Q. Any others? Let's do it this way. Would**
 16 **you say that this figure 1 is applicable to most**
 17 **polymers or to only a minority of them?**
 18 MS. JOHNSON: Objection. Plastic
 19 polymers?
 20 A. Minority.
 21 **Q. Are the surfaces of polypropylene and**
 22 **polyethylene plastics hydrophilic or hydrophobic?**
 23 A. Hydrophobic.
 24 **Q. Can microorganisms transform**
 25 **polypropylene and polyethylene plastics from**

1 hydrophilic to hydrophobic?

2 MS. JOHNSON: Objection.

3 A. By themselves? I don't believe so.

4 **Q. By themselves is rather stringent,**

5 **because they're in the environment. I don't mean**

6 **by themselves, I mean, does this occur?**

7 A. No. You said do microorganisms cause it.

8 **Q. Can microorganisms transform the surfaces**
9 **of polypropylene and polyethylene from hydrophilic**
10 **to hydrophobic?**

11 A. No.

12 **Q. Are you familiar with the work of**
13 **Dr. J. Arutchelvi, A-R-U-T-C-H-E-L-V-I?**

14 A. I have seen that.

15 **Q. Did you see that before you wrote your**
16 **expert report or afterwards?**

17 A. Again, if it wasn't produced by complaint
18 counsel, then it would have been after.

19 MR. EMORD: Let's mark it for
20 identification as Exhibit 13.

21 (Whereupon, Respondent's Deposition
22 Exhibit No. 13, Biodegradation of Polyethylene and
23 Polypropylene, marked.)

24 BY MR. EMORD:

25 **Q. Have you read this article?**

1 A. Yes, I have.

2 **Q. And if you'll look on page 10, which is**
3 **the second page in, under the title of mechanism**
4 **of biodegradation, and I would ask that the court**
5 **reporter insert at this point in the deposition**
6 **the entirety of the content of page 10 under the**
7 **mechanism of biodegradation heading.**

8 "Mechanism of Biodegradation.

9 "Biodegradation of polymers involves
10 following steps:

11 1. Attachment of microorganism to the
12 surface of the polymer.

13 2. Growth of microorganism utilizing the
14 polymer as the carbon source.

15 3. Primary degradation of the polymer and

16 4. Ultimate degradation.

17 Microorganisms can attach to the surface,
18 if the polymer surface is hydrophilic. Since PP
19 and PE have only CH₂ groups, the surfaces are
20 hydrophobic. Initial physical or chemical
21 degradation leads to the insertion of hydrophilic
22 groups on the polymer surface making it more
23 hydrophilic (insertion of hydrophilic groups also
24 decreases the surface energy). Once the organism
25 gets attached to the surface, it starts growing by

1 using the polymer as the carbon source. In the
2 primary degradation, the main chain cleaves,
3 leading to the formation of low-molecular-weight
4 fragments (oligomers), dimers or monomers. The
5 degradation is due to the extracellular enzymes
6 secreted by the organism. These low-molecular-
7 weight compounds are further utilized by the
8 microbes as carbon and energy sources. Small
9 oligomers may also diffuse into the organism and
10 get assimilated. The ultimate products of
11 degradation are CO₂, H₂O and biomass under aerobic
12 conditions. Anaerobic microorganisms can also
13 degrade these polymers under anoxic conditions.
14 The primary products then are CO₂, H₂O, CH₄ and
15 biomass under methanogenic condition or H₂S, CO₂
16 and H₂O under sulfidogenic condition. The
17 environmental conditions decide the group of
18 microorganisms and the degradative pathway
19 involved. Ultimate degradation of recalcitrant
20 synthetic polymers may take several hundred years.
21 Additives, antioxidants and other stabilizers
22 added to commercial polymers may be toxic to the
23 organisms or may slow down the rate of
24 biodegradation."

25 **Dr. McCarthy, I would like you to focus**

1 on that section, and I'm going to ask you a
2 question. He explains here in the first part of
3 the paragraph, biodegradation of polymers involves
4 the following steps, and then he lists four steps.
5 Do you agree with that representation of the steps
6 of biodegradation of polymers?

7 A. No.

8 **Q. In what respect do you disagree with it?**

9 A. Typically, the microorganism would
10 secrete the extracellular enzyme to degrade the
11 polymer. The one we went through in, I think, it
12 was the last one.

13 **Q. Where do you think that is germane to**
14 **your criticism of what he's written?**

15 A. He doesn't have it in there.

16 **Q. And you say it should be in there?**

17 A. Yes.

18 **Q. Now, if you look at the sentence**
19 **beginning microorganisms can attach to the surface**
20 **if the polymer surface is hydrophilic. Do you**
21 **agree with that?**

22 A. I'm not sure. It may be easier if it's
23 hydrophilic, but they can probably attach if it's
24 hydrophobic too.

25 **Q. Is this really a matter that is outside**

1 of your area of expertise as a plastics engineer,
 2 more in the zone of a microbiologist or
 3 biochemist?
 4 A. No. This is --
 5 **Q. You feel comfortable with this?**
 6 A. Yes.
 7 **Q. Now, it says since PP and PE have only**
 8 **CH₂ groups, the surfaces are hydrophobic. Initial**
 9 **physical or chemical degradation leads to the**
 10 **insertion of hydrophilic groups on the polymer**
 11 **surface making it more hydrophilic. Insertion of**
 12 **hydrophilic groups also decreases the surface**
 13 **energy. Do you agree or disagree with that?**
 14 A. I disagree with that.
 15 **Q. What is your opinion?**
 16 A. That the -- that this insertion of
 17 hydrophilic groups is not --
 18 **Q. Not important?**
 19 MS. JOHNSON: Objection.
 20 A. I don't think it's realistic.
 21 **Q. It doesn't happen?**
 22 A. I don't think it happens.
 23 **Q. Then he says, once the organism -- excuse**
 24 **me. You don't think it happens. Can you cite for**
 25 **me a source in the peer-reviewed literature that**

1 concludes that it does not happen, specifically
 2 that that does not happen?
 3 A. I think the Tokiwa paper.
 4 **Q. Now, specifically -- what's the number on**
 5 **the front of that one?**
 6 A. 10.
 7 **Q. Exhibit 10. You think that paper**
 8 **establishes that this process does not take place.**
 9 **You're nodding your head yes?**
 10 A. Yes.
 11 **Q. Any other source?**
 12 A. There are probably other sources.
 13 **Q. Is there any original research that**
 14 **you've performed on this issue in your lab?**
 15 A. No.
 16 **Q. Now, if we go on to the next sentence,**
 17 **once the organism gets attached to the surface, it**
 18 **starts growing by using the polymer as the carbon**
 19 **source. Do you see that part?**
 20 A. Yes.
 21 **Q. Do you disagree with that?**
 22 A. Yes.
 23 **Q. Do you have a source that would stand for**
 24 **that proposition? The same thing, Tokiwa?**
 25 A. There's many sources that microorganisms

1 can't -- that the large high-molecular-weight
 2 polymers that are solid, so in order to have a
 3 surface, it has to be solid, that the
 4 microorganisms cannot then -- cannot take that
 5 in -- it's just not realistic.
 6 **Q. If the microorganism were to be able to**
 7 **transfer a polymer surface to hydrophilic, which**
 8 **would lower necessarily the weight, molecular**
 9 **weight, right?**
 10 MS. JOHNSON: Objection.
 11 A. No. It says they're inserting
 12 hydrophilic groups.
 13 **Q. Would this lower the molecular weight or**
 14 **have no effect on the molecular weight?**
 15 A. No effect.
 16 **Q. Now, it then proceeds with, in the**
 17 **primary degradation the main chain cleaves leading**
 18 **to the formation of low-molecular-weight fragments**
 19 **(oligomers), dimers, and monomers. You disagree**
 20 **with that. Is that true? In the primary**
 21 **degradation the main chain cleaves leading to the**
 22 **formation of low-molecular-weight fragments.**
 23 A. So the next sentence -- he doesn't give a
 24 mechanism for the cleavage of the main chain. He
 25 just says the main chain cleaves, which isn't

1 realistic.
 2 **Q. You don't think that happens?**
 3 A. I think that he should have put the next
 4 sentence before that. Without the extracellular
 5 enzymes, the chain is not going to cleave by
 6 itself.
 7 **Q. And he cites for this proposition number**
 8 **24, Vasile C, Degradation and Decomposition, in**
 9 **the Handbook of Polyolefins and Properties in**
 10 **1993. Are you familiar with that publication?**
 11 A. I don't believe so.
 12 **Q. Let's go on to the next sentence. The**
 13 **degradation is due to the extracellular enzymes**
 14 **secreted by the organism. Do you agree or**
 15 **disagree with that?**
 16 A. That would be how it would degrade if it
 17 was a polyester.
 18 **Q. But only if it was a polyester?**
 19 A. Or an oxidized low-molecular-weight
 20 polyethylene.
 21 **Q. Anything else?**
 22 A. Polyurethane, polyether.
 23 **Q. Anything else?**
 24 A. There's a whole bunch.
 25 **Q. You're referring now to your patent?**

1 A. No.
 2 MS. JOHNSON: What exhibit?
 3 A. This is Number 10.
 4 **Q. Okay. Page what of Number 10?**
 5 A. Page 3726. So poly(ethylene adipate),
 6 polycaprolactone, poly beta-propiolactone,
 7 poly(butylene succinate), polyethylene succinate,
 8 aliphatic aromatic copolyester. Poly 3
 9 hydroxybutyrate. And polyurethanes and nylon 6,
 10 and nylon 4.
 11 **Q. That would be then the entire universe of**
 12 **polymers that would be affected?**
 13 MS. JOHNSON: Objection.
 14 A. It was just one set that you asked for.
 15 There probably are others.
 16 **Q. If you look at the remainder of that**
 17 **section under mechanism of biodegradation, can you**
 18 **indicate for me whether you agree or disagree with**
 19 **content and your reasons?**
 20 A. Starting where?
 21 **Q. Starting with the degradation is due to**
 22 **the extracellular enzymes secreted by the organism**
 23 **and forward.**
 24 A. I agree with respect to biodegradable
 25 polymers.

1 **Q. But not polymers generally?**
 2 A. Not polymers generally.
 3 **Q. Now, I'm going to identify a couple**
 4 **articles just to see if you have familiarity with**
 5 **them. If you don't, of course we're not going to**
 6 **ask you about them. I just want to check to see**
 7 **if you've read them before or are familiar with**
 8 **them.**
 9 **Have you read the peer-reviewed article**
 10 **by Mueller RJ entitled Biological Degradation of**
 11 **Synthetic Polyesters Enzymes as Potential**
 12 **Catalysts for Polyester Recycling and Process**
 13 **Biochemistry?**
 14 MS. JOHNSON: Objection. Do you have a
 15 copy of the article?
 16 MR. EMORD: No. I'm just seeing if he
 17 knows that as a familiar source.
 18 A. Yes.
 19 **Q. You're familiar with that article?**
 20 A. Yes.
 21 **Q. What does that article stand for?**
 22 A. Basically what you read as the title,
 23 that he found an enzyme that was able to
 24 hydrolytically cleave PET.
 25 **Q. Okay. Thank you. Do you think synthetic**

1 **plastics biodegrade in and of themselves?**
 2 A. Some of them.
 3 **Q. Have you read the peer-reviewed article**
 4 **by Shaw, et al. entitled Biological Degradation of**
 5 **Plastics, a Comprehensive Review in Biotechnology**
 6 **Advances, 2008?**
 7 A. I believe so.
 8 **Q. Do you recall the substance of that**
 9 **article?**
 10 A. I think it was another review like these
 11 reviews.
 12 **Q. Do you recall what the gist or**
 13 **proposition of that article?**
 14 A. It was just reporting on what other
 15 people have reported.
 16 **Q. About the biological degradation of**
 17 **plastics?**
 18 A. Yes.
 19 **Q. Now, does low density PE biodegrade?**
 20 A. High-molecular-weight low density
 21 polyethylene does not biodegrade.
 22 **Q. Have you read the peer-reviewed article**
 23 **by P-R-A-M-I-L-A, R, et al. entitled**
 24 **Biodegradation of Low Density Polyethylene (LDPE)**
 25 **by Fungi Isolated from Municipal Landfill Areas,**

1 **in the Journal of Microbiological Biotechnology**
 2 **Research 2011?**
 3 A. I think so.
 4 **Q. Do you remember what that was about?**
 5 A. I think it was a report of small amounts
 6 of degradation.
 7 **Q. Does low density polyethylene biodegrade?**
 8 A. I don't believe so.
 9 **Q. You mention in your report**
 10 **radiological --**
 11 A. Do you mean biodegrade at all or just --
 12 **Q. Biodegrade at all. Do you want to answer**
 13 **again?**
 14 A. In all these polymers there's molecular
 15 weight distribution and there could be some
 16 low-molecular-weight chains that could be oxidized
 17 that may be able to be degraded.
 18 **Q. I appreciate that. Now, radiological**
 19 **marker C testing. Now, in your report you**
 20 **identify that -- you said there's one test that**
 21 **you would deem essentially -- and correct me if**
 22 **I'm wrong -- dispositive as to whether additives**
 23 **like ECMs cause biodegradation of plastics**
 24 **containing them, and that test is 14C, right?**
 25 A. Carbon 14, yes.

1 **Q. And just for context, in paragraph 60 on**
 2 **page 24 you write, absent an approved ASTM**
 3 **specification, it is my opinion that to**
 4 **scientifically prove a claim that the plastic -**
 5 **not merely the additive and inoculum - is**
 6 **biodegrading, the claimant must support its claim**
 7 **with at least one test with positive results from**
 8 **14C labeling of the conventional plastic, right?**

9 A. Yes.

10 **Q. And are you aware of any peer-reviewed**
 11 **journal article that identifies radiological**
 12 **marker C testing as the only definitive test to**
 13 **establish biodegradation of plastics?**

14 MS. JOHNSON: Objection.

15 A. So when Eastman was introducing their
 16 copolyester that's PET with the aliphatic
 17 polyester, they did get some results that there
 18 was biodegradation. And it was believed that PET
 19 did not degrade. And so they labeled the benzene
 20 ring in the PET and then did the degradation test
 21 and proved that the -- because they didn't want
 22 the benzene rings to be just not degrading in the
 23 environment. So they proved that the benzene
 24 rings degraded.

25 Again, as long as it was enough -- I

1 think it was 50 percent aliphatic polyester. And
 2 that was a very affordable test.

3 **Q. My question really is different, in that**
 4 **I'm looking for whether there is -- whether you're**
 5 **aware of a peer-reviewed journal article that has**
 6 **identified radiological marker C testing as the**
 7 **only definitive test to establish biodegradation**
 8 **of plastics?**

9 A. Yes, I think that resulted in a
 10 peer-reviewed article.

11 **Q. Did it identify radiological marker C**
 12 **testing as the only definitive test?**

13 A. Yes. Because it was unclear --

14 **Q. Let's get the citation for that. When**
 15 **was it published?**

16 A. I'm not sure.

17 **Q. Do you have that article?**

18 A. Let me see. It was around the time of my
 19 patent. Not my patent. The university's patent.
 20 Yes, around '98 or '97.

21 **Q. Where was it published?**

22 A. I don't know.

23 **Q. In a peer-reviewed journal?**

24 A. Yes.

25 **Q. Do you have a copy of it?**

1 A. Not on me.

2 **Q. Do you have it back in Lowell?**

3 A. Probably.

4 **Q. May we have a copy of that article? Did**
 5 **you say it was Eastman?**

6 A. Yes.

7 **Q. Do you remember who the authors were?**

8 A. Charles Buchanan.

9 **Q. B-U-C-H-A-N-A-N?**

10 A. Yes.

11 **Q. Anyone else?**

12 A. I'm sure there were others.

13 **Q. Where is Charles Buchanan?**

14 A. I'm just guessing. He's probably on his
 15 farm in Tennessee because he's retired. Or he's
 16 in Florida where everybody else goes.

17 **Q. Has the 14C radiological marker that you**
 18 **recommended as a confirmatory test already been**
 19 **used to prove that polyethylene biodegrades?**

20 A. It's been used to prove that a small
 21 portion of polyethylene biodegrades.

22 **Q. Do you remember what the source is for**
 23 **that information?**

24 A. That's the Albertsson paper.

25 **Q. Are you familiar with that article?**

1 A. Yes.

2 **Q. Let's take a look at it.**

3 (Whereupon, Respondent's Deposition
 4 Exhibit No. 14, Biodegradation of Synthetic
 5 Polymers. II. A Limited Microbial Conversion of
 6 14C in Polyethylene to 14CO2 by Some Soil Fungi,
 7 marked.)

8 BY MR. EMORD:

9 **Q. Now, did you become familiar with that**
 10 **article before this litigation or after?**

11 A. Before.

12 **Q. And what's going on here? She's got**
 13 **polyethylene film. She does what with it, and how**
 14 **does this C14 process work? What were the**
 15 **results?**

16 A. So they bought carbon 14 labeled ethylene
 17 and then polymerized it to polyethylene. And then
 18 studied the release of carbon 14 labeled carbon
 19 dioxide from that polyethylene.

20 **Q. They're really studying the gas release,**
 21 **the carbon dioxide release?**

22 A. That's correct.

23 **Q. What did they determine?**

24 A. They determined that they get .4 percent
 25 degradation in 800 days.

1 **Q. If we look at the synopsis, and can you**
 2 **tell me if the synopsis is in any way not an**
 3 **accurate reflection of the remainder of the**
 4 **article? It says both the soil and the different**
 5 **mold cultures reflected with very good agreement a**
 6 **definite liberation of 14CO2 from the 14C labeled**
 7 **polyethylene film, significantly above that**
 8 **produced abiotically from aging samples. This is**
 9 **interpreted as due to an enzymatic cleavage and**
 10 **oxidative conversion of synthetic polymeric or**
 11 **oligomeric alkanes with limited chain length,**
 12 **accessible for biodegradation, right?**

13 A. Yes.

14 **Q. In your judgment did that 14C marker**
 15 **provide definitive proof in this study of that**
 16 **effect?**

17 A. Of .5 percent in two years?

18 **Q. Right. Of biodegradation.**

19 MS. JOHNSON: Objection. Do you mean to
 20 completion?

21 **Q. No. Of biodegradation.**

22 A. Right. Again, as I stated earlier,
 23 there's a distribution of molecular weight. There
 24 probably is some low molecular weight that could
 25 then be oxidized and then degraded to a very small

1 extent.

2 **Q. That's your theory there. But that**
 3 **theory isn't supported in the article itself, is**
 4 **it?**

5 MS. JOHNSON: If you need to read the
 6 whole thing, feel free.

7 A. Yes. It says it is assumed that the
 8 source of the carbon 14 metabolization in these
 9 degradational experiments must have been mainly
 10 low-molecular-weight polyethylene.

11 **Q. Can you show me the page for that?**

12 A. Sure. 3432.

13 **Q. And where are you?**

14 A. The last paragraph.

15 **Q. However, that's not stated as a specific**
 16 **test finding, correct? It is stated that -- to**
 17 **read the entire sentence, it is assumed that the**
 18 **source of 14C metabolization in these**
 19 **degradational experiments must have been mainly**
 20 **low-molecular-weight polyethylene. But this**
 21 **conclusion must be corroborated by further study,**
 22 **especially on material of a more accessible form,**
 23 **for example, powder, possessing a high-surface**
 24 **volume ratio compared with polyethylene film,**
 25 **right? Would you agree with that?**

1 A. I agree with the statement that it's
 2 low-molecular-weight polyethylene.

3 **Q. Would you agree that there needs to be a**
 4 **caveat based on the study that this conclusion**
 5 **must be corroborated by further study?**

6 A. I mean, it's a reasonable conclusion.

7 **Q. Now, I just want to see if you are**
 8 **familiar with this next one, Exhibit 15, also by**
 9 **Albertsson.**

10 (Whereupon, Respondent's Deposition
 11 Exhibit No. 15, Biodegradation of Synthetic
 12 Polymers. III. The Liberation of 14CO2 by Molds
 13 Like Fusarium redolens from 14C Labeled Pulverized
 14 High-Density Polyethylene, marked.)

15 BY MR. EMORD:

16 **Q. Just take a moment and read the -- first**
 17 **of all, did you see this article before you wrote**
 18 **your expert report?**

19 A. Yes.

20 **Q. And are you familiar with its contents?**

21 A. Yes.

22 **Q. Just go ahead and take a moment to look**
 23 **at the synopsis and then I'll ask you a question.**

24 A. Okay.

25 **Q. What is -- what do you understand the**

1 **proof to be, based on this article; what happened?**
 2 **We have again 14C labeling. And what is the test**
 3 **dealing with fungi and molds?**

4 A. This time they looked at powders.

5 **Q. And how did this test result differ from**
 6 **the prior Albertsson study, 14?**

7 A. They -- I think they got slightly higher
 8 degradation.

9 **Q. They also had a somewhat remarkable**
 10 **finding in that there are two unidentified**
 11 **bacteria strains as well as Acremonium kiliense,**
 12 **Aspergillus versicolor and Verticillium lecanii**
 13 **were all thriving on the sparse media and enhanced**
 14 **to some extent the degradative CO2 liberation,**
 15 **especially in mixed cultures together with F.**
 16 **redolens. What is that all about?**

17 A. Basically this was a similar finding to
 18 the carbon 14 labeled polymeric alkane.

19 **Q. So they found that there was degradation**
 20 **taking place?**

21 A. Yes. There's the low molecular weight.

22 **Q. Further proof. In your own peer-reviewed**
 23 **publications you explain the use of testing**
 24 **methods as reviewing biodegradation that are other**
 25 **than 14C, right?**

1 A. Yes.

2 **Q. And you're a co-author of**
 3 **Poly(b-hydroxybutyrate) Stereoisomers: A Model**
 4 **Study of the Effects of Stereochemical and**
 5 **Morphological Variables on Polymer Biological**
 6 **Degradability, a 1992 article in Macromolecules.**
 7 **(Whereupon, Respondent's Deposition**
 8 **Exhibit No. 16, Poly(b-hydroxybutyrate)**
 9 **Stereoisomers: A Model Study of the Effects of**
 10 **Stereochemical and Morphological Variables on**
 11 **Polymer Biological Degradability, marked.)**

12 BY MR. EMORD:

13 **Q. We've listed this as Exhibit 16. Does**
 14 **this refresh your recollection, having it before**
 15 **you?**

16 A. Yes.

17 **Q. Looking at the third paragraph of that**
 18 **article, beginning the susceptibility of bacterial**
 19 **polyesters.**

20 MS. JOHNSON: Where is this?

21 **Q. The third paragraph, first page, under**
 22 **introduction. The susceptibility of bacterial**
 23 **polyesters to microbial degradation has been**
 24 **demonstrated by various methods and by different**
 25 **laboratories. Do you see that?**

1 A. Yes.

2 MR. EMORD: Now, madam reporter, please
 3 place in the transcript at this point in the
 4 deposition the exact content of what we've marked
 5 as Exhibit 16, paragraph 3, page 5927.

6 "The susceptibility of bacterial
 7 polyesters to microbial degradation has been
 8 demonstrated by various methods and by different
 9 laboratories. Researchers at Imperial Chemical
 10 Industries showed that natural origin PHB was
 11 biodegradable in the soil, anaerobic and aerobic
 12 sewage, seawater, and estuarine sediment.
 13 Delafield et al. carried out the isolation of 16
 14 strains of soil microorganisms which were capable
 15 of growing under aerobic conditions with PHB as
 16 the sole source of carbon. The bacterial strains
 17 Pseudomonas lemoignei (ATCC 17989) and Alcaligenes
 18 faecalis T1, isolated from soil and activated
 19 sewage sludge, respectively, have been identified
 20 as being capable of using PHB as an exogenous
 21 source of carbon by excreting extracellular
 22 enzymes that depolymerize it. In our laboratory,
 23 we have successfully isolated and purified to
 24 electrophoretic homogeneity a PHB depolymerase
 25 exoenzyme from the fungus Penicillium funiculosum.

1 It has been determined that the protein has an
 2 M value of 38,000. The enzyme has an isoelectric
 3 point of 5.8, a pH optimum range of 5.5-6.2, and a
 4 temperature optimum range of 30-35 degrees
 5 Celsius. In-laboratory simulations of natural
 6 environments have also been utilized in our
 7 laboratories to demonstrate the degradability of
 8 bacterial copolyesters. Since the kinetics of PHB
 9 enzyme degradation with isolated enzymes such as
 10 that from P. funiculosum may be much more rapid
 11 than nonbiologically mediated chemical hydrolysis
 12 (see above and corresponding references),
 13 enzyme-mediated hydrolytic degradation events are
 14 easily measured in the absence of appreciable
 15 chemical hydrolysis of PHB."

16 When we look at that third paragraph and
 17 the cited peer-reviewed journal articles which are
 18 referenced within it, and it also has
 19 corresponding references on page 5934, that's
 20 where the references are, I would like you to tell
 21 me whether any of the peer-reviewed articles
 22 referenced for that paragraph involve, to your
 23 knowledge, 14C radiological testing?

24 A. Any of these references?

25 **Q. Right.**

1 A. Let me just look for the name Albertsson.
 2 I don't see any specifically.

3 **Q. In this report on your testing of**
 4 **degradability, the test you performed to determine**
 5 **the effects of PHB stereochemistry and crystalline**
 6 **morphology on enzymatic degradability did not use**
 7 **14C, right?**

8 A. That is correct.

9 **Q. And in the summary and result section of**
 10 **the article, on page 5933, in the second to the**
 11 **last sentence you explain your assessment of**
 12 **biodegradability based on the test you performed,**
 13 **right?**

14 A. The second to the last sentence on the
 15 paper?

16 **Q. Yes. It's above acknowledgment. The**
 17 **relative degradability of these PHB stereoisomers**
 18 **has interesting implications on the acceptability**
 19 **of stereochemical sequences in the biodegradation**
 20 **of PHB.**

21 A. Yes.

22 **Q. There in the second sentence you**
 23 **describe -- on 5933 -- it's actually under the**
 24 **heading summary of results on 5933. There in that**
 25 **second sentence you explain, the relative**

1 degradability of these PHB stereoisomers was
2 studied with a PHB depolymerase enzyme isolated
3 form *P. funiculosum*. And then show me where in
4 the remainder of this you reach your conclusion as
5 to the degradation and then just describe for me
6 the conclusion.

7 A. The question is to --

8 Q. Here we have your results. I guess the
9 best way to do this is just to allow you to
10 explain to me the summary of the results, the
11 essential nature of the test, the summary of the
12 results that came from the test.

13 Perhaps another way of doing this is to
14 just ask you is there any aspect of this summary
15 that you find in any way in error, the summary of
16 the results, or is it in your view an accurate
17 reflection of the test and the results?

18 A. I believe it's an accurate reflection.

19 Q. Did you establish in this study that the
20 test article completely biodegrades in the
21 environment within one year of customary disposal?

22 A. No.

23 Q. Does a 14C radiological test reveal the
24 time period required for plastic decomposition?

25 A. In what way?

1 Q. I'm going to give you another article.
2 (Whereupon, Respondent's Deposition
3 Exhibit No. 17, A Respirometric Method to Measure
4 Mineralization of Polymeric Materials in a Matured
5 Compost Environment, marked.)

6 BY MR. EMORD:

7 Q. Let's take a moment to refresh your
8 recollection. This is one of your articles,
9 right?

10 A. Yes.

11 Q. Do you recall whether in this article you
12 said that a single test method would not provide
13 all of the answers to the time period, loss of
14 properties and weight, formation of toxic
15 intermediaries, complete mineralization and
16 variable environmental exposure conditions. Take
17 a look at page 294.

18 A. Okay.

19 Q. Now, is it your position in this article
20 that a single test method does not provide all the
21 answers to those questions you delineate in the
22 first full paragraph on page 294, and you
23 enumerated questions?

24 MS. JOHNSON: What was the question?

25 MR. EMORD: The question is whether it is

1 Q. I don't know. I'm asking you.

2 A. It could.

3 Q. It could?

4 A. Yes.

5 Q. Does a 14C radiological test reveal the
6 loss of properties in weight of a plastic
7 resulting from a biological process?

8 A. It could.

9 Q. Does a 14C radiological test reveal the
10 extent to which the decomposition process results
11 in the formation of toxic metabolic
12 intermediaries?

13 A. It could.

14 Q. Does a 14C radiological test reveal the
15 extent to which decomposition occurs with complete
16 mineralization of the plastic?

17 A. It could.

18 Q. Does a 14C radiological test reveal the
19 environmental exposure conditions required to
20 sustain biodegradation?

21 A. Say that again.

22 Q. Does a 14C radiological test reveal the
23 environmental exposure conditions required to
24 sustain biodegradation?

25 A. Not by itself.

1 his position in this article that a single test
2 method would not provide all of the answers to the
3 questions that he specifies enumerated in the
4 first full paragraph on page 294.

5 A. It would not -- this could not be, that's
6 correct.

7 Q. That in fact stated there as the last
8 sentence, furthermore, a single test method will
9 not provide all of the answers to the questions
10 above.

11 A. That's correct.

12 Q. And you still stand by that view today?

13 A. Yes.

14 Q. Let's take a look at another of your
15 articles. This one is Exhibit 18.

16 (Whereupon, Respondent's Deposition
17 Exhibit No. 18, Advances in Properties and
18 Biodegradability of Co-Continuous, Immiscible,
19 Biodegradable, Polymer Blends, marked.)

20 BY MR. EMORD:

21 Q. Now, in this study you measured soil
22 degradation rates of polylactic acid, right? It
23 looks like, and you can tell me, it looks like
24 this may have something to do with your patent.

25 Am I mistaken? By your patent I mean the U Mass

1 **Lowell's patent based on your invention?**

2 A. The question was?

3 **Q. It looks like in this study you measured**
4 **soil degradation rates of polylactic acid, and is**
5 **this the study that is the principal study**
6 **underlying your '199 patent?**

7 A. No.

8 **Q. This is one in a series of them?**

9 A. This is the biodegradability with the
10 proteinase K, the soil and the composting, for the
11 blends which are the basis of the patent that U
12 Mass owns.

13 **Q. As I understand it, under this study you**
14 **base your determination of biodegradation**
15 **principally upon a measure of weight loss; is that**
16 **right?**

17 A. I believe the Proteinase -- it's true for
18 the proteinase K and the composting. I don't
19 recall how we did it for the soil.

20 **Q. If you look on page 72 under**
21 **biodegradability, the second paragraph. It looks**
22 **like the patent description in the '199 patent**
23 **with regard to biodegradation testing in the soil.**
24 **I'm going to have the court reporter put into the**
25 **transcript at this point the second full paragraph**

1 **under the title biodegradability on page 72 of**
2 **Exhibit 18 as a point of reference.**

3 "The biodegradation testing in soil,
4 Figure 10, shoed the biodegradation rate of
5 Bio#3000 was extremely fast, while the rate of PLA
6 was relatively slow. After degrading for 45 days,
7 Bio#3000 degraded almost 100%, while PLA only
8 degraded about 14%. For the blends with 70 and 50
9 wt % Bio#3000, the degradation rate is relatively
10 fast. After 45 days, the A30/B70 blend degraded
11 about 77%, the A50/B50 blend degraded about 65%.
12 These values are equal to those expected on the
13 basis of additivity rule. However, for blends
14 with less than 30 wt% Bio#3000, the degradation
15 percentage values are less than those expected on
16 the basis of additivity rule."

17 Now, as I understand it from this study,
18 you did not use 14C radiological testing, right?

19 A. That is true.

20 **Q. And I also do not see anywhere in here**
21 **reliance upon an ASTM standard test method?**

22 A. That is correct.

23 **Q. Did you use your own laboratory test**
24 **method here?**

25 A. It was the test method of the center.

1 I'm not sure there was an ASTM test method at that
2 time.

3 **Q. What was the test method at the center?**

4 A. There's three of them. One is the
5 compost; one is the enzymatic; and one is the
6 soil.

7 **Q. You concluded that the biodegradation did**
8 **occur in the test sample plastic, and it is listed**
9 **there, is it not, in the second paragraph under**
10 **the title biodegradability on page 72, for each of**
11 **the blends and for the PLA?**

12 A. So the question is the numbers are
13 listed?

14 **Q. Right. Is that an accurate summarization**
15 **of the biodegradability or biodegradation results**
16 **of the study listed on page 72 in paragraph 2**
17 **under the title biodegradability?**

18 A. Yes. That's what we found.

19 **Q. And you stand by those test results**
20 **today?**

21 A. Well, at the time, those were the best
22 results that we had. It would have been better to
23 do a measurement of carbon dioxide.

24 **Q. But as for the tests that you did do,**
25 **they're satisfactory for establishing the**

1 **biodegradation of the test sample?**

2 MS. JOHNSON: Objection.

3 A. I mean, at the time -- I mean, they're
4 not the best tests. The weight loss is
5 problematic, as we later found out.

6 **Q. Now, when it comes to proof in this**
7 **thing, you didn't prove that the test sample**
8 **plastic completely biodegrades within one year of**
9 **customary disposal, right?**

10 A. Not with this test.

11 **Q. Let's take a look at another one of your**
12 **articles. This one is Exhibit 19.**

13 (Whereupon, Respondent's Deposition
14 Exhibit No. 19, Biodegradable Polymer Blends of
15 Poly(lactic acid) and Poly(ethylene glycol),
16 marked.)

17 BY MR. EMORD:

18 **Q. Now we've marked for identification an**
19 **article of Dr. McCarthy's as Respondent's Exhibit**
20 **19, Biodegradable Polymer Blends of Polylactic**
21 **Acid and Polyethylene Glycol. This is one of your**
22 **articles?**

23 A. Yes.

24 **Q. Part of the article explains an enzymatic**
25 **degradation test, right?**

1 A. Part of the material was exposed to an
2 enzyme.

3 **Q. Correct me if I'm wrong, but it looks to**
4 **me that you measured enzymatic degradation on**
5 **pages 1500 and 1501 based on a weight loss**
6 **calculation; is that correct?**

7 A. Yes.

8 **Q. Did you rely on any other measure for**
9 **determining the degradation in this study, other**
10 **than weight loss?**

11 A. No.

12 **Q. And you didn't use in this study an ASTM**
13 **standard; is that correct?**

14 A. I don't think one existed at the time.

15 **Q. And you didn't use 14C radiological**
16 **testing?**

17 A. No.

18 **Q. And let me ask you, do you extrapolate**
19 **from your lab tests to conclusions about the**
20 **actual environment in landfills?**

21 A. Do I currently?

22 **Q. Have you ever?**

23 A. I don't know.

24 **Q. You don't remember?**

25 A. I don't remember.

1 **Q. Let's take a look at another article**
2 **here. I'll mark this as Exhibit 20.**
3 **(Whereupon, Respondent's Deposition**
4 **Exhibit No. 20, Degradation Ranking of Plastics in**
5 **a Landfill Environment, marked.)**
6 BY MR. EMORD:

7 **Q. This article is entitled Degradation**
8 **Ranking of Plastics in a Landfill Environment.**
9 **You appear to be one of the authors; is that**
10 **correct?**

11 A. Yes.

12 **Q. If we look at page 867, and that's right**
13 **on the front there, in the second full paragraph,**
14 **you appear to define the purpose of the study,**
15 **right?**

16 A. Yes.

17 **Q. And you write, the purpose of this paper**
18 **is to compare on a relative scale the degradation**
19 **of various plastic materials in an accelerated**
20 **test which is correlatable to the actual**
21 **degradation in actual landfills, right?**

22 A. Yes.

23 **Q. So it's fair to say from this study that**
24 **the accelerated control tests you performed in the**
25 **lab in this study you correlated to actual**

1 **landfill conditions in the outside world, right?**

2 A. No. We didn't. We weren't able to. I
3 mean, we tried to. That was the purpose of it,
4 but it never happened.

5 **Q. Now, in this study you didn't use 14C**
6 **radiological testing?**

7 A. No.

8 **Q. And what method did you use to measure**
9 **biodegradability?**

10 A. It looks like weight loss.

11 **Q. In the third full paragraph of the study**
12 **on the front, you write, in this preprint we**
13 **present preliminary results which correlate**
14 **plastics degradation with the biological**
15 **environment in the simulator, and provide**
16 **comparative rates for the degradation of plastics**
17 **and materials typically placed in landfills,**
18 **right?**

19 A. Right.

20 **Q. Are you extrapolating here from the lab**
21 **tests to the real world environment of landfills?**

22 MS. JOHNSON: Objection.

23 A. No.

24 **Q. In the third paragraph, you describe the**
25 **method you used here, it's not 14C radiological**

1 **testing, to present it as a, quote, a methodology**
2 **for the routine analysis for plastics degradation**
3 **under leachate-recycled landfill conditions, end**
4 **quote. Do you see that?**

5 A. Yes.

6 **Q. So you believe that that methodology, at**
7 **the time you wrote this article, you believed that**
8 **the methodology you used, is that a fair**
9 **statement, for the routine analysis for plastics**
10 **degradation under leachate-recycled landfill**
11 **conditions?**

12 A. That was what we had hoped.

13 **Q. But the method used you describe as the**
14 **routine analysis for plastic degradation?**

15 MS. JOHNSON: Objection. Asked and
16 answered.

17 **Q. As routine?**

18 A. No.

19 **Q. At the time you wrote this, you didn't**
20 **believe it was routine?**

21 A. No. We presented a methodology that we
22 had hoped could be used in routine analysis, and
23 ended up not being able to do it.

24 **Q. Now, you also evaluated the appearance of**
25 **samples to determine if they looked weathered; is**

1 that correct?

2 A. Do you know where that is?

3 **Q. If you look under results and discussion,**
4 **the second full paragraph, cellophane and PHBV**
5 **appeared extensively weathered from exposures in**
6 **simulators G, E and H. Cellophane turned black**
7 **and disintegrated into small fragments; in fact,**
8 **none could be recovered from simulator G. PHBV**
9 **became brittle, opaque and extensively eroded on**
10 **the surface; only small remnants of PHBV could be**
11 **recovered after an exposure of 127 days. In all**
12 **simulators, polypropylene became discolored and**
13 **somewhat embrittled, but films showed no signs of**
14 **surface erosion.**

15 A. This was the problem with the weight loss
16 is that they fragmented, and it was not accurate.

17 **Q. Exhibit 10, page 293, if you look there**
18 **in the first paragraph, 293, it reads, there is**
19 **increased recognition that biodegradable plastics**
20 **can serve an important role in the design of an**
21 **intelligent, integrated solid waste disposal**
22 **scheme. Do you believe that statement to be true**
23 **when you made it?**

24 A. Yes.

25 **Q. And is it true today?**

1 A. I believe so.

2 **Q. The same article on the same page, right**
3 **column, you write, biodegradable disposable-**
4 **plastic articles can be designed such that they**
5 **will be entirely converted by microbial activity**
6 **in a biologically active environment to biogas**
7 **(CO₂ and CH₄/CO₂ under aerobic and anaerobic**
8 **conditions, respectively), biomass and biological**
9 **byproducts. Do you believe that statement to be**
10 **true when you made it?**

11 A. Yes.

12 **Q. Do you believe it to be true today?**

13 A. If I was to write it today, I would say
14 just use aerobic and add biomass.

15 **Q. Now, two years after you wrote these**
16 **words, and two years later would be 1995, and you**
17 **wrote in another article, Laboratory-Scale**
18 **Composting Test Methods to Determine Polymer**
19 **Biodegradability: Model Studies on Cellulose**
20 **Acetate, which we will mark as Exhibit 21.**

21 (Whereupon, Respondent's Deposition
22 Exhibit No. 21, Laboratory-Scale Composting Test
23 Methods to Determine Polymer Biodegradability:
24 Model Studies on Cellulose Acetate, marked.)

25 BY MR. EMORD:

1 **Q. Look at that. This is one of your**
2 **articles, right?**

3 A. This is an article and I'm one of the
4 authors.

5 **Q. If you'll look an page 614, the first**
6 **full paragraph under the title Introduction, there**
7 **is an increased recognition that biodegradable**
8 **plastics can serve an important role in the design**
9 **of an intelligent, integrated, solid waste**
10 **disposal scheme. When you wrote this article, did**
11 **you believe the statement to be true?**

12 A. Well, this article was written by Rich
13 Gross.

14 **Q. Do you don't take credit for that**
15 **statement?**

16 A. I don't take credit for it. But I agree
17 with it.

18 **Q. Is it true today?**

19 A. I think so.

20 **Q. Again, as you wrote in the prior article**
21 **and again write here in the next sentence, the**
22 **third sentence of the first paragraph under the**
23 **title Introduction, biodegradable**
24 **disposable-plastic articles can be designed such**
25 **that they will be entirely converted by microbial**

1 **activity in a biologically active environment to**
2 **biogas (CO₂ and CH₄/CO₂ under aerobic and**
3 **anaerobic conditions, respectively), biomass, and**
4 **biological byproducts. That was what you wrote**
5 **then?**

6 A. Yes.

7 **Q. Was that statement correct when you wrote**
8 **it?**

9 A. Yes.

10 **Q. And is it correct today?**

11 A. Yes.

12 **Q. Now, let's look at another article that**
13 **you wrote, and we'll mark it as Exhibit 22.**

14 (Whereupon, Respondent's Deposition
15 Exhibit No. 22, Reactive Compatibilization of
16 Biodegradable Blends of Poly(lactic acid) and
17 poly(e-caprolactone), marked.)

18 BY MR. EMORD:

19 **Q. It's entitled Reactive Compatibilization**
20 **of Biodegradable Blends of Poly(lactic acid) and**
21 **poly(e-caprolactone). If you'll look at page 161**
22 **in the full sentence under the title Introduction**
23 **you write, PLA and PCL are well known**
24 **biodegradable polymers, right?**

25 A. Yes.

1 **Q. And you stand by that statement today,**
 2 **right?**
 3 A. Yes.
 4 **Q. Before you wrote that statement, did you**
 5 **establish that PLA and PCL plastics completely**
 6 **break down and return to nature, that is,**
 7 **decompose into elements found in nature within one**
 8 **year after customary disposal?**

9 MS. JOHNSON: Objection.

10 A. Possibly. I possibly had seen studies
 11 showing that.

12 **Q. But you're not sure whether you have or**
 13 **have not?**

14 A. I mean, this was '98.

15 **Q. Now, let's take a look at the next**
 16 **article. Certainly nowhere in this article do you**
 17 **refer to the biodegradation of PLA and PCL as**
 18 **being the result of a complete breakdown and**
 19 **return to nature of those elements and doing so**
 20 **within one year, right?**

21 A. I don't know.

22 **Q. Go ahead and take a look. If you find a**
 23 **spot in there where you did say that, let me know.**

24 **(Whereupon, Respondent's Deposition**
 25 **Exhibit No. 23, Biodegradable Blends of Bacterial**

1 **Polyesters with Polyethylene and Polystyrene,**
 2 **marked.)**

3 BY MR. EMORD:

4 A. It doesn't appear to be in here.

5 **Q. Let's take a look at this one, Number 23,**
 6 **which appears to be another article in which**
 7 **you're a co-author. This one is entitled**
 8 **Biodegradable Blends of Bacterial Polyesters with**
 9 **Polyethylene and Polystyrene. Here you identify**
 10 **polyethylene and polystyrene polymer blends as**
 11 **biodegradable, right?**

12 MS. JOHNSON: Objection.

13 A. Well, Bhalakla does.

14 **Q. You were a co-author. You disagreed?**

15 A. I wouldn't have characterized the blend
 16 as biodegradable. I would have characterized the
 17 PHB as biodegradable.

18 **Q. Now, if you look at the first paragraph**
 19 **it says, these polymers belong to a family of**
 20 **microbially degradable thermoplastics which are**
 21 **readily biosynthesized by a bacterial fermentation**
 22 **process, right?**

23 A. Yes.

24 **Q. Do you agree with that statement?**

25 A. It's referring to the PHB proponents,

1 yes.

2 **Q. You do. Okay. Before you wrote that**
 3 **statement did you establish that the polyethylene**
 4 **and polystyrene blend completely break down and**
 5 **return to nature, that is, decompose into elements**
 6 **found in nature within one year after customary**
 7 **disposal?**

8 MS. JOHNSON: Objection.

9 A. I didn't write this.

10 **Q. Did anyone who was involved with the**
 11 **writing of this, to your knowledge, establish that**
 12 **the polyethylene and polystyrene blends completely**
 13 **break down and return to nature within one year**
 14 **after customary disposal?**

15 A. I don't think so.

16 **Q. If we look at Exhibit 24.**

17 **(Whereupon, Respondent's Deposition**
 18 **Exhibit No. 24, The Effect of Hyperbranched**
 19 **Polymers on Processing and Thermal Stability of**
 20 **Biodegradable Polyesters, marked.)**

21 BY MR. EMORD:

22 **Q. Now, this is entitled The Effect of**
 23 **Hyperbranched Polymers on Processing and Thermal**
 24 **Stability of Biodegradable Polyesters. You're one**
 25 **of the co-authors?**

1 A. Right.

2 **Q. You identified poly-hydroxy-butyrate in**
 3 **the left column, end of the first paragraph, under**
 4 **the title Introduction, as fully biodegradable,**
 5 **right?**

6 A. That's right.

7 **Q. And do you stand by that statement today,**
 8 **that it is fully biodegradable?**

9 A. Under certain disposal methods.

10 **Q. Now, before this statement of it being**
 11 **fully biodegradable, it is contained in the last**
 12 **full sentence of the first full paragraph under**
 13 **the title Introduction, did you establish that**
 14 **poly-hydroxy-butyrate completely breaks down and**
 15 **returns to nature, that is, decomposing into**
 16 **elements found in nature within one year after**
 17 **customary disposal?**

18 MS. JOHNSON: Objection.

19 A. I believe that was demonstrated.

20 **Q. Was it demonstrated in the context of**
 21 **this article?**

22 A. I don't believe so.

23 **Q. Did any of the authors in this article**
 24 **recite that they had determined that existence of**
 25 **biodegradation predicated upon establishment that**

1 **the poly-hydroxy-butyrate completely broke down**
 2 **and returned to nature decomposing into elements**
 3 **found in nature within one year after customary**
 4 **disposal?**

5 A. No.

6 (Whereupon, Respondent's Deposition
 7 Exhibit No. 25, Biodegradation of
 8 Natural/Syndiotactic Poly(3-hydroxybutrate)
 9 Blends, marked.)

10 BY MR. EMORD:

11 **Q. This is entitled Biodegradation of**
 12 **Natural/Syndiotactic Poly(3-hydroxybutrate)**
 13 **Blends. Here you identified P3HB in the first**
 14 **paragraph as a biodegradable material, right?**

15 A. This is the polymer preprint again.
 16 That's not peer-reviewed that's written by this
 17 student. But I agree with that.

18 **Q. It's identified as such in the first**
 19 **paragraph, right, as a biodegradable material?**

20 A. Yes.

21 **Q. Do you stand by that identification that**
 22 **P3HB is a biodegradable material?**

23 A. Yes.

24 **Q. Is it anywhere referenced in this article**
 25 **that P3HB completely breaks down and returns to**

1 **nature, that is, decomposes into elements found in**
 2 **nature within one year after customary disposal?**

3 A. The reference would be it does -- if it
 4 does state it, it would be reference to it.

5 **Q. So it might be in the reference; there**
 6 **might be information germane to that point in**
 7 **reference?**

8 A. Right.

9 **Q. But you're not sure, or are you sure?**

10 A. It says that it mineralizes. The
 11 question is one year.

12 **Q. Right. One year. So you think that**
 13 **reference to establish is that it occurs within**
 14 **one year?**

15 MS. JOHNSON: Objection.
 16 Mischaracterizes his testimony.

17 **Q. Go ahead and explain.**

18 A. I think it could. I just don't know.

19 **Q. But there's no reference in the article**
 20 **itself to a standard that would indicate that the**
 21 **P3HB completely breaks down and returns to nature,**
 22 **decomposes into elements found in nature within**
 23 **one year after customary disposal?**

24 A. It could be in number 2.

25 **Q. Other than number 2, there's no express**

1 **reference in the article?**

2 A. Right.

3 MR. EMORD: Now this one is 26.

4 (Whereupon, Respondent's Deposition

5 Exhibit No. 26, Microwave-Assisted Solvent-Free or
 6 Aqueous-Based Synthesis of Biodegradable Polymers,
 7 marked.)

8 BY MR. EMORD:

9 **Q. This one is entitled, Microwave-Assisted**
 10 **Solvent-Free or Aqueous-Based Synthesis of**
 11 **Biodegradable Polymers.**

12 A. Yes.

13 **Q. This is another of your articles?**

14 A. Yes.

15 **Q. And you write here polysaccharides**
 16 **themselves are inherently biodegradable, right?**

17 A. Yes.

18 **Q. And you stand by that statement today,**
 19 **right?**

20 A. Yes.

21 **Q. Now, I don't find any reference in here**
 22 **to an assessment that would find that**
 23 **polysaccharides completely break down and return**
 24 **to nature as decomposing elements found in nature**
 25 **within one year after customary disposal. Does**

1 **such a determination exist in the article?**

2 A. Polysaccharides are found in nature.

3 **Q. Is there such a determination, in other**
 4 **words, in the use of the term biodegradable in the**
 5 **article, is it defined anywhere in here as**
 6 **requiring satisfaction of those two elements?**

7 A. Because polysaccharides are found in
 8 nature, they would in fact be elements found in
 9 nature immediately.

10 **Q. So that's why you say it's inherently**
 11 **biodegradable, because it's already found in**
 12 **nature and it doesn't really have to degrade; it's**
 13 **already in a state of degradation?**

14 A. No. It does degrade.

15 **Q. If it does degrade, is it the case that**
 16 **in this article there has been established or**
 17 **written here the point that it would degrade**
 18 **necessarily and return to elements, break**
 19 **completely down and turn to elements in nature?**

20 MS. JOHNSON: Objection.

21 **Q. Or do you consider polysaccharides**
 22 **themselves to be an element in nature?**

23 A. Well, the degradation of polysaccharides
 24 occurs in nature. So any biodegradation -- the
 25 biodegradation of products would be found in

1 nature.

2 **Q. How about the polyesters, with respect to**
3 **biodegradation of the polymers that are referenced**
4 **in this article, does it establish that those**
5 **polymers would biodegrade such that they would**
6 **break down and return to nature decomposing into**
7 **elements found in nature within one year after**
8 **customary disposal?**

9 A. No.

10 **Q. Now, does all paper completely break down**
11 **and return to nature, that is, decompose into**
12 **elements found in nature within one year after**
13 **customary disposal, all paper products?**

14 A. No.

15 **Q. Does a banana peel?**

16 A. Does a banana peel --

17 **Q. Does it completely break down and return**
18 **to nature, that is, decompose into elements found**
19 **in nature within one year after customary**
20 **disposal?**

21 A. I'm not sure.

22 **Q. If it didn't within a year, would it**
23 **still be biodegradable?**

24 A. There would probably be some conditions
25 where it would degrade within one year.

1 **Q. But assuming that a part of the banana**
2 **peel doesn't biodegrade within a year or that the**
3 **whole banana peel didn't biodegrade within a year**
4 **but it biodegraded two years later, would that in**
5 **your judgment exclude it from being appropriately**
6 **considered biodegradable?**

7 A. Well, it would exclude it from being
8 claimed as biodegradable within a year.

9 **Q. I'm asking not about claims. I'm asking**
10 **just as a scientist. Would you consider a banana**
11 **peel not to be biodegradable?**

12 A. I don't know. I don't know whether it
13 degrades completely.

14 **Q. Would you consider a tree trunk to be**
15 **biodegradable?**

16 MS. JOHNSON: Objection.

17 **Q. Is a tree trunk biodegradable?**

18 A. I would consider it biodegradable.

19 **Q. Does a tree trunk completely degrade in**
20 **nature within one year of customary disposal?**

21 A. If it's sliced thin enough.

22 **Q. So if it falls in the woods and it isn't**
23 **sliced, it's not biodegradable because it might**
24 **not biodegrade within one year?**

25 A. Again, it would biodegrade within the

1 year if you sliced it.

2 **Q. Say you don't slice it. A tree falls in**
3 **the woods, is it biodegradable?**

4 A. Yes, it's biodegradable.

5 **Q. Even if it doesn't completely return to**
6 **elements found in nature within one year?**

7 A. Right.

8 **Q. Is an orange peel biodegradable?**

9 MS. JOHNSON: Objection. How many more
10 of these do we have to go through?

11 **Q. Is an orange peel biodegradable?**

12 A. I think so.

13 **Q. Even if it doesn't biodegrade within one**
14 **year?**

15 A. I think it could be sliced thin enough so
16 it would.

17 **Q. Is there a difference between**
18 **verification and validation?**

19 MS. JOHNSON: Objection. Vague.

20 A. Yes, there is.

21 **Q. What is the difference?**

22 A. So validation is the validity of the
23 test.

24 **Q. And verification is?**

25 A. And I think verification is that the

1 material passes.

2 **Q. Do you know whether the EPA and the**
3 **United States Department of Defense use validation**
4 **rather than verification when conditions in the**
5 **field and in the lab are complex and**
6 **heterogeneous?**

7 MS. JOHNSON: Objection.

8 A. I do not know.

9 **Q. Have you read the Guidance on**
10 **Environmental Data Verification and Data**
11 **Validation, EPA document?**

12 A. I don't believe so.

13 **Q. And have you read the U.S. Army Corps of**
14 **Engineers Guidance for Evaluating Performance-**
15 **Based Chemical Data?**

16 A. I don't believe so.

17 **Q. Now, your report states that you reviewed**
18 **all the tests conducted by the independent labs on**
19 **ECM plastics, right?**

20 MS. JOHNSON: Objection.

21 A. I reviewed all of the data that was
22 supplied to me by complaint counsel.

23 **Q. Did that data include Eden Labs and**
24 **Northeast Labs test results?**

25 A. Yes.

1 **Q. You reviewed those Eden lab tests and**
2 **those Northeast lab tests?**

3 A. Yes.

4 **Q. Did you run any statistics for the D5511**
5 **test of Eden Labs and Northeast Labs?**

6 A. No.

7 **Q. You were provided the raw data from the**
8 **Eden Labs and Northeast Labs tests?**

9 MS. JOHNSON: Objection. Assumes facts
10 not evidence in that there is no raw data for the
11 Eden Labs.

12 **Q. Did you receive any raw data for the Eden**
13 **Labs and the Northeast Labs tests?**

14 A. I did not receive raw data from Eden
15 Labs.

16 **Q. You didn't get any raw data supplied to**
17 **you by complaint counsel?**

18 A. I did not.

19 MS. JOHNSON: If you have raw data,
20 please share it with us, because we didn't receive
21 any.

22 **Q. So this probably goes without saying, but**
23 **you didn't calculate mean CO2 in milliliters for**
24 **the substrate in those tests?**

25 A. I have not.

1 **Q. Or the mean CH4 in milliliters for the**
2 **inoculum?**

3 A. I have not.

4 **Q. Or the mean CO2 and the milliliter for**
5 **the inoculum?**

6 A. I have not.

7 **Q. You didn't calculate the ratio of the**
8 **mean methane yield of the substrate to the mean**
9 **inoculum yield?**

10 A. Calculate the mean?

11 **Q. The mean methane yield of the substrate**
12 **to the mean inoculum yield?**

13 MS. JOHNSON: Objection. What substrate?

14 A. Yes. What substrate?

15 **Q. What substrate? I don't know. Now, but**
16 **basically you didn't do any calculations, because**
17 **you didn't have the raw data. You weren't**
18 **supplied with the raw data so you didn't do any**
19 **calculation.**

20 A. I wasn't supplied with the raw data from
21 Eden.

22 **Q. Were you supplied with raw data from**
23 **Northeast Labs?**

24 A. There was sort of raw data that was not
25 the real raw data. It was numbers that I guess

1 were like average. So there were a lot of the
2 same number in most of the tests. So it wasn't
3 the real raw data.

4 **Q. Now, I think you said you weren't a**
5 **biochemist, so if this is outside of your area,**
6 **you can say, but can you name for me each of the**
7 **species of microbial life that dwell in a**
8 **landfill?**

9 A. No.

10 **Q. And could you explain the life cycle of**
11 **those critters in the landfill?**

12 A. No.

13 **Q. You couldn't explain how they reproduce**
14 **and feed and colonize and that sort of thing?**

15 A. No.

16 **Q. Can you explain for me what stimulates**
17 **microbial life forms to produce enzymes?**

18 A. It would be the food source.

19 **Q. Is that the only thing that would**
20 **stimulate them to --**

21 A. I'm not sure.

22 **Q. That's outside of your area?**

23 A. Yes.

24 **Q. Is a biological -- is a biodegradation**
25 **test finding that is stated as no conclusion can**

1 **be drawn the same as a finding that no**
2 **biodegradation was observed?**

3 MS. JOHNSON: Objection.

4 **Q. Is it the same?**

5 A. I'm not sure of the context.

6 **Q. Right. If you were to read within a**
7 **study test a finding that stated no conclusion can**
8 **be drawn, would that be the same in your mind as a**
9 **finding that no biodegradation was observed?**

10 A. I can see instances where it could be the
11 same.

12 **Q. And you can see instances when it would**
13 **not be the same?**

14 A. Probably.

15 **Q. Is a biodegradation test finding that no**
16 **statistically significant biodegradation was found**
17 **the same as a finding of no biodegradation?**

18 MS. JOHNSON: Objection.

19 A. I could see cases where they would be the
20 same.

21 **Q. And you can see cases when they would not**
22 **be the same?**

23 A. Yes.

24 MS. JOHNSON: Are we talking about
25 specific tests?

1 MR. EMORD: I have no further questions.
 2 MS. JOHNSON: Let's just take a couple-
 3 minute break.
 4 (Recess.)
 5 EXAMINATION BY MS. JOHNSON:
 6 **Q. Dr. McCarthy, when were you retained?**
 7 A. Over two years ago.
 8 **Q. In that time, what volume of information**
 9 **have you reviewed, would you say?**
 10 A. Monstrous.
 11 **Q. And so is it possible that some of the**
 12 **articles that have been placed before you today as**
 13 **exhibits you may have reviewed before you prepared**
 14 **your expert report in this case?**
 15 A. Definitely.
 16 MS. JOHNSON: No further questions.
 17 (Proceedings concluded at 3:15 p.m.)
 18
 19
 20
 21
 22
 23
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 25

1 CERTIFICATE OF DEPONENT
 2
 3 I hereby certify that I have read and
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Complaint Counsel
Exhibit C
CCX-C

4. Complaint Counsel objects to the Subpoena to the extent that it seeks information before expert disclosures are required in accordance with § 3.31A of the Commission's Rules of Practice and the ALJ's Scheduling Order in this case.

5. Complaint Counsel objects to the Subpoena to the extent that it seeks information that is not relevant to the subject matter of the litigation and/or not reasonably calculated to lead to the discovery of information relevant to the allegations of the complaint, to the proposed relief, or to Respondent's defenses.

6. Complaint Counsel objects to the Subpoena to the extent that it is overly broad, unduly burdensome, vague or ambiguous.

7. Complaint Counsel objects to the Subpoena to the extent that it is unreasonably cumulative or duplicative, or is obtainable from some other source that is more convenient, less burdensome, or less expensive.

8. Complaint Counsel objects to the Subpoena because the burden and expense of the proposed discovery outweigh its likely benefit.

9. Complaint Counsel objects to the Subpoena to the extent it seeks information that is subject to the attorney-client privilege, the attorney work-product privilege, the investigative privilege, the non-testifying expert privilege, the deliberative privilege, the law enforcement privilege, the informant privilege, and the joint prosecution privilege, that is exempt from disclosure pursuant to confidentiality provisions set forth in the FTC Act, that is protected from disclosure by the privilege for information given to the FTC on a Pledge of Confidentiality, that is protected from disclosure under principles of financial privacy, that is subject to a protective order from another litigation, or that is subject to other applicable legal protection or privilege.

10. Complaint Counsel objects to the Subpoena to the extent that it calls for materials outside the scope of discovery pursuant to Rule 3.31(c)(2).

11. By providing information in response to the Subpoena, Complaint Counsel does not concede that the Subpoena is valid, appropriate, or that such information is relevant, material, or admissible in evidence.

12. Complaint Counsel's objections and responses to the Subpoena are based on information now known to Counsel. Complaint Counsel has not yet completed its discovery of the facts in this case or prepared for trial and therefore reserves its rights under the Commission's Rules of Practice to amend, modify, or supplement its objections and responses if it learns of new information.

13. Complaint Counsel will not produce information responsive to any request that Respondent previously has produced to Complaint Counsel at any point during the investigation or prosecution of this matter.

14. Complaint Counsel will not produce information responsive to any request that has been provided to Respondent previously at any point during the investigation or prosecution of this matter.

15. Each of the foregoing General Objections is incorporated in each of the Responses hereinafter set forth. Subject to and without waiving these objections, Complaint Counsel provides the following responses.

OBJECTIONS AND RESPONSES TO SUBPOENA SPECIFICATIONS

1. All documents received or possessed before you were engaged as an expert (consulting or testifying) in FTC Docket No. 9358 that concern ECM BioFilms, Inc., any past and present employee or principal of ECM, and/or the ECM additive.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii).

Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

2. All documents, materials, correspondence, forms, marketing material, and testing used or referenced to form any and all opinions you may offer in this case. Production of all responsive materials should be submitted in accordance with the Commission's Rules of Practice and the ALJ's Scheduling Order in this matter.

RESPONSE: Complaint Counsel objects to this Request because it seeks information required to be produced under Rule 3.31A(c) and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel therefore objects to this Request because it unilaterally changes the scheduling order and advances Complaint Counsel's deadline for production of Rule 3.31A(c) expert information by two months. The Scheduling Order dictates the time and manner of production for information covered by this Request. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

3. All contracts, retainers, or engagement letters between you and any public or private firm that manufactures and/or produces biodegradable and/or compostable products.

RESPONSE: Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel further objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii).

4. All reports, analyses, assessments, tests, data, summaries, and conclusions issued to any public or private firm that manufactures and/or produces biodegradable and/or compostable products concerning the biodegradability of plastics manufactured by those companies.

RESPONSE: Complaint Counsel hereby incorporates by reference each General Objection as if set forth here in full. Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

5. All correspondence between you and any firm that manufactures and/or produces a product or substance in competition generally with other biodegradable plastic products

(to wit, ECM's additive) concerning the biodegradability of plastics manufactured with plastic additives.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

6. All correspondence and sections of contracts, retainers, and/or agreements with the University of Massachusetts, Lowell ("Umass") concerning funding (including research grants) of research related to biodegradable plastics or polymers.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

7. All your pending or existing patents that involve or relate to plastics and or biodegradable and compostable substances, products, and technologies, including those patents for which you are the assignor.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed his complete Curriculum Vitae, which includes a list of all his patents. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

8. All licensing or royalty agreements involving or concerning patents identified *supra* in response to Request 7, and all such agreements involving intellectual property related to biodegradable and compostable products.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed his complete Curriculum Vitae, which includes a list of all his patents.

9. Copies of all contracts, grant documents (including proposals) for the following research projects you were involved in:
 - a. Metabolix, “Development of Novel of Biodegradable Materials, \$1,500,196
 - b. NSF Center for Biodegradable Polymer Research, \$1,200,000 Industrial Members (8/93-present), Principal Investigator
 - c. Polymer Degradation Research Center, \$475,000, Industrial Members (8/89-8/93)
 - d. Digital, “Plastics Materials Research”, \$458,706
 - e. Metabolix Inc., Performance of PHA Derived Chemicals and Polyols in Polyurethane, \$141,465
 - f. 3M, “Composting Research”, \$155,000
 - g. Warner Lambert, “Biodegradable Polymer Research”, \$116,591
 - h. National Science Foundation, “Biodegradable Polymer Research Center”, \$110,000 (8/93-8/95)
 - i. Department of the Army, “Polymer Degradation Research”, \$104,000
 - j. Institute for Plastics Innovation, “Injection Molding Research”, \$75,000
 - k. Massachusetts Centers of Excellence, “Institute for Plastics Innovation”, \$75,000
 - l. Metabolix Inc., Performance of Polyhydroxyalkanoate Derived Chemicals and Polyols in Polyurethane, \$71,465
 - m. Battelle, “Biodegradable Packaging Development”, \$59,865
 - n. DuPont Corian, \$50,000
 - o. Invista, “Evaluation of Plasticizers”, \$ 28,000
 - p. Massachusetts Centers of Excellence, “Polymer Degradation Research”, \$25,000

RESPONSE: Complaint Counsel hereby incorporates by reference each General Objection as if set forth here in full. Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court’s Scheduling Order.

10. All documents concerning any testing or product evaluations involving biodegradable and/or compostable plastics in which you participated on behalf of, or as a member of, the BioEnvironmental Polymer Society and/or the Society of Plastics Engineers.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

11. All correspondence between you and any employee and/or consultant of the Biodegradable Products Institute ("BPI").

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

12. All correspondence with Dr. Ramani Narayan.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

13. All correspondence with any employee or contracting employee of O.W.S., Inc. related to biodegradable plastics.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

14. All correspondence (not subject to attorney client or work-product privilege and received before engagement as an expert in FTC Docket No. 9358) with any employee and/or representative of the Federal Trade Commission concerning biodegradable plastics.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

15. All correspondence with any witness, person, and/or consultant used to help form any opinion you have in this case. Production of all responsive materials should be submitted in accordance with the Commission's Rules of Practice and the ALJ's Scheduling Order in this matter.

RESPONSE: Complaint Counsel objects to this Request because it seeks information required to be produced under Rule 3.31A(c) and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel therefore objects to this Request because it unilaterally changes the scheduling order and advances Complaint Counsel's deadline for production of Rule 3.31A(c) expert information by two months. The Scheduling Order dictates the time and manner of production for information covered by this Request. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

16. All documents revealing shares of stock or ownership interests held by you in any company that sells, manufactures, or markets plastics, biodegradable technologies, and/or compostable technologies.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

17. A listing of all consultant, executive, or corporate positions you held concerning work or employment related to the biodegradability of plastics over the past ten years.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed his complete Curriculum Vitae, which includes a list of all his positions related to biodegradability of plastics over the past ten years.

18. All documents and correspondence between you and the authors of the article Gómez, EF, Michel Jr., FC. “Biodegradability of conventional and bio-based plastics and natural fiber composites during composting, anaerobic digestion and long-term soil incubation” *Polymer Degradation and Stability*, Vol. 98 (December 2013): 2583-2591.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed his complete Curriculum Vitae, which includes a list of all his scientific publications, papers, or presentations. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

19. Copies of all scientific publications, papers, or presentations that you authored concerning the rate or extent of biodegradable (including compostable) polymers when measured in a laboratory environment or in situ.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed his complete Curriculum Vitae, which includes a list of all his scientific publications, papers, or presentations. Subject to and without waiving the foregoing General and specific objections, Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

20. All conflict of interest forms or agreements completed or signed by you in association with your work at the Umass, or as a testifying witness in this case.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court’s Scheduling Order.

21. All documents concerning ASTM, including correspondence, in which you presented a proposal, voted on a proposal, or opposed a proposal concerning biodegradable plastics standards or test methods.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope

of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order.

22. If you have ever served as an expert in any other proceeding involving the Federal Trade Commission, copies of all expert reports and testimony given by you in those proceedings. Production of all responsive materials should be submitted in accordance with the Commission's Rules of Practice and the ALJ's Scheduling Order in this matter.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel objects to this Request because it seeks information required to be produced under Rule 3.31A(c) and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel therefore objects to this Request because it unilaterally changes the scheduling order and advances Complaint Counsel's deadline for production of Rule 3.31A(c) expert information by two months. The Scheduling Order dictates the time and manner of production for information covered by this Request. Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed all prior cases in which the Expert has testified or has been deposed within the preceding four years. Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

23. If you have ever served as an expert in any other legal proceeding involving plastics technologies, produce copies of all expert reports and testimony given by you in those proceedings. Production of all responsive materials should be submitted in accordance with the Commission's Rules of Practice and the ALJ's Scheduling Order in this matter.

RESPONSE: Complaint Counsel hereby objects to this Request to the extent that it seeks information not likely to lead to relevant evidence, and to the extent that this unlimited request is overbroad and burdensome under 16 CFR § 3.31(c)(2)(i)-(iii). Complaint Counsel objects to this Request because it seeks information beyond the scope of information to be produced under Rule 3.31A and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel objects to this Request because it seeks information required to be produced under Rule 3.31A(c) and Paragraph 19 of the Court's Scheduling Order. Complaint Counsel therefore objects to this Request because it unilaterally changes the scheduling order and advances Complaint Counsel's deadline for production of Rule 3.31A(c) expert information by two months. The Scheduling Order dictates the time and manner of production for information covered by this Request. Subject to and without waiving the foregoing General and specific objections, Dr. McCarthy has disclosed all prior cases in which the Expert has testified or has been deposed within the preceding four years. Complaint Counsel will produce all responsive, non-privileged documents within the scope of Rules 3.31 and 3.31A, and in accordance with the Scheduling Order and the Commission Rules.

Dated: April 25, 2014

Respectfully submitted,

/s/ Katherine Johnson

Katherine Johnson (202) 326-2185

Jonathan Cohen (202) 326-2551

Elisa K. Jillson (202) 326-3001

Division of Enforcement

Bureau of Consumer Protection

Federal Trade Commission

600 Pennsylvania Avenue, NW

Mailstop M-8102B

Washington, DC 20580

CERTIFICATE OF SERVICE

I hereby certify that on April 25, 2014, I caused a true and correct copy of the paper original of the foregoing document to be served as follows:

One electronic copy to **Counsel for the Respondent:**

Jonathan W. Emord
Emord & Associates, P.C.
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I further certify that I possess a paper copy of the signed original of the foregoing document that is available for review by the parties and the adjudicator.

April 25, 2014

/s/ Katherine Johnson
Katherine Johnson