IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO
Criminal Action No. 96-CR-68
UNITED STATES OF AMERICA,
Plaintiff,
vs.
TERRY LYNN NICHOLS,
Defendant.

REPORTER'S TRANSCRIPT
(Trial to Jury: Volume 92)

Proceedings before the HONORABLE RICHARD P. MATSCH, Judge, United States District Court for the District of Colorado, commencing at 8:45 a.m., on the 26th day of November, 1997, in Courtroom C-204, United States Courthouse, Denver, Colorado.

Proceeding Recorded by Mechanical Stenography, Transcription Produced via Computer by Paul Zuckerman, 1929 Stout Street, P.O. Box 3563, Denver, Colorado, 80294, (303) 629-9285

APPEARANCES

PATRICK RYAN, United States Attorney for the Western District of Oklahoma, 210 West Park Avenue, Suite 400, Oklahoma City, Oklahoma, 73102, appearing for the plaintiff.

LARRY MACKEY, BETH WILKINSON, GEOFFREY MEARNS, JAMIE ORENSTEIN, and AITAN GOELMAN, Special Attorneys to the U.S. Attorney General, 1961 Stout Street, Suite 1200, Denver, Colorado, 80294, appearing for the plaintiff.

MICHAEL TIGAR, RONALD WOODS, and JANE TIGAR, Attorneys at Law, 1120 Lincoln Street, Suite 1308, Denver, Colorado, 80203, appearing for Defendant Nichols.

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PROCEEDINGS

(In open court at 8:45 a.m.)

THE COURT: Be seated, please.

I need counsel at the bench, but I don't know --

MR. MACKEY: See if we can get there.

(At the bench:)

(Bench Conference 92B1 is not herein transcribed by court order. It is transcribed as a separate sealed transcript.)

(In open court:)

THE COURT: Members of the jury, good morning.

Just to remind you, we were hearing testimony from Mr. Buechele when we recessed, and we had just received into evidence two exhibits, 28 -- 786 and 786B, and we're about to inquire about those. So that's where we were. We'll bring in Mr. Buechele.

Good morning. If you'll resume the stand under the oath earlier taken.

(Richard Buechele was recalled to the stand.)

THE COURT: Ms. Wilkinson.

MS. WILKINSON: Thank you.

DIRECT EXAMINATION CONTINUED

BY MS. WILKINSON:

Q. Good morning, Mr. Buechele.

A. Good morning.

Q. You told us yesterday that you had done some limited testing on Government's Exhibit 786 and 786B. Do you recall that?

A. Yes, I do.

Q. Did you do additional testing on some other plastic that was collected from the crime scene?

A. Yes, I did.

MS. WILKINSON: Your Honor, may I approach the witness?

THE COURT: Yes.

BY MS. WILKINSON:

Q. I'm handing you Government's Exhibit 785. Do you recognize that, Mr. Buechele?

A. Yes, I do. It bears my initials on the back of this bag.

Q. And do you recognize the plastic inside of that bag?

A. Yes, I do.

Q. Did you alter that plastic in any way?

A. No, ma'am, I did not.

Q. Did you cut off portions for testing?

A. Again, as I mentioned yesterday, I would have removed a small sliver of one of those pieces of plastic for testing.

Q. And is that the only way you altered the plastic that's in Government's Exhibit 785?

A. Yes, it is.

MS. WILKINSON: Your Honor, we'd offer Government's Exhibit 785.

MR. TIGAR: May I --

MS. WILKINSON: I'm sorry. I forgot one other question.

BY MS. WILKINSON:

Q. Is there also a Q number on there, Mr. Buechele?

A. Yes, there is. This was given Laboratory No. Q116.

Q. And is that how you referred to it when you were doing your testing?

A. Yes, it is.

THE COURT: Yes, you may inquire.

MR. TIGAR: May I approach? Thank you, your Honor.

VOIR DIRE EXAMINATION

BY MR. TIGAR:

Q. Agent Buechele, when this item that's labeled "plastics" labeled "Q785" came to you, it was in a plastic Ziploc bag; correct?

THE COURT: I think there's a misreference. You said Q --

MR. TIGAR: I'm sorry. Government Exhibit 785. Thank you, your Honor.

BY MR. TIGAR:

Q. When Government Exhibit 785 came to you, it was in a plastic Ziploc bag; is that correct?

A. Yes, sir. That is correct.

Q. And that's the Ziploc brand; is that right?

A. Ziploc, generic term, yes, sir.

Q. Okay. And the -- when you received it, it had the YR and DW initials on it; is that right?

A. I'm not sure if they were present when I received it or not. They probably were.

Q. Had a -- when you received it, had a Q number been assigned to it?

A. Yes, sir, I believe it had.

Q. And do you recognize on this edge of plastic that I'm showing you -- is that where you cut the piece that you were going to do a materials analysis on? Can you see this -- this edge I'm showing you there, sir?

A. Yes. I see that edge, but to say that that was the exact location of my sample, I couldn't say.

Q. Okay. And when you received the items in the bag, did they have this Q116, etc., typewritten tag with it?

A. I don't recall if that Q116 tag was present when I did my examination or not.

Q. And whose initials are these up here; do you know? The green.

A. Without being 100 percent certain, I would say those are Roger Martz' initials.

Q. Okay. And were those on there at the time you received the bag?

A. Again, I don't recall.

Q. Okay. The RH, do you know if those initials were on at the time you got there?

A. I -- I don't recall. The only initials, sir, that I can testify to are my own initials, and I don't recall what order

any others would have been placed on there.
Q. Okay. So your testimony is, sir, that you recognize the plastic as the plastic you received; correct?
A. That's correct.

Q. And do you know if this cut edge here on this other little shard here was one that was there at the time you received it?
A. Again, I can't specifically say which edge of that plastic I sampled and which ones might have been sampled by other individuals.
Q. Okay. And you can't remember exactly which -- which of these pieces were cut at the time you received them and which not; correct?
A. That's correct.
Q. Is it the case, sir, though, that any of these cuts that we
see that are clean cuts are not the plastic as it existed at the time that you got it?
A. I'm not sure that I understand that question.
Q. Well, when you got these pieces of plastic, were all of them in a form that did not have these clean cuts that I've just been showing you?
A. I don't recall if there were any clean cuts when I sampled that plastic. No, sir.
Q. Okay. All right.
MR. TIGAR: We have no objection to 785, your Honor.
THE COURT: All right. It's received.
You may continue.
MS. WILKINSON: We have no further questions for this witness, your Honor.
THE COURT: All right. Mr. Tigar, do you have some

cross?
MR. TIGAR: Yes, your Honor.
CROSS-EXAMINATION
BY MR. TIGAR:
Q. Agent Buechele, in April and May of 1995, sir, you were part of the Materials Analysis Unit; is that correct?
A. Yes, sir, that is correct.
Q. And the Materials Analysis Unit was responsible for the identification of evidence that came from bombing crime scenes; is that correct?
A. The Materials Analysis Unit was certainly one of the units in the laboratory that would receive evidence from bombing crime scenes, yes, sir.
Q. And in that period of time, you're -- one of your responsibilities was to receive -- excuse me -- and analyze evidence from the Oklahoma City bombing crime scene; is that right?
A. That is correct, yes, sir.

Q. Now, when the pieces of plastic came into your possession, they were all in Ziploc-type bags of the type that we've been examining; is that right, sir?
A. I believe most of them were, yes, sir.
Q. Now, do you have a procedure, or did you at the time -- let
me start this again. Was -- is one of the functions of the Materials Analysis Unit at that time to examine items of

evidence for potential residues of bombing crime scenes?
A. At that particular time, I'm not sure if the examination of residues from bomb scenes was delegated to the Chemistry Toxicology Unit or if it was still being handled by the Materials Analysis Unit.
Q. But the -- both of those are parts of the FBI Laboratory, are they not?
A. Yes, sir.
Q. And you knew that, did you not, that it was a part of the investigative process here to attempt to identify residues of the device?
MS. WILKINSON: Objection, your Honor. I think this is beyond the scope of the direct.
THE COURT: Well, I take it you're asking in terms of handling of the exhibits?
MR. TIGAR: Yes, your Honor.
MS. WILKINSON: I withdraw my objection.
THE COURT: All right.
THE WITNESS: Would you repeat the question, please.
BY MR. TIGAR:
Q. If I can remember it. Did you understand it was part of the function of the FBI Laboratory at this time to try to examine crime-scene evidence for -- for residues of the device?
A. Yes, sir.
Q. Now, before you received the Exhibit 785 and 786, do you

know whether they had been subjected to any analysis for potential residues?
A. Yes, sir. I believe they had.
Q. They had already been subjected to that?
A. Yes, sir.
Q. And what we've looked at here when we looked at these plastic bags is a bag that has initials from someone who picked up the item at the crime scene and then a series of initials that reflect the passage of the item from the crime scene to the laboratory; is that right?
A. Yes, sir. That would be the standard procedure.
Q. Now, you did an analysis, you testified, of pieces of plastic using an instrument in your laboratory; correct?
A. That's correct.
Q. And in order to do that, you testified you removed

fingernail-clipping-size pieces from some of the plastic; is that right?
A. Approximately, yes, sir.
Q. Now, was it -- do you know whether there was a policy at that time in the FBI Laboratory as to whether items collected from a bombing crime scene should be stored in Ziploc-type polyethylene plastic bags?
A. I don't recall any written policy at that time, no, sir.
Q. Do you know the characteristics of polyethylene bags in terms of whether they are or are not permeable to items

commonly found at crime scenes?
A. No, sir.
Q. Bombing crime scenes?
A. No, sir. I've done no research, and I'm not familiar with any studies along that line.
Q. Okay. Was there a -- in effect at the time you handled this evidence any policy with respect to using paint cans for items collected at bombing scenes? Do you know?
A. Again, if there was any policy along those lines, I was unfamiliar with it.
Q. Now, what you did, sir, was the test that you've described; correct? The removing the clipping and looking at it; right?
A. In addition to that, I subjected it to instrumentation analysis.
Q. Well, let's start. How many pieces of plastic did you analyze in connection with this case?
A. Probably approximately eight to ten.
Q. Now, were all of those pieces of plastic shards or fragments collected at the crime scene, or were there other pieces that you also examined?
A. There was pieces of plastic collected from the crime scene, and there was also pieces of plastic shavings which I removed from drums, barrels.
Q. And the pieces that you removed from drums included four -- did you -- did some of those drums come from Mr. Terry Nichols'

home?
A. I believe they did, yes, sir.
Q. And did you examine shavings from four drums?
A. I believe there were four, yes, sir.
Q. Two of those had been manufactured by Smurfit; isn't that what you found out?
A. Yes, sir.
Q. And two of them had been manufactured by Van Leer; correct?
A. I believe that's correct, yes, sir.
Q. In addition to that, you examined material from a drum taken from the home of Mr. James Nichols, did you not, sir?
A. I believe we did, yes, sir.
MS. WILKINSON: Objection, your Honor. I think this

MS. WILKINSON: Objection, your Honor. I think this is beyond the scope.
THE COURT: Sustained.
BY MR. TIGAR:
Q. Well, sir, you testified about two analyses of 785 and 786; correct, sir?
A. 785 and 786 --
Q. Government -- your Q numbers. Just a moment. Your Q No. 116; correct?
A. Yes, sir.
Q. And your Q No. 1112 (sic); correct?
A. Yes, sir. That's correct.
Q. Now, when you were assigned to look at Q116 and 1112(sic),

that was not the only thing you were supposed to do with respect to plastics; correct?
A. That's correct.
Q. And when did you first receive the assignment to examine Q116 and 1112 (sic)?
A. It would have been at the time the evidence was submitted to the FBI Laboratory.
Q. And who made that assignment?
A. I'm not sure who asked -- or made the request to have these
plastics compared. Probably would have been the case agent at the time.
Q. The senior special -- the special agent who was going to submit a lab report about them?
A. Yes, sir.
Q. And who would that be?
A. I believe it was David Williams.
Q. And in fact, after you completed your examination of Q116, which is here in evidence as 785, Government 785, and Q1112 (sic), which is here in evidence as Government 786, you reported your results to Senior Special Agent Williams; correct?
A. Yes, sir, I did.
Q. Now, was the choice of you to conduct these plastics analysis made because another person in the laboratory was not available?

A. No, sir.
Q. Did you ever discuss this plastics work with Dr. Frederic Whitehurst?
A. No, I don't believe --
MS. WILKINSON: Objection, your Honor.
THE COURT: Objection sustained.
BY MR. TIGAR:
Q. Now, when -- who was it then that made the assignment directly to you to examine Q116 and 112?
A. That would have been done through our paperwork and the

laboratory worksheets by the case agent in the lab report.
Q. And -- and the case agent in the lab -- you mean Mr. Williams?
A. Yes, sir.
Q. So you got this assignment in a written form?
A. Yes, sir.
Q. All right. Now, what was -- did you receive more than one assignment with respect to plastics or just one?
A. I believe the assignment was more generic to compare plastic from the crime-scene debris to plastics in the drums that were recovered at a separate location.
Q. So your analysis of 116 and 112 was simply a part of a more generic assignment that embraced a whole bunch of plastic fragments and pieces; is that correct?
A. That's fair to say, yes, sir.

Q. All right. Well, now I'd like to ask you about the rest of your assignment. The -- you looked at these fingernail-clipping-size pieces; is that right?
A. Yes, sir.
Q. And what did you determine from looking at the fingernail-size pieces?
MS. WILKINSON: Objection, your Honor.
THE COURT: Sustained. He hasn't offered any conclusions.
MR. TIGAR: Well, if I -- I don't mean to argue with your Honor. It's our position that it was gone into on direct that he conducted an examination.
THE COURT: Yes. But the results weren't testified to.
MS. WILKINSON: It was only for chain of custody purposes, your Honor.
THE COURT: You can call him as a witness later if you choose, of course.
MR. TIGAR: Well, let me continue the examination, your Honor, and see.
BY MR. TIGAR:
Q. Did you -- in connection with the examination, did you telephone -- did you contact barrel manufacturers?
MS. WILKINSON: Objection.
THE COURT: Sustained.
MR. TIGAR: Your Honor, in light of the Court's rulings, I do not have any further examination of the witness at this time.
THE COURT: All right.
MR. TIGAR: I would ask that the witness be made available so that he can be called in the defense case.
THE COURT: He'll be available.
MS. WILKINSON: That's fine, your Honor. We have his phone number.

THE COURT: You may step down now, and we'll let you know when you're to be back.
THE WITNESS: All right. Does that mean I'm not free to leave town, your Honor?
THE COURT: You can leave town, but don't leave the country.
THE WITNESS: Thank you, your Honor.
THE COURT: Next witness.
MR. MACKEY: Your Honor, we'll call Mr. Tony Tikuisis.
THE COURT: All right.
(Tony Tikuisis affirmed.)
THE COURTROOM DEPUTY: Would you have a seat, please.
Would you state your full name for the record and spell your last name.
THE WITNESS: Tony Tikuisis, T-I-K-U-I-S-I-S.
THE COURTROOM DEPUTY: Thank you.
THE COURT: Mr. Mearns.

DIRECT EXAMINATION

BY MR. MEARNS:
Q. Where do you live, Mr. Tikuisis?
A. Calgary, Alberta.
Q. Is that in Canada?
A. Yes. In western Canada, just north of Montana.
Q. How long have you lived in Canada?
A. 37 years, all my life.
Q. Where did you go to college?
A. University of Waterloo.
Q. And where is that institution?
A. Waterloo, Ontario.
Q. When did you graduate from the University of Waterloo?
A. 1984.
Q. And what was your degree or -- and your major?
A. Chem -- honors degree in applied chemistry.
Q. Where do you work now?
A. I work for Nova Chemicals.
Q. And how long have you worked for Nova Chemicals?
A. Approximately 13 years.
Q. And has that company always been known as Nova Chemicals?
A. No, it hasn't.
Q. What was it known as prior?
A. Novacor Chemicals.

Q. It's been the same company, though, during the entire time that you've been there?
A. Yes, it has.
Q. What kind of products does Nova Chemicals manufacture or produce?
A. Nova is a major petrochemical producer. We make plastics and methanol, and we also transport natural gas.
Q. What positions or jobs have you had?
A. I've held a variety of positions at the company. Started off in the analytical lab as a chemist, and then I worked as a tech service specialist for customers and more recently, as an

tech service specialist for customers and more recently, as an additive specialist and a regulatory expert.
Q. What kinds of things did you do as an analytical chemist?
A. I did a lot of testing on our plastics to look at the recipe of the additive we put into the plastic to determine proper concentrations were present, etc. I did a lot of troubleshooting.
MR. TIGAR: Your Honor, if the witness can speak a little slower.
THE COURT: Yes. It's a little difficult to hear you.
If you'll slow down and speak up, please.
BY MR. MEARNS:
Q. Okay. Mr. Tikuisis, yes, if you could keep your voice up and slow down a little bit.
A. Okay.

Q. Tell us what you did as an analytical chemist.
A. I did a lot of testing on the plastic for customers to ensure that the formulation was correct and that the plastic

met specifications for the customer.
Q. And you're now presently in what position?
A. An additive specialist.
Q. And what do you do in that job?
A. In that job, I have technical responsibility for all the chemicals and additives that we put into our plastics to protect the plastic during its life cycle and also to protect it during processing by our customers.
Q. Okay. You're going to have to continue to slow down for us. Okay?
A. Okay.
Q. As a result of your education and your experience with Nova Chemicals, have you written any articles that have been published?
A. Yes, I have.
Q. How many articles have you published?
A. About a dozen have been published.
Q. And what are those articles, generally speaking? What are those articles about?
A. They are published articles about plastic analysis -- polyethylene analysis.
Q. And what kinds of publications have they appeared in?

A. Various industry trade journals such as the Journal of Polymer Science, and they are also in a lot of the publications from conference proceedings where I presented papers.
Q. And have you presented papers at -- at many conferences?
A. Yes, I have.
Q. Have you taught any classes related to the chemical analysis of plastics?

A. I've given several internal seminars to new employees and other staff members.
Q. Now, you told us that Nova Chemicals manufactures plastics; is that right?
A. Yes.
Q. What kinds of plastics does Nova Chemicals manufacture?
A. We manufacture polyethylene and polystyrene.
Q. And are there different types of polyethylene?
A. Yes, there is.
Q. Tell us what different types of polyethylene there are.
A. The three basic types of polyethylene are low-density polyethylene, linear low-density polyethylene, and high-density polyethylene.
Q. And what is the difference between those three types of polyethylene?
A. Their basic difference is their strength and toughness.
Q. Describe for us then with respect to those characteristics, what are the characteristics of high-density polyethylene?

A. High-density polyethylene is a very strong plastic. It's used for rigid containers and materials that require strength.
Q. And what -- could you tell us what types of products. Give
us some more examples of what types of products are made from high-density polyethylene.
A. High-density polyethylene is used in gas pipe. It's used in potable water pipe for homes to convey water. It's also used in low molded articles such as containers such as ice cream pails, drums --
MR. TIGAR: Your Honor, if he could just slow down a little bit more.
THE COURT: Yes. We have a court reporter who has to take it down.
THE WITNESS: Okay.
THE COURT: It's difficult for the reporter when you go as fast as you've been.
THE WITNESS: High-density is used in a variety of consumer articles.
BY MR. MEARNS:
Q. Okay. What kinds of consumer articles?
A. Pipe -- sorry. Those containers would be ice cream containers, for example. Margarine containers. Those types of materials.
Q. Is high-density polyethylene also used to make large containers like plastic barrels or plastic drums?

A. Yes, it is. It's used for fertilizer tanks. It's used for drums. It's used for pipelines.
Q. Does Nova Chemicals actually manufacture those end products; that is, barrels and drums and ice cream pails?

A. No, we do not.
Q. What -- what type of plastic or what is the form of plastic
that Nova Chemicals manufactures?
A. We sell our material in the form of a pellet which is similar to a small pebble.
Q. And what do you refer to in your -- in your area of expertise -- what do you refer to that plastic pellet as?
A. That's referred to as a resin.
Q. What kind of customers does Nova Chemicals sell that plastic high-density polyethylene resin to?
A. We sell to a variety of customers that will take our material and process it into a variety of finished articles.
Q. Does Nova Chemicals sell a high-density polyethylene resin to a company known as Smurfit Plastic Packaging, Incorporated?
A. Yes, we do.
Q. What does Smurfit do with the polyethylene resin, the high-density polyethylene resin?
MR. TIGAR: Object, personal knowledge, your Honor.
THE COURT: Yes. We have to find out how he knows.
BY MR. MEARNS:
Q. Have you had a relationship in your experience at -- at

Nova Chemicals in connection with Smurfit?
A. Yes, I have.
Q. And what is the nature of your relationship with Smurfit?
A. I do some consulting and technical service work for this customer.
Q. And do you confer with them, discuss with them the chemical composition of the resin that you are going to sell to them?
A. Yes, I do. I have detailed knowledge of -- of the components of what they do.
Q. And is it important to you in terms of formulating the recipe for the resin that you provide to them to know what Smurfit is going to then use the resin for?
A. Yes, it is.
Q. So tell us then, do you know what -- what Smurfit does with
the resin that you sell to them?
MR. TIGAR: Objection, your Honor. If that's not offered for the truth, simply to -- to inform his business decision, we have no objection to it.
MR. MEARNS: We intend to call the next witness as a -- as a representative of Smurfit.
MR. TIGAR: Mr. Udell will be here?
MR. MEARNS: Yes, sir.
MR. TIGAR: If Mr. Udell will be here, your Honor, we have no objection to any of this, and I will not make any other objections.

THE COURT: All right. Proceed.
BY MR. MEARNS:
Q. Mr. Tikuisis, what does Smurfit do with the plastic resin that you sell to them -- that Nova Chemicals sells to them?
A. Smurfit takes our plastic material, they add another component, the UV stabilizer package. They mix those two components together. The material is then melted and extruded, or processed into a melt state to where it's blown into the finished part, into a mold, such as making a pail or a barrel.
Q. So the first thing that they do is they take your resin?
A. Yes.
Q. Do they mix anything with that resin prior to making their barrel?
A. Yes. They -- they will add a second component which contains some specialty additives.
Q. And then what do they do with that mixture?
A. They will blend that, and then they will put it through a machine which melts the plastic; and it's slowly pushed out through the end of the machine where high-pressure air is used to blow the molten plastic into -- into the mold.
Q. And the mold is then a mold of a large plastic drum?
A. Yes.
Q. How long has Nova Chemicals supplied the specific type of resin, plastic resin that Smurfit now uses to make drums? How long have they -- how long has Nova Chemicals been supplying

that specific resin?
A. Since 1991.
Q. Do you know what month in 1991?
A. December.
Q. I want to direct your attention now to September of 1997. Were you asked to conduct some chemical tests of some plastic fragments?
A. Yes, I was.
Q. Describe briefly what you were asked to do.
A. I was asked to identify the composition of the plastic samples.
Q. Okay. What I'd like you to do is to look in the folder that you have there and locate Government Exhibit 786B and Government Exhibit 785.
And why don't we first begin with 786B. Do you have that in front of you?
A. This is 786B.
Q. Do you have that?
A. Yes.
Q. Is the Government exhibit sticker there?
A. Yes.
Q. Okay. Do you recognize that?
A. Yes. These -- I remember these samples.
Q. When were you provided -- were you provided those samples in September of 1997?

A. Yes, I was.
Q. Who -- who gave them to you?
A. Mr. Jim Elliott.
Q. Did he provide -- did he send them to you or did he bring them by hand?
A. No. He brought the samples with him.
Q. Okay. And look at 785, if you will. And do you recognize that?
A. Yes, I do.
Q. How do you recognize that?
A. I remember the samples, and also, my initials are on the sample bag.
Q. And what were you asked to do with the plastic that was contained in 786B and 785?
A. I was asked to select one sample from each bag and to conduct an analysis on that one piece.
Q. And did you do that?
A. Yes, I did.
Q. Okay. What I'd like to do is -- if I may have the ELMO. If I could show you what is not yet in evidence as 785C. Do you see that on the screen?
A. Yes, I do.
Q. And do you recognize what's shown in that photograph?
A. Yes.
Q. What is it?

A. It's a sample that I tested from that sample bag.
Q. Now, 785C is a sample that you took from which sample bag?
A. From the sample bag labeled as 785.
Q. And is this the sample that you subjected to a chemical analysis?
A. Yes.
MR. MEARNS: Your Honor, we would offer the photograph 785C.
MR. TIGAR: No objection, your Honor.
THE COURT: Received, 785C.
BY MR. MEARNS:
Q. What I'd like to show you now, Mr. Tikuisis, is what is marked as 786E. Do you see that on the screen?
A. Yes, I do.
Q. And what is that?
A. That is the sample that I selected for testing from the sample bag 786.
Q. From sample bag 786B that is in front of you?
A. Yes.
Q. And is that the -- the plastic that you submitted to a test in September of 1997?
A. Yes.
MR. MEARNS: Your Honor, we would offer the photograph

786E.
MR. TIGAR: No objection, your Honor.

THE COURT: Received, photograph 786E.
BY MR. MEARNS:
Q. Now, did you take this photograph 786E prior to conducting the test?
A. Yes.
Q. What I'd like you to do now is also look in your bag -- in the folder -- excuse me -- for Government Exhibit 190A.
A. Okay.
Q. Do you recognize that?
A. Yes, I do.
Q. And what is that?
A. That's a sample of a piece of a drum that we cut out from a
sample drum.
Q. Okay. Let me show you what is in evidence as Government Exhibit 190. Do you recognize this drum, Mr. Tikuisis?
A. Yes, I do.
Q. Okay. How does what you have before you as Government Exhibit 190A relate to what I'm showing you as Government Exhibit 190?
A. It has the sample number on it -- the same sample number as
on the drum. My initials are on this sample and also on the drum.
Q. Were you present when that sample that you're now holding was extracted from that drum?
A. Yes, sir. I actually assisted in cutting out the sample.

Q. Are your initials on that sample that's before you, 190A?
A. Yes.
MR. MEARNS: Your Honor, we would offer 190A.
MR. TIGAR: May I look at it, your Honor?
THE COURT: You may.
MR. TIGAR: Excuse me.
VOIR DIRE EXAMINATION
BY MR. TIGAR:
Q. Mr. Tikuisis, my name is Michael Tigar. I'm one of the lawyers appointed to help out Terry Nichols.
I didn't hear your answer to the last question about these numbers. You said that you recognized this because of these numbers on -- on the back here, or -- what did you say about how you recognize it?
A. I recognized the sample for several reasons. First of all,
I recognized it because I -- I assisted in cutting the sample out of the drum.
Q. Yes, sir.

A. I also initialed the sample immediately after it was cut out.
Q. Right.
MR. TIGAR: No objection, your Honor.
THE COURT: 190A received.
MR. MEARNS: May I give 190A back to the witness, your Honor?

THE COURT: Yes.

DIRECT EXAMINATION CONTINUED

BY MR. MEARNS:
Q. Mr. Tikuisis, in a moment, I'm going to ask you about the tests that you performed; but before I do that, I'd like to ask you a question. As a result of the tests that you performed on the plastic that we saw in Government Exhibit -- the piece of plastic in Government Exhibit 785C, which we see there, and the piece of plastic that you performed your tests on, 786E, and what you have now in front of you, 190A, what happens to the plastic during the course of that testing?
A. Some of the tests that we conducted are destructive in nature and would consume the sample; i.e., the sample is used during the testing and is not recovered.
Q. Okay. Does any of the plastic from the -- those fragments or sample remain at the end of your testing?
A. Yes. Some of the material, we performed an extraction on where we had to grind the resin and make it into smaller particle size, and we retrieved the sample after the test was complete.
Q. Okay. What I'd like you to do then is see if you could locate Government Exhibit 786A.
A. I have it.
Q. Do you recognize that?
A. Yes.

Q. What is that?
A. That is some ground material left over from Sample Q112A.
Q. And what did you -- how do you recognize that?
A. I have my initials on the sample, and I also put the sample number on the bag after I put the sample back into it.
Q. And is that bag sealed at the top there?
A. Yes, it is.
Q. And are your initials there on top of the seal that you placed on it in September of '97 after your tests were completed?
A. Yes, they are.
MR. MEARNS: Your Honor, we would offer 786A.
MR. TIGAR: No objection, your Honor.
THE COURT: Received. 786A

THE COURT: Received, 785A.
BY MR. MEARNS:
Q. With respect to -- to the piece of plastic that we see depicted in the photograph 785C, was there a similar result as a result of your testing on that piece of plastic?
A. Yes, there was.
Q. Do you see on -- in front of you 785A?
A. Yes, I do.
Q. And what is that?
A. That is some ground -- or leftover material from the testing I performed on that sample.
Q. And did you seal that package the same way that you sealed

the other package you testified about a moment ago?
A. Yes, I did.
Q. And are your initials and -- still on the intact seal on the top of that envelope?
A. Yes, they are.
MR. MEARNS: Your Honor, we would offer 785A.
MR. TIGAR: No objection, your Honor.
THE COURT: Received.
BY MR. MEARNS:
Q. Did you also test a portion of 190A; that is, the -- the large piece that you extracted from this barrel?
A. Yes, I did.
Q. And did you subject that to the same chemical tests?
A. Yes, I did.
Q. Okay. Do you have before you 190B, Government Exhibit 190B?
A. Yes, I do.
Q. And what is that?
A. That is some leftover material from the drum section of the sample I tested.
Q. And did you seal that in the same fashion?
A. Yes, I did.
Q. And are your initials still on the intact seal?
A. Yes, they are.
MR. MEARNS: Your Honor, we would offer 190B --

Government Exhibit 190B.
MR. TIGAR: May I examine it, your Honor?
THE COURT: Yes.
MR. TIGAR: No objection, your Honor.
THE COURT: 190B received.
BY MR. MEARNS:
Q. Mr. Tikuisis, prior to conducting these tests in September of 1997, did you know the chemical composition of the resin used by Smurfit to manufacture 55-gallon barrels?
A. Yes, I did.
Q. And is that because that's the resin that Nova Chemicals provides them?

A. Yes.
Q. Prior to conducting those tests, did you also know the chemical composition of the additive package that Smurfit mixes with the Nova Chemicals resin?
A. Yes, I did.
Q. Tell us then about the testing that you did on those three samples in September of 1997. What tests did you perform?
A. We did a total of seven different tests in order to determine the composition of the material.
Q. What was the first test that you performed?
A. The first test we did was called "infrared analysis."
Q. And what was the result of the infrared analysis on each of the samples that you tested?

A. That test identified the three samples as -- to be composed
of polyethylene.
Q. What was the second test that you conducted?
A. The second test I performed was a melting point on the pieces of plastic.
Q. And what was the result of that test with respect to the three samples you tested?
A. The melting-point analysis indicated that the samples were composed of high-density polyethylene.
Q. What was the third test that you conducted?
A. The third test I did was a melt index measurement.
Q. And what was the result of the melt index test with respect to those three samples?
A. The melt index result indicated the material to be a high-density polyethylene with a melt index of approximately 5, which is similar to a grade that we manufacture.
Q. Does that mean it was consistent or inconsistent with the Nova resin that you supply to Smurfit?
A. It was consistent.
Q. What was the fourth test that you conducted?
A. The fourth test, I did some additive analysis. When we manufacture our resin, we add stabilizers to the plastics to protect it during processing and also to extend its usage life when the customer uses it. And the test I looked for was the specific two additives that we add to our recipe when we make

this plastic.
Q. And what was the result with respect to those three samples that you tested?
A. The antioxidants that I found present in the sample were identical to the additives that we put into that formulation.
Q. And what was the fifth test that you conducted?
A. Knowing that our customer adds a UV stabilizer, a specialized additive to protect the drum from sunlight just similar to a UV suntan lotion for protecting skin from the

harmful rays of the sun -- the customer adds a UV stabilizer, so I checked for the presence of that stabilizer in the plastic samples.
Q. And did you find that UV stabilizer present in each of the three samples you tested?
A. Yes, I did.
Q. What was the next step that you conducted?
A. The next test, I looked for the specific concentration of those UV stabilizers in the samples.
Q. And what did you determine?
A. I found them to be present at the approximate levels that they would be expected to be present if the blending -- if the blending operation was done correctly; i.e., the resin and the UV master batch was added in the proper concentration.
Q. And so the result of your sixth test was again that it was consistent with the additive package that's added by Smurfit in

their manufacturing process?
A. Yes.
Q. And what was the seventh test that you conducted?
A. Because this UV additive is very difficult to analyze and requires a lot of specialized equipment, most of our customers, if they are doing a similar test, would -- did not do that test; so Smurfit had the customer or the supplier that they purchased this additive from add another component to this master batch or UV stabilizer.
Q. What's the purpose of this additional component?
A. The additional component is simply there as a tracer to help in the identification of the UV stabilizer, to confirm the
concentration.
Q. And did you look for the presence of that tracer chemical?
A. Yes. The tracer in use is calcium carbonate, commonly known as limestone.
Q. And did you find that tracer chemical present in each of the three samples that you tested?
A. Yes, I did.
Q. As a result of the tests that you then conducted on Government Exhibit 786A -- that is, the -- what you have left -- what was the result of your tests?
A. I identified that material as Smurfit plastic.
Q. And with respect to Government Exhibit 785A, what was your conclusion after these tests?

A. I identified that material as Smurfit plastic.
Q. And with respect to Government Exhibit 190B, the portion that you tested that was extracted from the barrel, what was the result of your tests?
A. I identified that material as Smurfit plastic.
MR. MEARNS: No further questions. Your Honor.
THE COURT: Mr. Tigar.

THE COURT: Mr. Tigar.

CROSS-EXAMINATION

BY MR. TIGAR:

Q. Hello again, Mr. Tikuisis.

What I'd like to start out with, sir, is to ask you about the plastics manufacturing that your company does.

You testified that there are three types of polyethylene; correct?

A. Yes.

Q. And we're talking today about something called high-density polyethylene; is that right?

A. Yes.

Q. And we're also talking about high-density polyethylene that you supply to a company called Smurfit; is that right?

A. Yes.

Q. And from your relationship with Smurfit, you know that they manufacture a number of products using high-density polyethylene; is that right?

A. Yes. Yes.

Q. Have you seen their catalogue?

A. Yes.

Q. I show you now what I have marked as Defense Exhibit E99, and ask you if you recognize this as the Smurfit -- Smurfit catalogue material.

A. Yes, I do.

MR. TIGAR: We offer it, your Honor.

MR. MEARNS: No objection.

THE COURT: E9 -- is it E 99?

MR. TIGAR: E99, yes.

THE COURT: Received.

BY MR. TIGAR:

Q. Now, you do not manufacture containers; is that correct?

A. That is correct.

Q. You manufacture resin?

A. Yes.

Q. And when you send the resin to Smurfit, it doesn't have the UV stabilizer in it, does it?

A. No.

Q. Now, the UV stabilizer is -- that's something to prevent damage to what's ever going to be contained in a manufactured container from the sun; is that right?

A. No.

Q. What is the purpose of the UV stabilizer?

A. It's used to protect the container, itself.

Q. Oh, so that -- it isn't -- it isn't to prevent light from passing through; right?

A. No.

Q. So this prevents the sun from having some adverse effect on

Q. So this prevents the sun from having some adverse effect on the polyethylene; is that right?
A. Yes.
Q. Now, that UV stabilizer that you were looking for is manufactured by a Swiss company, Ciba-Geigy, is it not?
A. Yes.
Q. C-i-b-a dash G-e-i-g-y; correct?
A. Yes.
Q. And it goes by the product name Tinuvin, doesn't it?
A. Tinuvin.
Q. Tinuvin, T-i-n-u-v-i-n; right?
A. Yes.
Q. Now, is there more than one kind of Tinuvin?
A. There are several of them.
Q. Now, the particular kind of Tinuvin that is used by Smurfit is called Tinuvin 622; is that right?
A. Yes.
Q. Now, in terms -- and in order to detect the presence of Tinuvin 622, you used a technique called thin-layer chromatography; correct?
A. Yes.
Q. Or TLC?

A. Yes.
Q. All right. And using -- and the -- the particular kind of TLC that you were administering to this sample was supplied to you by Ciba-Geigy; correct?
A. Yes.
Q. That is, they have a proprietary method, something that they own, that helps you to detect the presence of their product; is that right?
A. Yes. But the method is not proprietary.
Q. I -- all right. Now, is -- in terms of using thin-layer chromatography or TLC to find Tinuvin 622, is -- is -- are there other kinds of Tinuvin?
A. There are a couple other grades.
Q. Now, does this method that you used identify uniquely T622, or does it -- does it read back a result that some form of Tinuvin is present?
A. No. It identifies specifically Tinuvin 622.
Q. All right. Now, the Tinuvin 622 is a particular molecule; correct?
A. Yes.
Q. And it is a molecule that you've got some carbon atoms in there and some nitrogens and some oxygens and -- is that right?
A. Yes.
Q. And this particular test will read back T622. You'll know that's what you've got; right?

A. The person doing the test has to observe the -- the finished test result and make that conclusion.

Q. All right. And that is a conclusion that you made; correct?
A. Yes.
Q. And you're a person that's experienced in the process; right?
A. Yes.
Q. Now, this particular substance called Tinuvin 622 has a shelf life -- correct -- or has a life, a useful life?
A. No. I really -- it's -- we can store that chemical if we -- we do add that chemical in some of the other grades of polyethylene that we sell, and it has a storage life at our plant site of at least five years minimum.
Q. That was my -- I'm sorry. My question was not artfully done. Once you've added the T622 to a product that's going to go to consumers, the -- its ability to protect the product from
the harmful rays of the sun has about a five-year life expectancy; correct?
A. I would not agree with that.
Q. Well, all right. Then tell me because I -- I'm just reading off some notes here.
A. Okay.
Q. How does it work?
A. Manufacturers of this additive such as Ciba-Geigy would

make recommendations on the expected life expectancy, how long you could protect the integrity of the container that you put the Tinuvin in. We have data in the lab that shows the containers can last much longer. The pieces of plastic can withstand UV for much longer than five years.
Q. So Ciba -- Is it correct that Ciba-Geigy says five years is what you can expect in terms of their marketing, but, in fact, you'll probably get more? Is that what happens?
A. Exactly. It's used as sort of a limited warranty.
Q. All right. Now, Ciba-Geigy sells T622 to anybody that wants to buy it; correct?
A. Yes.
Q. So Smurfit is not the only company that uses T622 in its high-density polyethylene; is that correct?
A. Probably not.
Q. And you say, for instance, that in your laboratory, you do add T622 for other customers' purposes; right?
A. Yes.
Q. Now, you -- what you sell to Smurfit are these resin beads;
right?
A. Yes.
Q. And they are then melted down -- mixed, melted -- melted, mixed, and then made into things; correct?
A. Yes.
Q. Now, you mentioned that high-density polyethylene is used

in a number of products; right?
A. Yes.
Q. And you mentioned that it's used in pipe; correct?
A. Yes.
Q. And that pipe that carries gas?
A. Gas and water.
Q. Now, when you say "gas," do you mean gas like natural gas?
A. Natural gas.
Q. All right. Does it -- is it used to carry liquid hydrocarbon products?
A. It can be.
Q. All right. That is, the polyethylene is high-density polyethylene -- does it begin its life as a hydrocarbon?
A. Yes, it does.
Q. And by beginning its life as a hydrocarbon, do you mean to say that it starts out its life as -- as petroleum?
A. Basically.
Q. So that the -- the plastics that we're talking about here, these polyethylene products, are byproducts of petroleum that you get out of the ground, crude oil?
A. Yes.
Q. Now, how many pounds of high-density polyethylene pellets does your company sell in a calendar year?
A. Approximately 300 million.
Q. So the 3 -- now, how many pounds of high-density

polyethylene pellets do you sell to Smurfit in a calendar year?
A. I don't have that exact information.
Q. Now, are you aware that Smurfit uses T622 in its entire line of industrial plastic containers?
A. Yes. But that is not exactly correct.
Q. Okay. Well, what -- what is not correct about it?
A. Smurfit also manufactures a variety of colored drums where they add a pigment to the container. In those cases, the presence of the Tinuvin 622 is not required.
Q. All right. And is that because the color that they add fulfills this role of protecting from ultraviolet; right?
A. Yes.
Q. Now, is it a fact, sir, that there are certain United-Nations-based regulations on the recycling of these containers when they are manufactured?
A. I'm not aware of that.
Q. Are you aware that one of the things that you can do with high-density polyethylene is to recycle it?
A. Yes.
Q. Now, by recycling, do you mean that you can take high-density polyethylene and you can grind it up and melt it down and use it over again?
A. Yes. But it depends.
Q. Depends on --
A. It depends on what the container was previously used for.

If it was containing a hazardous chemical, then the recycling of that material -- you would have to careful in what you recycle that plastic into.
Q. Now, in addition to being able to grind it up and use it over again, you can reuse the container itself; correct?
A. Yes.
Q. In fact, in your discussions with Smurfit, have you had -- have you talked to them about the use of high-density polyethylene barrels to increase market share for the storing of lubricating oils?
A. Yes.
Q. And isn't it a fact, sir, that -- that Smurfit believes that its barrels can be reused 15 to 25 times?
A. I'm not aware of that.
Q. All right. How many times would you say that a barrel that's manufactured of high-density polyethylene with the Tinuvin 622 additive in a -- with no dye in it could be reused?
A. It depends.
Q. And could you give me a range and tell me what it depends on, sir?
A. First of all, it depends on what the use is. If the container was used to contain a hazardous chemical, then internal recycling of that material would be encouraged so that these drums could not get out into the public and --
Q. Let's stop there. If it was used for a hazardous chemical,

you would recommend internal recycling; that is, you only use it -- the same company ought to use it --
A. Yes.
Q. -- for the same thing so that you don't get these hazardous
chemicals out into the world; correct?
A. Yes. Yes.
Q. All right. Go ahead.
A. Okay. You could also -- some companies have a deposit program, where the drum is made, filled with a chemical that goes out to a customer, and the customer returns the drum for a deposit to encourage recycling.
Q. All right. So that's another kind; right?
A. Yes.
Q. All right. What's some other kinds?
A. Some people -- there are entrepreneurs in the United States and in Canada that are starting now to look at this market, because there's a large volume of plastic being used every year, and some companies are starting to try to recycle this plastic and recover it and reuse it, so they will buy plastic off the open market.
Q. And is that in order to resell a container, or is it in order to grind it up and make more things out of it?

A. Most recyclers that are sophisticated enough will collect the material, they will segregate it to the different types of plastic and they will usually remelt and extrude it into a

plastic pellet.
Q. Now, and is there also -- well, go ahead. Tell me the other categories, then.
A. Well, that's the -- that's the basic separation. The first step is collection, either from the landfill site or garbage site or wherever the plastic comes in. It's cleaned and washed
and then examined. Some -- some plastic will not be reused again because of the hazardous nature of the chemicals it contained, or whatever and the rest is again washed, melted, and reextruded into plastic pellet. And these pellets can be sold as sort of a low-grade polyethylene to use into such articles as flowerpots or trays, things like that.
Q. Now, it's -- what you didn't mention -- I didn't hear you mention -- is the use of a high-density polyethylene barrel that's been used for a nonhazardous chemical that is simply sold for people to use for household purposes.
A. I would not recommend that practice.
Q. All right. Are you aware that that practice occurs?
A. I'm not aware of anybody doing it that I'm aware -- of any customers that I'm aware of doing that.
Q. You do not know of any commercial landfill or surplus operations that sell used barrels?
A. Not personally, no.
Q. All right. Now, this particular barrel originally contained something called STER-BAC; right?

A. Yes.
Q. And that is a quaternary ammonium stabilizer. Do you know anything about STER-BAC or what it is?
A. I know a little bit about that product.
Q. All right. What is that product?
A. It's used as a sanitizing agent.
Q. It cleans dairy barns; right?
A. It could. It could clean other equipment. Stainless steel
equipment.
Q. Okay. Now, we have in evidence now Defense Exhibit E99. These are some barrels or containers that are manufactured by Smurfit; correct?
A. Yes.
Q. And what we're looking to here are -- now I'm pointing to the tops of these items here. Are these, in your experience, going to be chemically identical to what you tested in this case?
A. They could be.

Q. Now, here is a -- a product that Smurfit makes called the Medi-Bin. And does this here that I'm pointing to appear to be something chemically identical to what you were describing?
A. No.
Q. And is that because it has white pigment in it?
A. And red pigment and yellow pigment.
Q. And that -- you're saying that's white pigment?

A. Yes, it appears to be white.
Q. Now, I'm putting up the Tight-Head Family. Tight-Head Family. Did some of these appear to be chemically identical to what you were describing for us?
A. Possibly.
Q. Now, you don't work for Smurfit; correct?
A. No, I don't.
Q. Now, when you tell us that high-density polyethylene is -- you sell it in the form of resin beads; right?
A. Pellets.
Q. Pellets. You call them pellets?
A. Yes.
Q. Now, high-density polyethylene is consistent; that is, if I go to a place and say I want high-density polyethylene pellets, within a certain range, I will get a chemically identical product from various suppliers; correct?
A. Not necessarily.
Q. Well, does high-density polyethylene have a certain recycling number that's attached to it?
A. Yes, it does.
Q. And that's the number 2; is that correct?
A. Yes.
Q. So that in terms of the consumer market, the three-arrow recycling symbol with the number 2 inside it marks something called "high-density polyethylene"; correct?

A. Yes.
Q. And that is something that identifies high-density polyethylene for people that are in the recycling business; is that right?
A. Yes.
Q. So that -- and so that certain characteristics of

everything that has a 2 on it are identical; right?
A. No.
Q. Tell me why not.
A. Because if you start analyzing high-density, there are several different physical properties associated with those materials, and it can range considerably.
Q. All right.
A. For example --
Q. What are those physical properties? The melt index?
A. Melt index is one of the best examples. High density can

A. Melt index is one of the best examples. High-density can be made in a variety of melt indices, ranging from as little as 1 up to over 100.
Q. All right. And the resin beads that you sell when you said you sold 300 million pounds a year --
A. Approximately.
Q. -- do they all have the same melt index?
A. No, they don't.
Q. All right. Do the -- does the -- then how much do you sell
to Smurfit a year?

A. I'm not sure exactly, but I think it's in the order of 100 million pounds, possibly.
Q. All right. So that Smurfit takes one-third of your output; right?
A. Approximately.
Q. Are you the only supplier of these beads to Smurfit?
A. For --
Q. For pellets?
A. For this application, yes.
Q. For this particular application?
A. We are the sole supplier to Smurfit.
Q. All right. Now, in addition to looking for polyethylene, you said that you looked for a -- this T622 additive; correct?
A. Yes.
Q. All right. And you also said that what you found was a -- you were looking for a specific concentration of it; correct?
A. Yes.
Q. And you testified that the concentration was consistent with; right?
A. Yes.
Q. Now, what does the phrase "consistent with" mean?
A. To be in the approximate target concentration that I would expect.
Q. All right. And it does not mean identical to; is that right?

A. It could.
Q. I understand it could, sir; but there is a difference between "consistent with" and "identical to," isn't there?
A. Yes. But I have to explain.
Q. Well, go ahead and explain.
A. These additives that we add are hydrocarbons, as you described, consisting of carbon, hydrogen, oxygen, nitrogen, for example. And they are stable, they are -- they have a job to protect the polymer. But during the processing, when we manufacture the pellets, or when Smurfit manufactures the drum, some of the additive is consumed by doing its job; i.e., protecting the polymer from degradation or burning, so when we analyze for the finished levels, there are some variations in

the concentration because of the consumption of the additive. Also, when we manufacture polyethylene, we put in a target concentration. There is an allowable range.
Q. You put in what? I'm sorry?
A. A target concentration of a component. Because we can't make that concentration exactly, there is an allowable range, which is called the specification for that additive. We have a minimum and a maximum level. The material that we sell has to meet that -- the minimum and maximum level to go out the door to a customer as a prime resin.
Q. So there is a range of the amount of -- of Tinuvin 622 that
one would find even in several different samples from the same

company; is that right?
A. Yes. Yes.
Q. Now, you did two laboratory analyses in this case; correct?
A. For -- for which -- which test are we talking about?
Q. You did one set of analyses in 1996, did you not?
A. Yes.
Q. And then you did another set of analyses in September of 1997; is that right?
A. Yes.
Q. And what was the reason that you did a second set?
A. The first time we did -- the actual testing we did was in September of '95. The reason we did the testing, we were looking at -- I performed the same seven tests. But I looked at multiple pieces within the sample bag. And this time, we were asked to do all seven tests on one piece of plastic.
Q. I'm going to show you now what I've marked as Defendant's Exhibit E79. Is that your first test?
A. Yes, it is.
MR. TIGAR: We offer it, your Honor.
THE COURT: I take it it's a report of the test.
MR. TIGAR: Yes, your Honor.
MR. MEARNS: May I have just a moment?
THE COURT: Yes.
MR. MEARNS: Mr. Tigar, can I just make sure that I know --

MR. TIGAR: E79.
MR. MEARNS: No objection, your Honor.
THE COURT: All right. What is the number again, please?
MR. TIGAR: E79, your Honor.
THE COURT: Thank you. E79 received.
BY MR. TIGAR:
Q. I'm going to put up on the device here a summary. Does this sheet reflect the summary of the analyses that you performed?

A. Of the first analysis I performed, yes.
Q. Yes, this is the September. What time frame was this?
A. September of '95. This letter was written in '96.
Q. All right. The letter that -- that you wrote to describe your results was written in '96, but the test was in '95; is that right?
A. Yes. Yes.
Q. Now, can you find on here where are the fragments that you tested?
A. They are under -- located under the column labeled as sample identification. "Sample ID."
Q. And which ones are they?
A. Well, I tested all of those samples in that table.
Q. I understand. But you only testified today about two tests; correct? Two pieces of plastic?

A. Three pieces of plastic.
Q. Well, two, one from the drum and two that were in the little bags; right?
A. Yes.
Q. All right. Now, the -- I'm asking you to look on here and find the two that were in the little bags.
A. Okay. I have to refer to the Q number.
Q. Please do.
A. Q112.
Q. All right. That's the top one up here?
A. Yes.
Q. Okay.
A. And Q1 -- not Q121. Q116. Sorry.
Q. 116. And that's the third line down; correct?
A. Yes.
Q. Now, you testified that for Q112 here, the first thing you did was a melt index; correct?
A. Yes.
Q. And what is the reference to Van Leer and Smurfit?
A. When the samples came to us with Monica Knuckles, they had already had some previous test results of those samples; so in this particular sample, I did not perform a melt index measurement. I simply recorded the melt index data that was already -- were already completed.
Q. All right. So that's not a test you did on that sample at

that time?
A. No. Did not -- the names in parentheses represent the companies that performed the tests on that piece of plastic.
Q. Oh, I see. And then we're looking over here to T -- UV stabilizer type; correct?
A. Yes.
Q. And that's T622; correct?
A. That's the -- that's the abbreviation I use for Tinuvin

622.
Q. And that's reflected at the bottom. Tinuvin 622; right?
A. Yes.
Q. So that's what you found, is Tinuvin 622?
A. Yes.
Q. And in that sample, you found 995 parts per million; correct?
A. Yes.
Q. Now, in your manufacturing process, what is the target range for -- in parts per million for the addition of the ultraviolet stabilizer Tinuvin?
A. That depends. We don't, as I said before -- we don't add it to high-density resin. We add it to a linear low resin.
Q. So do you know and you do not have -- you do not add Tinuvin to the pellets that you sell to Smurfit; is that right?
A. That is correct.
Q. They add it?

A. Yes.
Q. And do you know what their target parts per million is?
A. Yes, I do.
Q. What is that?
A. It's 2 percent of 6.25 percent, or .125 percent, which is 1250 PPI, parts per million.
Q. 1250?
A. Parts per million.
Q. Okay. And this one here is 995; correct?
A. Yes.
Q. Now, over -- what is it that causes the Tinuvin level in a manufactured drum such as this to vary?
A. Several things.
Q. All right.
A. First of all, the manner in which it was added or the accuracy of the addition could be questioned. First of all --
Q. Okay. The accuracy of what?
A. The addition of the -- of the Tinuvin to the original material.
Q. Oh, the accuracy of how it's added; correct?
A. Yes.
Q. All right.
A. For example, Smurfit purchases its UV stabilizer from Allied Color. The specification calls for 6.25 percent of this Tinuvin 622 in the concentrate. There is a manufacturing range

there. 6.25 percent simply represents the range, but it could be lower than that or it could be higher.
Q. Okay. So let me interrupt you there. Smurfit buys its Tinuvin 622 from an outfit called Allied Color?
A. Yes.
Q. Does what it buy -- does Allied Color supply Tinuvin 622, or does it supply some product that contains Tinuvin 622?

Or does it supply some product that contains Tinuvin 622?
A. It supplies what we refer to in the industry as a "master batch," which is a concentrate of the UV additive or other components.
Q. All right. Okay. So the first thing is that what they receive from Allied could be different; correct?
A. Well, it could be -- suppliers usually do some QC or quality control testing to ensure that the key components are present at the approximate levels; but there is a range called a minimum and maximum allowable concentration.
Q. And are there -- does the quantity, the discernible or measurable quantity of this UV additive change over time? That is, if I leave this barrel -- Now, in its natural state, by the
way, this barrel didn't have all this powder on it; correct?
A. Probably not.
Q. Okay. And this is a natural barrel; right? This is what we call a natural one?
A. Yes.
Q. That is, it doesn't contain any color dyes of any kind;

right?
A. That is correct.
Q. And thus, it's -- it looks white, but that's only because it's -- it's thicker than, let us say, a -- a milk container you'd get at the store; correct?
A. Exactly.
Q. All right. And there are other high-density --
Now, if -- come back to my question. If -- if you leave this out in the sun for a long time, do the measurable levels of T622 diminish?
A. They could.
Q. And are there any other things that would cause the measurable levels of T622 to change?
A. Yes. Getting back to the first part, when Smurfit received
the master batch, they have to -- they add it to our plastic. Additional level of 2 percent. That can vary from maybe as little as 1.5 percent or 2-1/2 percent, depending on what their range is. Or they could simply make a mistake in the addition of it.
Q. So there could be changes in the manufacturing process?
A. Yes. But they check for the final to confirm that they have added the components at the approximate level.
Q. That's right. They want to make sure that they are getting a consistent product; right?
A. Yes.

Q. Because they're buying 100 million pounds a year of this stuff from you and manufacturing it into things that are supposed to do a job; correct?

A. Yes.
Q. And they are telling their customers that what they are making and selling as these bins can be used over and over again; right?
A. Not necessarily.
Q. Well, in many cases, they are telling their customers they can be used over and over again; right?
A. Depends on the product stream and the chemical that the drum is going to contain.
Q. Well, are there standards, international standards, for the number of times that a container made of high-density polyethylene should be reusable?
A. I'm not -- I'm not -- I don't know.
Q. Do you know of any numbers that begin with UN, for United Nations, and some numbers after that --
A. Yes.
Q. -- that have to do with these things?
A. Uh-huh.
Q. Is it your -- are those -- do those have to do with, among other things, the ability of the thing to be recycled?
A. Not necessarily.
Q. Do some of them have to do with that?

A. It depends -- it depends on what you're talking about recycling. If you're recycling to reuse the container for that specific application, yes.
Q. Yes, sir.
A. But recycling can also mean taking that drum or finished article, grinding it up, and processing it into another piece of plastic.
Q. I understand that. Do some of these UN numbers have to do with the number of times it can be reused?
A. Probably. I'm not familiar with that code.
Q. All right. And you have worked with Smurfit in the -- their attempt to penetrate the market with respect to using their high-density polyethylene drums for lubricating oils; correct?
A. Not -- not specifically lubricating oils. Including lubricating oils, but other chemicals, as well.
Q. Lubricating products; correct?
A. Well, that wouldn't -- Smurfit sells to a variety of customers, and they package a variety of chemicals, which may include lubricating oils.
Q. We can ask Smurfit.
So over time -- Have we gone through all the ways in which the amount of Tinuvin 622 might be different?
A. No. We haven't finished that.
Q. All right. Please finish.

A. We first talked about that the -- the level added could be

in question a little bit. There could be a range, what we call a "range" in the industry, or variation.

Depending on how Smurfit processes the plastic, if they overcook the resin, for example, you can consume some of these additives during processing. Tinuvin is mainly present there to protect the polymer in the finished state; i.e., in the drum.

Q. When you say the "polymer," you mean the -- the polyethylene; right?

A. High-density.

Q. But in polymerization, p-o-l-y-m-e-r, that simply refers to a process by which relatively short chains are made into relatively longer chains; is that right?

A. That's correct.

Q. All right. So that -- that what starts out as a relatively simple molecule that contains a carbon and some hydrogen gets cooked and is made into a -- a much longer molecule; right?

A. Yes.

Q. Is that fair enough?

A. That's fair.

Q. Is that about a B-plus answer? Okay. Get -- it -- okay. We'll go on from there.

You're saying that there could be a problem because they might cook it too much; right?

A. A little bit.

Q. Okay. Have we gone through the list now?

A. Well, then the article is finished. Depending on the trauma that the container sees, how much sunlight it was exposed to, some of that Tinuvin could be consumed. That depends on the life of the drum.

Q. Well, we already went through that. If you leave it outside, the bright sunlight, that Tinuvin is going to go away?

A. Not all of that.

Q. Well, some will. That is, that will change the amount of it; correct?

A. Yes.

Q. Okay. Now, the next thing that -- the next -- you also said you looked at Q116; right?

A. Yes.

Q. And there, you've got a melt index of 5.72; correct?

A. Yes.

Q. And you determined that it was -- it contained an antioxidant; right?

A. Two antioxidants.

Q. Two. All right. And that was -- which antioxidants did you find Q116 contained? I see you have two numbers here.

A. Irganox 1010 and Weston 399.

Q. And up here, for Q112, you found two antioxidants and they were 1010 and I168; right?

A. Yes.
Q. So are you saying that the two samples that you had, the little fragment samples, had different antioxidants?
A. Partially.
Q. All right. And are -- tell us why that is.
A. When we manufactured the specific grade HPW555, we have an alternate antioxidant package so we can make it with -- it contains -- there's two antioxidants used, a primary antioxidant which Irganox 1010 is and we add a secondary antioxidant. The secondary antioxidant we can use for that grade, we're authorized to use Weston 299 or Irgafos 168. In our opinion, they can be used interchangeably.
Q. So that of the 100 million pounds a year of pellets that you sell to Smurfit, some are going to have one combination of antioxidants and some are going to have another combination; right?
A. Yes.
Q. And do you tell Smurfit which combination, or do you regard
these as chemically identical?
A. Disclosing antioxidant or additive formulation information to customers is usually not done because that information is considered proprietary.
Q. All right. That is, you'd like to stay in the pellet business and keep them in the drum business; right?
A. Basically.

Q. Okay. So the answer is that you wouldn't necessarily tell them that; right?
A. No. It depends on the nature of our working relationship with that customer.
Q. All right. Now, here, if we can put this back up. Here is
Q116 again. And I'm going to follow across with my finger, and
we're going to find T622 again; right?
A. Yes.
Q. And we're going to find 673 parts per million; right?
A. Yes.
Q. And that's -- that -- the first one we had was 995 and the second was 673; correct?
A. Yes.
Q. And if we use the lower number, what percentage more in terms of parts per million is Q112 from Q116?
A. It looks like approximately 25 to 30 percent.
Q. Okay. Now, you also testified about that you looked at the calcium carbonate content; correct?
A. Yes.
Q. Now calcium carbonate, that's chalk?
A. Chalk, limestone.
Q. And I mean, that -- it's like what we write on a blackboard with; right?
A. Exactly.

Q. And we could go out in a limestone quarry, we could pick up

a piece, we could write on the board with it; right?
A. Uh-huh.
Q. Now, is calcium carbonate -- is that -- the addition of that something that's unique to your high-density polyethylene?
A. No. It's unique to Smurfit.
Q. All right. Smurfit uses calcium carbonate. Do you know of any other -- do then they put the calcium carbonate in all 100 million pounds of this stuff that they use?
A. No. It only goes in the UV stabilizer where they add -- when they make a natural container.
Q. So that the calcium carbonate would not be present in the red and blue --
A. That's right.
Q. -- plastic, or black, or whatever color they have?
A. Exactly.
Q. Now, when you say 100 million pounds, is that to supply Smurfit's United States market, or do you supply them for their entire international market?
A. We supply them -- they have several manufacturing locations in the United States. We supply those plants. The finished drums from those plants may be shipped worldwide.
Q. Now, Smurfit is a company based where? In Ireland?
A. Headquarters?
Q. Yes.
A. I think so.

Q. And they also sell high-density polyethylene in the European community; correct?
A. Possibly.
Q. Do you know if they have plants located within the European community?
A. Not personally, no.
Q. All right. Now, the calcium carbonate that you found in Q112 -- we can just trace across here -- was 1776 parts per million; correct?
A. Yes.
Q. Now, in Q116, you found 2714 parts per million; correct?
A. Yes.
Q. Now, do you know what the target parts per million is in -- at Smurfit for calcium carbonate?
A. Yes, I do.
Q. What is that?
A. It's 7 -- it's 2 percent of 7 percent, or .14 percent, or 1400 PPI.
Q. 1400 PPI. Okay. So that the level of calcium carbonate

that you found is 1776 here and 2714 there? Correct?
A. Yes.
Q. Now, do you think that is -- well, do you have an explanation for, first, the fact that both of these numbers are higher than the target amount of calcium carbonate that Smurfit wants to put in its plastics?

A. Yes. It's not unusual.
Q. Okay. It's -- all right. It's not unusual, but do you have an explanation for it?
A. It -- there's several explanations. The first one could be
that there was a higher level of calcium carbonate put into the UV master batch, or the sample that I tested -- when we do this analysis, we do it on a small piece. There could have been a glomerate or a chunk of calcium carbonate in the sample that I analyzed. It depends on how well that calcium carbonate is dispersed in the material.
Q. Now, when you do the calcium carbonate analysis, do you do a destructive test?
A. Yes, we do.
Q. And the destructive test consists of grinding; correct?
A. Not this test, no.
Q. All right. What does this test consist of?
A. This test, we actually burn the sample to get an ash, and we dissolve the ash in an acid/water mixture, and we subject it
to a test called ICP, inductive-coupled plasma emission spectroscopy.
Q. Okay. Easy for you to say.
And when you did that, you got these two results; correct?
A. That's right.
Q. Now, which -- looking at this sheet here, a part of E79 --

A. Actually, these are an average of the results. The results
reported are an average.
Q. All right. An average of what, sir?
A. Of two determinations.
Q. Of?
A. Two determinations, or two measurements.
Q. All right. Two determinations. And the two determinations are determinations based on the entirety of the sample, or did you divide the sample in order to do it?
A. A portion of the sample.
Q. You took a portion of the sample.
A. Well, the test requires a sample weight.
Q. The test -- I'm sorry?
A. We use a specific sample weight.
Q. Okay. A sample weight. That is to say, there's a certain

Q. Okay. A sample weight. That is to say, there's a certain amount you have to have in order to have confidence in your results; right?
A. That's right.
Q. Now, looking at this, which is the piece -- which is the test that reflects what you did with what you took from the drum that's sitting right there?
A. Which -- can you repeat the question?
Q. Yes, sir. Which of the tests reflected on E79 here has to do with the -- the particular drum?
A. I did all seven tests on that piece of drum.

Q. Okay. I'm saying -- I'm sorry. I'm just trying to find out which line I should look at to find it. Which Q number?
A. The drum test was done -- that's reported on a different table.
Q. Well, where is -- what's Q14?
A. That would -- that was a clerical typo. It's -- and that was from a -- that was from a sample Q121, but a different section of the drum.
Q. But a different section of the same drum?
A. Yes.
Q. So that Q14 result does reflect an analysis of a piece of what is in evidence as Government's 190; correct?
A. Yes.
Q. All right. Now, zooming on out so we can see what we're talking about, we first talked about Q112; correct? The top line?
A. Yes.
Q. And then we talked about Q114; correct?
A. No.
Q. No. Excuse me. Q116; correct?
A. Yes.
Q. And then -- and you did a whole bunch of tests; right?
A. Yes.
Q. On a different -- bunch of different kinds of plastic?
A. Initial tests, we did. We had several samples that are not

reported here because we were screening some of the samples.
Q. Okay. Now, these were all things that Monica Knuckles brought to your laboratory?
A. Yes.
Q. All the things on this sheet?
A. Yes.
Q. All right. Now, the -- the test that refers to that refers to a piece from the drum that's in evidence as Government's Exhibit 190 is here at Q14; correct?
A. Yes.
Q. And the first thing you did was a melt index -- correct -- or you did a melt index; right? Or a melt index was done.

or you did a more index, right? Or a more index was done? You
wrote ND here; right?
A. That was not determined. The initial testing we did on that piece, we only did -- we had limited samples, so we only did a few tests, or we decided -- Monica decided that the tests
were not necessary at that point.
Q. And then you looked at the antioxidant composition?
A. Yes.
Q. Correct?
A. Yes.
Q. Now, this -- the antioxidant that's in this drum, Government's 190, is the I1010 and W399; correct?
A. Yes.
Q. And that is the same antioxidant package as in Q116 but not

the same as in 112; correct?
A. That's correct.
Q. Now, then, we see T622 -- whoops. I'm got them -- T622; correct?
A. Which line are you on?
Q. I'm on the -- the Q14 line.
A. Okay.
Q. And parts per million here is 1587; right?
A. Yes.
Q. Now, that means that your test, the first test you ever did of this drum, shows that it contains Tinuvin 622 in a certain concentration, and that concentration is 1587 parts per million; correct?
A. Yes.
Q. The test on Q116 that you've been testifying about today -- correct?
A. Uh-huh.
Q. -- shows 673 parts per million? Correct?
A. Yes.
Q. Now, in terms of percentage, how much more in terms of parts per million is in this drum than in the sample Q116?
A. Approximately double.
Q. Okay. Double plus; right? 673 times 2 is 1346; correct?
A. Yes. I can't say, though, for sure that the sample is from that drum. It was identified to me as that.

Q. And -- well, who identified it to you as from the drum?
A. Well, we -- Monica Knuckles.
Q. And Monica Knuckles works for the Federal Bureau of Investigation; correct?
A. Yes.
Q. All right. So we have 2 -- we have 2 -- what percentage more here, 673 to 1587? 200-and-some percent; right?

A. Okay.
Q. Is that correct?
A. Yes.
Q. Okay. And on the Q112, the UV stabilizer T -- was 995; right?
A. Yes.
Q. And that's -- so from 995 to 1587, that's 100-and-some percent more; right?
A. Yes.
Q. At least 150?
A. Uh-huh.
Q. And over here, the calcium carbonate content on the piece excised from the drum, Government 190, is 953; correct?
A. I can't see it on the table here.
Q. Okay. Can you -- let me zoom in. There it is. 953. Shall I put the paper in front of you?
A. I can see it now.
Q. You can see it?

A. Yeah.
Q. 953?
A. Yes.
Q. And that correlates to 2714 for the sample Q116, the small piece of plastic; right?
A. Yes.
Q. And correlates to 1776 for the other small piece of plastic
Q112; correct?
A. Yes.
Q. Now, you said that you did then a second study in 1997; correct?
A. Yes.
Q. And you reported on that on September the 17th, 1997; correct?
A. Yes.
Q. I show you what I have marked as Defendant's Exhibit E80, and I ask you if that's the cover letter to Mr. Mearns and the summary of your results from the 1997 tests.
A. Yes, it is.
MR. TIGAR: And I offer it, your Honor. E80.
MR. MEARNS: No objection, your Honor.
THE COURT: E80 received.
MR. TIGAR: May I have a moment, your Honor?
THE COURT: Yes.
BY MR. TIGAR:

Q. I'm going to place up on the machine here what I have marked -- what's now been received in evidence as Defense Exhibit E80. And I'll ask you, sir, is that the chart summary of your 1997 analysis?

A. Yes, it is.
Q. Now, does it reflect the same information as -- excuse me. Is it the same type of information as is reflected in your 1995 tests?
A. Yes.
Q. And the information is arranged in the same way on the chart as on the chart that we've been looking at earlier, Defendant's E79?
A. Yes.
Q. Now, here, the first sample we -- you have here is Q112A; correct?
A. Yes.
Q. Now, and that is a sample from a little bag of fragments; correct?
A. Yes.
Q. And that's the bag of fragments now. Now, did they bring the bag of fragments back to you or did you -- did you keep them there all the time?
A. They brought them to me.
Q. That is, after you had completed your tests in 1995, the -- the agents of the FBI took the materials back, and then they

brought them to you again in '97; correct?
A. Yes.
Q. And they asked you to perform some additional tests; is that right?
A. Yes. Yes.
Q. Now, here, we see that there is a -- you've got three samples here, 112A and 116A. That's from the little bags of fragments; right?
A. Yes.
Q. And 121A, that's from the -- the cutout of the barrel; correct?
A. Yes. Which -- that's the sample that I labeled and I -- I labeled it as Q14 on the -- on the sample, but I misread the 4 for a 2.
Q. I understand. We don't have any dispute about that, sir. I mean, I understand how the labeling process worked. The point is that that sample is for sure what you watched somebody cut out of this barrel?
A. I assisted in cutting the sample out. It was quite difficult.
Q. Pardon me?
A. It took a little bit of time to get the sample out.
Q. I can imagine. You had to use a very sharp instrument of some kind.
A. We didn't actually have the proper tools, so it took about

a half an hour.
Q. Now, when you say the "melt index," can you just tell us what that means

what that means.
A. "Melt index" is a measurement of the processability of the resins, the full -- the processability, or flowability.
Q. The -- I see. That has to do with the fact that when you sell these pellets, you can't make anything useful out of them unless you can melt them and then make them into something; correct?
A. That's right. And we sell a variety of melt indices. Different resins with different melt indices.
Q. All right. That is to say -- what you said before, is that
what you're saying -- telling us about that now; that is, that within the family called HDPE, we will find resins that have a range of melt indices; is that correct?
A. Yes.
Q. And those are for different applications; right?
A. Yes.
Q. For instance, HDPE might be used for a -- to make something that looks like corrugated cardboard?
A. Possibly.
Q. Yes. And if that were done, would that be a melt index the
same as you would use for a barrel?
A. Not necessarily.
Q. And what -- how would we choose?

A. Depends on the processing. You choose to produce the part.
For example, if you were making a -- a beer -- a beer container that's used at a baseball game, that can be also be a high-density polyethylene, but that's made in a process called injection molding. The melt index of the resin there could be as high as 50 to 100.
Q. All right. And -- Now, injection molding, is that what Smurfit uses to make its HDPE barrels?
A. No. They use a process called blow molding.
Q. Blow molding. And what is the different between blow molding and injection molding?
A. In injection molding, the material is still melted, and it's -- it's goes into a melted state and then a high-pressure ram forces the molten plastic into a mold at high pressure.
Q. All right. That's -- That's blow molding?
A. That's injection molding.
Q. Injection molding. And what's blow molding which is what Smurfit uses?
A. In blow molding, the plastic melt come out of the machine in a thin tube called -- what is called a parison, and then the high-pressure air is injected into that parison to blow the molten plastic against the wall of the mold.
Q. I see. Now -- so you wanted to measure the melt index; correct?
A. Yes.

Q. Now, you found that the melt index of the two samples from the little bag of samples was 5.9 and 5.82 respectively; correct?
A. Yes.
Q. And you found that the melt index of the piece taken out of
that barrel was 5.17; correct?
A. Yes.
Q. And so from 5.17 to 5.9, we have a what percent difference?
A. Less than 10 percent.
Q. Well, 10 percent of 5.17 is .517; correct?
A. Uh-huh.
Q. And if I add .517 to 5.17, I get a number that's somewhat less than 5.9, don't I?
A. Yeah. It could be 10 to 15 percent.
Q. 10 to 15 percent. Okay. So it's 10 to 15 percent more; correct?
A. I need a calculator to determine the exact percentage.
Q. Well, we could figure it out with a pencil or a calculator;
right? It -- Now, then there's the antioxidant content; correct?
A. Yes.
Q. And once again, we see that the antioxidant package, particular package used in the 116A is the same package as happens to be in 121A; correct?
A. Can you open up the -- yes.

Q. Can you see that? You want me to go --
A. No. No. That's fine. I can see it.
Q. Got it?
A. Yeah.
Q. Okay. Good. And the amounts, the respective amounts we've
got -- the Q116A has the same antioxidant package as Q121A; correct?
A. Yes.
Q. The -- however, the amount of I1010 in 116A is 616; correct?
A. Yes.
Q. And that's in parts per million?
A. Yes.
Q. The amount of I116 in 121A is 862 parts per million; correct?
A. Yes.
Q. And what is the percentage difference in parts per million between the little bag of fragments, 116, and the barrel one?
A. Approximately, I guess, 25 to 30 percent.
Q. Now, we look at infrared spectrum. That says PE. That means that using this infrared machine, we know it's some kind of polyethylene; correct?

A. Yes.
Q. Okay. And that infrared spectrum means you shine a light through it and look at something?

A. Yes. You get a chemical fingerprint. You use an infrared source. The outprint is a spectrum, an infrared spectrum.
Q. And you know it's some kind of polyethylene because you can see that you've got some kind of carbon chain there; right?
A. Yes.
Q. They are called carbon atoms?
A. Well, carbon ethylene chains. Ethylene units.
Q. Right. Then you look at the melting points, and the three melting points are pretty consistent here; correct?
A. Yes.
Q. Then we see that the UV stabilizer type is the same, T622; correct?
A. It yes.
Q. And that identifies it as somebody (sic) that's been made by somebody who buys stuff from Ciba-Geigy; right?
A. Yes.
Q. And Ciba-Geigy, we've now established, sells not only -- they sell through intermediaries; correct?
A. That's right.
Q. Such as --
A. Well, it depends on what you mean by "intermediary," but they usually sell directly to a customer.
Q. Well, you said that Smurfit purchased their ultraviolet -- you know, sunlight protector additive from Atlas; is that correct?

A. No. Allied Color.
Q. I'm sorry. Allied. Allied is not Ciba-Geigy, is it?
A. No.
Q. So that's -- what happened there was that Ciba-Geigy, the Swiss company, has -- has either licensed Allied to make it or they have sold it directly to them; correct?
A. Not a license. They sold it.
Q. They sold it. So it goes through an intermediary in that instance?
A. Yes. But the customer could also buy the additive directly.
Q. You also can?
A. Yes.
Q. Because Tinuvin 622, Ciba-Geigy obviously wants to sell as much of that as they can; right?
A. Yes.
Q. And they sell it to a lot of different people; correct?
A. Yes.
Q. Okay. And the idea of using calcium carbonate as a stabilizer -- that's not patented, is it?
A. It's not a stabilizer. It's used

A. It's not a stabilizer. It's used --
Q. Calcium carbonate. What's the purpose of calcium carbonate?
A. It's a gravimetric tracer. I.e. Smurfit would do an ash test. They would burn the plastic after it was made a piece of

the drum to confirm that the UV stabilizer was added.
Q. Okay. That's not a patented process, is it, using calcium carbonate?
A. No. But it's unique.
Q. In your experience, it's unique; correct?
A. No. It's unique because this formulation -- Allied Color makes this concentrate specifically for Smurfit Plastics and no one else.
Q. All right. That is, Allied Color has a deal with Smurfit where they make something that contains Tinuvin 622 and calcium carbonate?
A. Yes.
Q. All right.
A. And that's a unique formulation.
Q. And -- and you know that because that's a contractual relationship between Smurfit and Allied?
A. Yes.
Q. All right. And you know about that; right?
A. Yes.
Q. All right. Now, are you saying that the idea is -- the idea of putting a tracer in your plastic -- is that only Smurfit that does that?
A. No.
Q. There are other companies that do it; right?
A. It depends what -- the tracer is unique. The choice of

tracer is specific.
Q. I understand it's specific. Are you the only company that manufactures resin pellets?
A. No.
Q. Okay. There are others; correct?
A. Yes.
Q. What's your market share?
A. We are --
Q. For the -- Canadian -- Canada/U.S. market?
A. In North America, we are probably about No. 4 on the list of 20 producers, so we have significant market share.
Q. All right.
A. I don't know what it is. I don't have the numbers offhand,
but we are a major player in the business.
Q. So you do 300 million pounds a year. And do you know how many million pounds a year of these resin pellets are made?
A. Well, we manufacture in total -- Nova manufactures about 2.2 billion pounds of polyethylene a year.

2.2 billion pounds of polyethylene a year?
Q. All right. The 2.2 billion pounds of polyethylene -- and you're one of 23 players in that market?
A. One of 22 players.
Q. 22 players. And your market position is No. 4?
A. In North America.
Q. In North America. And beyond the 22 billion pounds that you make, do you have any idea what the total size of your

market is?
A. 2.2 billion pounds.
Q. 2.2 billion. Got my decimal wrong.
A. The annual volume of polyethylene produced is approximately 50 billion pounds.
Q. Now, how much of the 50 billion pounds of polyethylene is high-density polyethylene?
A. I don't know. Approximately maybe a third. I'm not sure.
Q. All right. And now, you then looked for the amount of this Tinuvin; is that correct?
A. Yes.
Q. And you found 814 and 815 parts per million respectively in the two fragments out of the little bag of fragments; correct?
A. Yes.
Q. And then you looked at the amount in the barrel itself and you found 1343 parts per million; correct?
A. Yes.
Q. And that represents a difference, does it not, of, well, what -- what percentage, from 815 to 1343? It's a hundred and --
A. Maybe 40 percent.
Q. So it's about 160 percent of the amount in the little bag of fragments pieces that's represented in the big barrel; correct? Something like that? Is that about right?
A. Could be.

Q. Okay. But we could do the arithmetic?
A. Yes.
Q. Correct? If we had -- I'm not attacking your numbers. Are
you -- you're the -- are you -- you use a calculator for this; right?
A. Yes.
Q. Okay. And at my age, we didn't have those.
Now, the calcium carbonate content varies among the three samples; correct?
A. Yes.
Q. And it varies from 954, which is the amount in your sample barrel, to 2603 in your Q116A; correct?
A. Yes.
Q. And then back down to 1138 in Q112A; correct?
A. Yes.

THE COURT: We need to take a recess somewhere.
MR. TIGAR: Yes, your Honor. If -- I would appreciate the opportunity. I could assemble my notes and then head for the home stretch on this witness. Thank you.
THE COURT: All right. We'll take the recess now. You may step down, sir.
Members of the jury, we'll take our usual 20-minute rest stop, during which, of course, please continue to follow the cautions given always when we stop -- and you're excused -- avoiding discussion of the case or anything about the testimony

or issues in the case. And continue to stay away from anything outside the evidence, knowing that you will decide on the basis of all of the evidence received. You're excused now. 20 minutes.
(Jury out at 10:25 a.m.)
THE COURT: Okay. We'll recess. 20 minutes.
(Recess at 10:25 a.m.)
(Reconvened at 10:48 a.m.)
THE COURT: Please be seated.
(Jury in at 10:48 a.m.)
THE COURT: Please resume the stand, Mr. Tikuisis.
Mr. Tigar?
BY MR. TIGAR:
Q. Mr. Tikuisis -- is it Dr. Tikuisis, or Mr. Tikuisis?
A. Mister.
Q. Mr. Tikuisis, before the break, we were talking about a little while ago this calcium carbonate. Do you remember that?
A. Yes.
Q. And calcium carbonate we see is chalk. Right?
A. Limestone.
Q. Limestone. Now, what -- does limestone have other applications, industrial applications other than being used as chalk?
A. Yes, it does.
Q. And does it have applications in construction?

A. Possibly.
Q. Is it part of mortar, do you know?
A. Could be in cements.
Q. Cements?
A. Cements.
Q. Now, the samples that you got in the plastic bag: Did -- what did -- how did you test for calcium carbonate? You made them into an ash? Is that right?
A. We took the sample and we burned it into an ash, and then we analyzed the ash.
Q. Now, at the time you received those samples, they were not

in the original nice, clean character that a freshly manufactured Smurfit product would be. Correct?
A. Yes.
Q. They were distorted and they were discolored; correct?
A. Partially discolored. Some were still completely natural.
Q. And which ones did you select to reduce to ash? How did you make your selection?
A. Because we were instructed to do the tests on one piece of plastic, I weighed several of the pieces to get a sample with a
minimum weight so I could do the complete analysis.
Q. And the sample that you used for the minimum weight: Was it clean, or dirty?
A. Could be either/or. It was partially white. Some of it was a little bit discolored, black.

Q. And did it show signs of having been stressed by something?
A. Yes.
Q. Did you wash the sample with anything before you reduced it to ash?
A. No.
Q. Is a finding of calcium carbonate -- could some of the parts per million of calcium carbonate that are associated with those samples result from calcium carbonate that had adhered to the exterior of the sample or been -- that the sample had been in contact with, as opposed to being a part of the manufacturing process?
A. I would say no.
Q. And on what basis do you base your conclusion "no"?
A. Because I carefully examined each piece that we tested to look at the surface, and we did not find any powders or anything on the surface.
Q. Now, the -- you didn't see any visible powders; right?
A. Exactly.
Q. You do -- it is the case, isn't it, that the sample showing
signs of stress was distorted and that there were jagged edges to it? Correct?
A. It was irregularly shaped.
Q. Now, in your -- in your process there, what's the temperature at which a piece of high-density polyethylene of the kind that Smurfit -- that you sell to Smurfit for

manufacturing barrels will melt?
A. Somewhere between 130 to 140 degrees.
Q. Celsius; is that correct?
A. Yes.
Q. Now, that's the Celsius or centigrade thermometer; right?
A. Yes.
Q. Now, water boils at 100 degrees Celsius at sea level. Correct?

correct.
A. Yes.
Q. Not in Denver; right?
A. That's correct.
Q. Okay. It boils at a lower temperature in Denver; right?
A. Uh-huh.
Q. So you're saying that -- and paper burns at what?
A. I'm not sure.
Q. Do you read Ray Bradbury? 454 (sic) Fahrenheit?
A. I recall the book, but I don't think I remember that.
Q. 130, 140 degrees means that if I took a common, ordinary cigarette lighter and a piece of that and applied the flame to the edge of that barrel, I'd see it start to melt; correct?
A. Yes.
Q. And at that point, the resin becomes liquid; correct?
A. Becomes molten.
Q. Molten. And in its molten state at 130 to 140 degrees Celsius, what is that in Fahrenheit? Can you tell me offhand?

A. No.
Q. Okay. But we could figure it out using a formula?
A. Very easily.
Q. All right.
A. I'm more familiar with conversing in centigrade or Celsius. That's the scale that we use.
Q. I understand. And is there a temperature at which the resin beads vaporize?
A. Yes.
Q. What is the temperature at which the resin beads used in high-density polyethylene of the sort that you sell to Smurfit vaporizes?
A. I don't know exactly, but I would say it's very high. Probably over -- at least over 500 degrees Celsius.
Q. 500 degrees Celsius?
A. At least.
Q. And -- and we could use a formula to convert that into Fahrenheit. Correct?
A. (Witness nods head.)
Q. Now, did you examine the fragments that were submitted to you to -- in an attempt to determine to what temperatures they had been subjected?
A. No.
Q. Now, if I melt -- if I used a common or ordinary cigarette lighter to melt this barrel, part of this barrel, and then I

took the flame away, the stuff would get solid again; correct?
A. It would freeze.
Q. It would freeze. And by "freeze," you mean become solid; correct?
A. Yes.
Q. That is, this chemical, like -- I guess almost every

other -- has three states: a liquid, a solid and a gas; correct?
A. Theoretically, yes.
Q. And what we're looking at here is the solid form; right?
A. Yes.
Q. And it gets liquid at something like 130, 140 degrees centigrade; right?
A. Yes.
Q. And vaporizes or becomes a gas at these high temperatures that you've estimated for us; correct?
A. Yes.
Q. Now, are the only samples that you analyzed -- you were asked to analyze high-density polyethylene samples?
A. No.
Q. Did you analyze, without getting into what it was, any polyvinyl chloride samples?
A. I think one sample.
Q. And was that brought to you by the FBI?
A. Yes, it was.

Tony Tikuisis - Cross

Q. Was it blue?
A. I can't recall.
Q. Did you examine any polypropylene samples?
A. Yes, I did.
Q. And how many?
A. I think two or three.
Q. Do you remember what color they were?
A. No, I don't.
Q. Were they brought to you by the FBI?
A. Yes.
Q. In addition to high-density polyethylene, polyvinyl chloride and polypropylene, are there any other plastic types that were brought to you by the FBI to analyze?
A. Not that I know of, no.
Q. Now, a polyvinyl chloride is another one of these plastic polymers; correct?
A. Yes, but there is a distinction between the two.
Q. Between HDPE and PVC?
A. Yes.
Q. Oh, yes. Tell the jury: What is the difference?
A. Polyethylene is what's called a thermoplastic. It can be heated and solidified several times. PVC is what is referred to in the industry as a thermal-set resin.
Q. And PVC --
A. It is cured into a finished state. It cannot be remelted.

Tony Tikuisis - Cross

Q. Now, polyvinyl chloride is the sort of thing that's used for plumbing pipes?
A. Yes and -- yes.
Q. That's one of the things it's used for; and if we go to

the
hardware store, we might see a bunch of, for the
do-it-yourselfers, plumbing pipes in 8-, 12-foot lengths;
correct?
A. Partially because the market is changing, PVC is starting
to be used less because of environmental concerns with it.
Q. But it is the sort of thing that has been used; right?
A. Yes.
Q. And the distinction between the PVC and the HDPE, you say,
is that once PVC is set, you can't melt it and then put it back
together again?
A. It can be remelted, but it can't be readily reprocessed,
plus there are obviously the chemical differences and chemical
structure of the material and other physical-property
differences.
Q. Yes. And polypropylene is another one of those plastics -
-
correct -- that's used in commerce and industry. Right?
A. Yes.
Q. And on PVC, what's the recycle number for that?
A. I can't recall.
Q. And PP, do you know? Polypropylene?
A. Not offhand, no.

Q. But these -- is there some requirement now that when you
make something out of plastic, you put a number on it to tell
what it is?
A. I think -- I don't know -- I'm not sure if that was
legislated, or not. I know the industry has talked about doing
it through the SPI, Society of Plastics Industry, and the SPE;
but I'm not sure if it's mandatory for all producers.
Q. And to your knowledge, Smurfit uses that system; correct?
Can I -- I'm going --
MR. TIGAR: May I approach, your Honor?
THE COURT: Yes.
BY MR. TIGAR:
Q. I'm going to bring Government's Exhibit 190 over to you,
sir. We can just read out here. You see the recycle symbol
and the "2"?
A. Yes.
Q. And that says "HDPE"; correct?
A. Yes.
Q. And then underneath it says "5-10HLMI." Do you know what
that means?
A. No.
Q. Okay. And then there is some other --
A. Actually I do now that I've read it.
Q. Go ahead.
A. It probably refers to high-load melt index, 5 to 10.

Q. What does that mean?

Q. What does that mean?
A. That is an indication of the melt index of that material that was used to make the drum.
Q. What's the range, 5 to 10?
A. Exactly what it is, 5 to 10.
Q. Does that mean a melt index of 5 to 10? I just don't understand what the numbers mean.
A. It probably refers to the drums -- of melt index varying between 5 to 10 could be used to make a drum of that nature.
Q. And to what temperature does a melt index of 5 to 10 correlate?
A. Doesn't correlate to any temperature.
Q. Then what does the melt index refer to?
A. The processability of the resin, its molecular weight. Basically's an approximation of the molecular weight, the length of the polyethylene chains.
Q. The polyethylene chains. And those you mean the chains --
A. Chains of molecules.
Q. -- molecules that go to make up the polymer?

MR. TIGAR: Thank you very much, sir. I have no further questions, your Honor.

THE COURT: Mr. Mearns, do you have any follow-up?

MR. MEARNS: Yes, briefly, your Honor.

THE COURT: All right.

REDIRECT EXAMINATION

Tony Tikuisis - Redirect

BY MR. MEARNS:
Q. Mr. Tikuisis, Mr. Tigar was asking you certain questions about plastics being produced from hydrocarbons. Is that correct?
A. Yes.
Q. The plastic fragments that you tested came to you in plastic bags; is that right?
A. Yes.
Q. Are those plastic bags made out of high-density polyethylene?
A. No, they are not.
Q. What are those plastic bags made out of?
A. Either linear low-density polyethylene or low-density polyethylene.
Q. Would storing the high-density polyethylene fragments that you tested in those plastic bags have any risk of affecting the results of your test?
A. Not at all.
Q. You were asked questions both about the first test that you conducted in September of 1995 and the second test that you testified about on direct. Do you recall those questions?
A. Yes.
Q. If I can -- showing you a portion of what is the third page
of Exhibit -- Defense Exhibit E79. That is the chart that you prepared after your first test in September of 1995; is that

correct?
A. Yes.
Q. Based upon the results of those tests, what conclusions did you draw?
A. I concluded that the samples -- some of the samples that I analyzed in that table were identified as Smurfit plastic.
Q. And specifically with respect to the samples contained in Q112 that you subsequently retested in September of '97, what was your conclusion about Q112 in September of 1995?
A. It was identified as Smurfit plastic.
Q. And with respect to Q116, what was the result of your initial test?
A. The initial test is September of '95?
Q. Yes.
A. That it was identified as Smurfit plastic.
Q. Was there any difference between the results of your first test and your second test in September of 1997?
A. Not statistically significant.
Q. Let me show you a portion of the third page, the chart from
Defense Exhibit 80. That is a chart that you prepared after your second test in September of 1997?
A. Yes.
Q. And the entry here for Q112A -- that refers to Government's Exhibit 786A. Is that correct?
A. Yes.

Q. And Q116A refers to Government's Exhibit 785A; is that correct?
A. Yes.
Q. And Q121A refers to Government's Exhibit 190B; is that correct?
A. Yes.
Q. Mr. Tigar asked you about certain variations or differences
in terms of the numbers with respect to each sample.
A. Yes.
Q. Do you recall those? With respect to those variations, does that change the conclusion that you reached about identifying the samples that you tested?
A. No.
Q. Specifically with respect to the variations in the UV stabilizer content, we see -- for Q112A, we see 814; then 815 for Q116A and Q120A -- excuse me -- Q121A. Is there any statistical significance between those variations?
A. Not in terms of what we were looking at, no.
Q. If the samples that were in Q112A and Q116A were subjected to extreme heat, how would that affect the parts per million with respect to the UV stabilizer content?
A. They could be changed, probably lowered.
Q. With respect to the calcium carbonate content, the first

two referred to the fragments that you tested?
A. Yes.

Q. And that last column refers to the sample that you drew from the drum; right?
A. Yes.
Q. If the samples in Q112A and Q116A were subjected to extreme heat, how would that affect the concentration of the calcium carbonate?
A. In this case, they wouldn't change because they are inorganic.
Q. When you test for the presence of calcium carbonate, what do you do to the carrier package; that is, the plastic in which the calcium carbonate is present?
A. It is removed by ashing the sample.
Q. By "ashing" it, do you mean --
A. You burn it in a controlled environment so you can recover all of the ash, and the ash is composed of calcium carbonate.
Q. So when you burn it, what happens to the plastic?
A. The plastic is combusted basically to carbon dioxide and water.
Q. And what happens to the calcium carbonate?
A. It remains as an ash. It can -- some of it can be converted to calcium oxide.
Q. So it remains as the plastic is burned to ash?
A. It remains as an ash residue.
Q. Mr. Tigar asked you certain questions about whether you provide this resin to other manufacturers of high-density

polyethylene products. Do you recall that?
A. Yes.
Q. And I believe you testified that Smurfit plastic is unique.
A. Yes.
Q. What did you mean by that?
A. They take a specific combination of additives to make their natural drums.
Q. That is -- what do they do with the additives?
A. The additives: They specify the UV stabilizer package that they combine with our material, and that recipe is specific to them and nobody else uses.
Q. And are you aware of any manufacturer of any type of a high-density polyethylene product that uses your Novacor resin that you supply to Smurfit and the additive package that Smurfit uses to make natural high-density polyethylene drums?
A. No, I'm not.
Q. What does that tell you, then, about the conclusion you drew about the sample that you tested in September -- the two samples that you tested in September of 1997. Could it have

samples that you tested in September of 1997? Could it have come from any other source but a Smurfit high-density polyethylene natural drum?
A. No.
Q. Finally, Mr. Tigar showed you a catalogue, a Smurfit catalogue, Defense Exhibit E99. And I'll just show you the cover that Mr. Tigar showed you, and we see drums on there of

various colors; correct?
A. Yes.
Q. Could any of those Smurfit drums have produced the results of the test samples that you tested?
A. No.
Q. Why not?
A. Because all these drums in the picture contain a colorant or a pigment.
Q. So the only type of Smurfit drum that has the same chemical composition is Smurfit's natural drums?
A. Yes.
Q. So none of these drums pictured here could have been -- produced those samples?
A. No.

MR. MEARNS: No further questions.

THE COURT: Mr. Tigar?

RECROSS-EXAMINATION

BY MR. TIGAR:
Q. You were just shown this picture, sir.
A. Yes.
Q. See the top of this drum here?
A. Yes.
Q. Is that natural?
A. I can't tell from the reflectant -- reflection of the light on the picture.

Q. You see the top of that drum?
A. Yes.
Q. Is that natural?
A. It appears to be white to me.
Q. See this top of this drum?
A. Yes.
Q. Is it natural?
A. I can't tell.
Q. If these three lids that I've just pointed to are -- well, let's look at 02, here. This is white. Correct?
A. Yes.
Q. From the picture. Looking at that, does that help you to tell whether these are white, or natural?
A. Not really.
Q. If they are natural, then -- And Mr. Udell from Smurfit would know; correct?
A. Yes.

A. Yes.
Q. If these are natural, then the tops of these drums would be
consistent with what you found in your laboratory; correct?
A. Possibly. I don't know the formulation for when they make the lids. That's a separate process.
Q. When you say a process is unique to Smurfit, you mean it's unique to 55-gallon Smurfit drums?
A. To their natural containers, as far as I know.
Q. So all of their natural containers; correct?

A. Not all. There is a specific volume range.
Q. 55-gallon is one; correct?
A. Yes.
Q. 30-gallon is another?
A. I think so. I'm not sure.
Q. Is there a smaller one than that?
A. I'm not sure.
Q. Do you know if these Smurfit items are made with that same recipe?
A. No, I don't.
Q. Do you know if these items that I'm pointing to here from the Smurfit catalogue, the non-blue ones, are made from that recipe?
A. No, I don't.
Q. And specifically I'm pointing to the Delcon and Delex models. Do you see that?
A. Yes.
Q. Do you know if these Delex and Delcon containers that are not blue and black are made from that recipe?
A. No, I don't.

MR. TIGAR: No further questions, your Honor.

MR. MEARNS: I have no questions, your Honor. He may be excused.

THE COURT: Agree to excuse the witness?

MR. TIGAR: Yes, your Honor.

THE COURT: You may step down. You're excused.

Next please.

MR. MACKEY: Call Mr. Theodore Udell.

THE COURT: All right. Mr. Udell.

THE COURTROOM DEPUTY: Would you raise your right hand, please.

(Theodore Udell affirmed.)

THE COURTROOM DEPUTY: Would you have a seat, please.

Would you state your full name for the record and spell your last name.

THE WITNESS: Theodore H. Udell, U-D-E-L-L.

THE COURTROOM DEPUTY: Thank you.

THE COURT: Proceed.

DIRECT EXAMINATION

BY MR. MEARNS:
Q. Mr. Udell, where do you live, sir?
A. I live at Westchester, Pennsylvania.
Q. Is that near Philadelphia?

A. Yes, it is.
Q. Where did you go to college?
A. Fairleigh Dickinson University.
Q. When did you graduate from Fairleigh Dickinson?
A. 1968.
Q. What kind of degree do you have?
A. I have a bachelor's of science in mechanical engineering.

Q. You also said a moment ago that you have a master's degree. Do you?
A. I do.
Q. Where did you get your master's degree?
A. From Rensselaer Polytechnic Institute.
Q. What was your master's degree in?
A. Management.
Q. When did you get your master's degree?
A. 1973.
Q. Where do you work now?
A. I work for Russell Stanley Corporation.
Q. How long have you worked for Russell Stanley?
A. Two weeks.
Q. How was it that you came to work for Russell Stanley within the last two weeks?
A. Russell Stanley Corporation purchased Smurfit Plastics Packaging on November 10.
Q. Where you work prior to November 10?
A. Smurfit Plastics Packaging.
Q. Prior to November 10, how long had you been working for Smurfit?
A. 24 years.
Q. And what was your position at the time Russell Stanley acquired Smurfit? What was your position at Smurfit?
A. I was manager of engineering and product development.

Q. Any particular division or product area?
A. Plastics division.
Q. How long had you had that position?
A. For approximately 10 years.
Q. What kind of product does the plastics division at Smurfit produce?
A. We produce plastic drums from 3 1/2 gallons to 67 gallons in capacity.
Q. What were your duties and responsibilities at Smurfit?
A. I was in charge of purchasing the resin, negotiating the price for the resin, the material that the drum is made out of for the color concentrates and the UV stabilizers that are added to the drum to give it color or protection from the sun, the price of the color concentrates, all new-product development, product modifications. I took care of the

environmental aspects of it, the accessories that went into the drums, the closures, the handles, the pins that were part of the drums, and some legal aspects on patents.
Q. How long have you been doing those kinds of -- how long had
you had those responsibilities?
A. Those responsibilities I had for about five years.
Q. Now, I want to show you what's been marked as Government's Exhibit 2040 and Government's Exhibit 190. Did you have an opportunity to inspect those exhibits before you came to court today?

A. Yes, I did.
Q. Did you have a chance to look at them closely?
A. Yes, I did.
Q. Can you tell us what those two items are, Government's Exhibit 2040 and Exhibit 190?
A. Those are two Delcon 55D drums with tops missing.
Q. When you say "Delcon," what do you mean?
A. It's a -- Delcon is our -- is our plastic container's name.
We call everything Del something or other because we used to be Delaware Drum and Barrel, so that's the Delcon line of plastic containers.
Q. Those are essentially, then, barrels manufactured by Smurfit?
A. They are manufactured by Smurfit Plastics Packaging.
Q. And Delcon is a line of drums that you produce?
A. That is correct.
Q. How do you know that those are 55-gallon barrels produced by Smurfit?
A. First of all, I designed, developed, produced, and patented those containers; and if I wasn't sure at that point, there are also plates on the drum that signifies -- they have a Smurfit logo, the Smurfit name. They have an M number which is registered by the Department of Transportation. It has a third-party certification number that goes along with Smurfit Plastics Packaging, and it has the plant that produced those

containers.
Q. You said the design is patented. Does that mean the design of that barrel is unique?
A. Very unique. It's patented in most of the world and the United States.
Q. Who has that patent?
A. Well, Smurfit Plastics Packaging holds the patent. I am the author of the patent.
Q. Now, on -- both of these barrels have no lids on them. Is that how they were when they were manufactured by Smurfit?
A. No. When the containers were manufactured, they were considered Tight-Head. That means they had a lid on the top

considered Tight Head. That means they had a lid on the top with two closures that we call "bungs" usually; and in the bungs are plugs that go to seal it off. So those are -- have been modified.
Q. Now, was the lid that was manufactured with that barrel one that could be removed, just taken off?
A. No. It cannot. It was -- it's called a Tight-Head as compared to a full Open-Head drum. Those drums -- those lids are not removed. An Open-Head drum is where the hole lid would be removed to give you access to the inside of the drum.
Q. So with a Tight-Head drum like this, it's actually one large piece of plastic all molded together?
A. That's correct, with 2-inch openings.
Q. Could you describe for us just in a simple fashion how

those barrels were manufactured? What's the process?
A. The process is called extrusion blow-molding. Basically, we take resin that's from a railcar. We pump it into a mixer; and in that mixer, we add -- if it's -- drum has color, it will
be color. In this case, it has a -- basically like a sunscreen to protect the drum from the rays -- protect the drums from the rays of the sun. And then that material is put into an extruder that melts it, and it's blow-molded very much like glass-blown molding into a mold, and then it's cooled; and the results are a 55-gallon, one-piece drum.
Q. Where does Smurfit get its plastic resin that it uses to manufacture those barrels?
A. Those drums were made with Novacor resin -- Nova Chemical resin.
Q. And when did Smurfit first begin to purchase the specific type of resin that's used to manufacture these barrels?
A. We first purchased resin for those drums at the end -- the end of December, 1991.
Q. And when did Smurfit first produce a 55-gallon, or any kind
of a natural drum with that specific type of Nova Chemicals resin?
A. The first records of production would be in January of 1992.
Q. You indicated a moment ago that the resin is mixed with some kind of an ultraviolet --

A. Protection.
Q. -- protection?
A. Yes.
Q. Where does Smurfit get the ultraviolet protection that it mixes with the resin to manufacture those barrels?
A. That formulation comes from Allied Chemical, and it's a proprietary formulation that we specify.
Q. Is the combination of the Smurfit -- excuse me -- the

combination of the Nova Chemicals resin and the Allied additive package used only to manufacture 55-gallon drums?
A. No. We use that same formulation for 15-, 30- and 55-gallon drums.
Q. Is -- is it used -- is that resin used and that additive package used to manufacture drums of any other color besides the natural color that we see here?
A. No.
Q. What other color drums does Smurfit produce?
A. We have black, blue, white. I think we have a purple. But most of the drums are black, blue, white, and natural.
Q. Is the combination of Nova Chemicals resin and the additive package from Allied -- is that unique to Smurfit?
A. Yes, it is.
Q. To your knowledge, does any other manufacturer of high-density polyethylene products use that same combination of Nova Chemicals resin and Allied Chemicals additive package?

A. I'm sure that they do not.
Q. Who does Smurfit sell 55-gallon drums like this to?
A. Well, that drum there was sold to a company called Ecolabs; Ecolabs, Diversey, who is a company very similar to the products that Ecolabs sell; Du Pont; Hercules, ICI, Roman Haus, Ashland Chemical, a number of -- a very large number of chemical houses. And they also sell it to the food product line, janitorial chemical suppliers.
Q. Where does Smurfit ship these barrels after they're manufactured?
A. Usually to the people who fill them with product.
Q. And after your barrels are filled with your customers' products, where are Smurfit barrels shipped then?
A. To their ultimate customers.
Q. Where are those customers?
A. They're throughout the world.
Q. You told us a moment ago that you first manufactured this type of Smurfit barrel with that Nova Chemicals resin in January of '92. Is that correct?
A. Yes.
Q. Between January of 1992 and April of 1995, how many 55-gallon Tight-Head natural drums did Smurfit manufacture?
A. 700,000.

MR. MEARNS: I have no further questions, your Honor.

THE COURT: Mr. Tigar?

CROSS-EXAMINATION

BY MR. TIGAR:
Q. Good morning, Mr. Udell.
A. Good morning.
Q. My name is Michael Tigar. I'm one of the lawyers

appointed
to help out Terry Nichols in this case.
Smurfit -- can we still call it Smurfit even though it's been acquired?
A. Yes, you can.
Q. Smurfit is an international company, is it not, sir?
A. Yes, they are.
Q. And how many manufacturing plants does Smurfit have in the United States for plastic products?
A. Five.
Q. Now, when I say "plastic products," are you also related to a company called Jefferson Smurfit?
A. Yes, I am. Yes, we are.
Q. And Jefferson Smurfit manufactures container board and corrugated board, and so forth and so on?
A. They are a paper company, yes.
Q. And so the kind of -- when I ask you about Smurfit, let's just agree that we're talking about the Smurfit that makes the plastic; correct?
A. Yes.
Q. Where does the name "Smurfit" come from?

A. The owner of the company, Michael Smurfit.
Q. All right. Now, do you have plants also in the European community?
A. There are paper plants there, yes, but not plastics.
Q. You do not have plastic plants in the European community?
A. No.
Q. And how much -- one of the -- or some of the products you make are high-density polyethylene products; correct?
A. Excuse me?
Q. Some of the products that Smurfit makes at its plants in the United States are high-density polyethylene products; correct?
A. We make drums from high-density polyethylene.
Q. Do you make any other kinds of containers than drums?
A. No.
Q. Do you make any products for consumer things that you might see on the shelves in your grocery store or supermarket?
A. No.
Q. So Smurfit's business is uniquely plastic drums and containers of -- for industrial uses; is that correct?
A. Industrial plastic containers, yes.
Q. And how many pounds of high-density polyethylene do you use each year in your five manufacturing plants in the United States?
A. About 50 million pounds.

Q. How much does one of these 55-gallon drums weigh?
A. 23 pounds.

A. 25 pounds.
Q. Now, of the drums that you manufacture, do you know what percentage are natural?
A. Of 55-gallons?
Q. No, of any kind.
A. Give me a second.
About 25 percent.
Q. 25 percent are natural?
A. Yes.
Q. And in the course of a calendar year, how many different natural-color containers do you manufacture, looking to calendar year 1992?
A. I can't give you exactly that count for 1992.
Q. For any given year.
A. The -- from the time period of January 1, 1992, to April 30, 1995, the total number of natural drums using the Novacor resin and the Allied color concentrate was 2.5 million.
Q. 2.5 million from what period to what period?
A. From January 1, 1992, to April 30, 1995.
Q. Now, you testified that in your natural color drums you use a proprietary formulation provided to you by Allied Chemical; correct?
A. That's correct.
Q. That proprietary formulation contains a product

manufactured by Ciba-Geigy under a patent; correct?
A. That's correct.
Q. And it also contains some calcium carbonate or chalk; correct?
A. That's correct.
Q. Now, you testified that you are sure that no other manufacturer uses T622 and calcium carbonate. Right?
A. In natural drums, that's correct.
Q. In natural drums.
A. In natural drums.
Q. Now, do you know that from trade associations?
A. No.
Q. How do you know it, sir?
A. I called up every manufacturer of plastic drums, all manufacturers of -- anybody who uses Novacor resin provided by Novacor, all people who purchase resins of the same type from Mobil and Union Carbide.
Q. So you called everybody who uses resins not only from Novacor but from Union Carbide and Mobil; correct?
A. That's correct, of the same type of material that's used in that drum.
Q. Because what Novacor makes is not unique to Novacor; right?
A. That's correct.
Q. These people who you were calling: They are your competitors; right?

A. In some cases, they were.
Q. What's your market share?
A. In which market?
Q. In the drum market. In the market we're talking about here, these plastic barrels.
A. About 25 to 30 percent.
Q. And the people that you called: They would represent the other 70 to 75 percent of the market?
A. That is correct.
Q. Now, in this -- so you have a lot of competition; right?
A. Yes, I do.
Q. Now, in this highly competitive industry, do you all just share your proprietary formulas with phone calls like that on a regular basis?
A. No.
Q. And do you sometimes find that when you call up your competitors to find out how they make their stuff that they don't have much interest in leveling with you?
A. I think everybody was very honest with me.
Q. Well -- and you were talking to them on the phone; is that right?
A. That is correct.
Q. Did you have the opportunity to observe their demeanor?
A. No.
Q. Did you have the -- did you ask them for production runs on

their plant that showed you the chemical processes that they used for their own proprietary mixtures?
A. No.
Q. And did you feel like you cross-examined them effectively?
A. Yes.
Q. And you were satisfied that what you were hearing was the truth; right?
A. Yes.
Q. Does your company have a policy about calling up your competitors and asking them for all the details of their proprietary processes?
A. What I was asking them for was data that was old at that point in time.
Q. You weren't asking them for how they make them now?
A. That's correct.
Q. So you didn't even find out whether they're all using Tinuvin 622 and calcium carbonate at the present time; correct?
A. Excuse me?
Q. Well, what period of time were you asking them about, sir?
A. I asked them prior to April 30, 1995, going back as far as their records would indicate.
Q. And did you ask them to send you records to verify that what they were telling you was true?
A. No.
Q. Now, why did you conduct this investigation?

A. Because I wanted to be certain that no one else was using the same formulation that Smurfit was using.
Q. Did you conduct this investigation for your own competitive purposes, or did somebody ask you to do it?
A. Somebody asked me to do it.
Q. Who asked you to do it?
A. The FBI.
Q. So -- Now, is this a policy at your firm, when the FBI asks
you to go call up your competitors about their proprietary processes, that you do those investigations?
A. Is it a policy?
Q. Yes. Do you have a policy about that?
A. No, we don't have a policy.
Q. Now, you were asked on direct examination -- and you said that this here drum that we're looking at here -- these drums are patented?
A. That's correct.
Q. Now, does that patent refer to what they're made of?
A. No.
Q. No. The patent doesn't have anything to do with what they're made of, does it?
A. That's correct.
Q. The patent has to do with the Tight-Head-type construction; correct?
A. Basically, yes.

Q. And so -- and the reason that you patented it is that these -- the Tight-Head thing has to do -- helps you to penetrate certain markets that would otherwise be held by manufacturers of drums made of different things; correct?
A. Correct.
Q. In other words, you all were trying to penetrate the market that was formerly held by steel drum manufacturers; correct?
A. And fiber drum.
Q. And fiber drums. And one of the things you were trying to convince people is that you should be able to put lubricating things in here; correct?
A. Among other things.
Q. And Conoco was one of your customers?
A. That's correct.
Q. In order to get Conoco's business, you've got to manufacture a drum that meets certain specifications in terms of its strength and construction; correct?
A. Yes.
Q. And one of the things you looked for in manufacturing drums for Conoco under this patent that you told us about is reusability; correct?
A. That's correct.
Q. And how many times have you been telling Conoco that you

can reuse these things?
A. We haven't told Conoco that. They've decided that on their

own.
Q. They what?
A. They decided that on their own.
Q. And what have they decided, sir?
A. That it can be reused.
Q. How many times does Conoco decide that your drum can be reused?
A. I do not know how many times.
Q. Does the word "15 to 30" refresh your recollection?
A. I was never told that.
Q. Now, when you say that this -- these drums that you make -- are you familiar with the reports that your company files with the Securities and Exchange Commission?
A. No.
Q. Do you review the annual report to the shareholders on how you all are doing?
A. I mean I've seen it, yes. I don't review it.
Q. Do you remember anything in there about the reusability of the drums that you make?
A. There is no legal limit to the life of a plastic drum. It can be reused.
Q. Okay. Well, there is no -- that is to say that the plastic police don't come and say you've used that drum enough times, we're taking it back; right?
A. That's correct.

Q. Okay. And one of the things that you like about this plastic is that it lasts a very long time; correct?
A. Yes.
Q. And in fact, Ecolab here --
A. Ecolab. It's on the bottom of the label.
Q. On the bottom? On the bottom of the label. Down here on the label of Government's Exhibit 190?
A. Yes.
Q. Now, are you the only supplier to Ecolab?
A. No.
Q. In fact, they also buy from Van Leer, don't they?
A. Yes, they do.
Q. And they buy from Van Leer a natural drum that is also in the 55-gallon type; correct?
A. Yes.
Q. Is it the same-type head design that you've described here?
A. It's a Tight-Head design. It's a different construction.
Q. So it's not covered by that same patent; correct?
A. That's correct.
Q. Now, Ecolab puts into their drums that they buy

Q. Now, Ecolab puts into their drums that they buy agricultural products; correct? Do they put agricultural products that are used in agriculture?
A. Ecolabs, as far as I know, supplies the dairy industry and the commercial restaurants area. I'm not sure what other products they make.

Q. The dairy industry -- for instance, that barrel there: That was used to contain something that's used to -- in the dairy industry; correct?
A. Yes.
Q. Now, do they also manufacture, or does Ecolab, your customer, also put cleaning products in drums that are manufactured from this natural plastic?
A. Yes.
Q. And that -- those cleaning products to your knowledge: To whom are those distributed?
A. Commercial restaurants. A lot of those products are used for sanitizers or cleaners.
Q. Are they used by other than restaurants? I mean, are they usable for sanitizing other spaces, other than spaces where food is served?
A. I'm not familiar with all the uses of their products.
Q. Well -- but -- Now, once you've taken out whatever is in the barrel, it can be washed out and reused; correct?
A. Ecolabs has a return policy for reusing their containers, yes.
Q. And are you aware that in addition to the return policy that manufacturers use that these barrels are available at landfills and surplus stores?
A. I hope not.
Q. Whether you hope not or not, sir, do you know of your

knowledge whether or not those sorts of things exist?
A. I do not know that.
Q. Now, I want to show you some of what's been received in evidence here as Defense Exhibit E99 and put it up on the board. Here's the machine.
That's Smurfit Plastic Packaging. That's your company?
A. That's correct, yes.
Q. And this is a portion of your product literature?
A. This is the Open-Head family product line.
Q. Now, the Open-Head family -- that's what we're looking at here.
That's the Tight-Head family?
A. Yes.
Q. Now, looking at the Open-Head family here, do you see any plastic in this picture that is manufactured from Novacor resin and contains Tinuvin 622 and calcium carbonate?
A. Not in that picture.

Q. How about the lids of these barrels?
A. They're injection-molded, and they are not made out of Novacor 555, nor do they contain any calcium carbonate.
Q. All right. So even though they're natural color, they do not contain it; correct?
A. That's correct.
Q. All right. Now I'm going to show you the Tight-Head

family. Correct?
A. That's the 5-gallon Tight-Head family. The 3 1/2- to 8-gallon Tight-Head family.
Q. Now, what's this one down here?
A. That's called the Delcon Plus.
Q. And how many gallons does that contain?
A. 5 gallons.
Q. 5 gallons. Now, in your 5 gallons, do you use any of this Novacor with the Tinuvin 622 and the calcium carbonate?
A. No.
Q. No. All right. Now, let's look at the Tight-Head family 15- to 64-gallon. Do you use Tinuvin -- the Tinuvin calcium carbonate mixture for this part of the Tight-Head family?
A. There are no natural drums in that picture.
Q. I understand. But in that -- can I buy, for instance -- see this blue drum here?
A. Yes.
Q. Can I buy that from you in a natural color with the -- made
with this kind of resin?
A. If you buy a natural drum, you will find it with Novacor resin and the additive package.
Q. Now, is only the drum injection, or the drums are blow-molded; is that correct --
A. That's correct.
Q. -- that you were talking about here? And you use this

particular additive package in the blow-molded ones?
A. In the natural blow-molded containers.
Q. Natural blow-molded containers. Are your bungs blow-molded, or injection-molded?
A. Injection-molded.
Q. So the bungs would not have the same resin content?
A. That is correct.
Q. So I can order this one here, this blue one, in natural and
then I'd get that package; correct?
A. Yes.
Q. All right. And is that the one you made 700,000 of?
A. Yes.
Q. Now, here's a smaller one down here with a carry handle. Is that injection-molded, or blow-molded?

A. That's blow-molded.
Q. Now, if I ordered that one in white -- or excuse me -- in natural, would I get this same package?
A. Yes.
Q. All right. And how many gallons is that?
A. 15.
Q. 15. And who do you sell those to?
A. Ecolabs buys a lot of those containers as well.
Q. And do you have any other large companies that do?
A. Well, we -- Diversey, Ecolabs, Du Pont, Hercules, ICI, Roman Haus; and we sell to a lot of chemical distributors and

chemical houses.
Q. Now, do you all make pipe?
A. No.
Q. And these -- these drums here: How many of those have you made? When did you start making those, this particular one that I'm pointing to?
A. We have made those for 20 years.
Q. And when did you start making them with this particular combination of Tinuvin 622 and calcium carbonate, the Allied Signal -- excuse me -- Allied Chemical package?
A. That all started January 1, 1992.
Q. And from January, 1992, to April, 1995, how many of them did you make?
A. In what color?
Q. In natural.
A. 1.5 million.
Q. All right. So we've got 700,000 of these and 1.5 million of these.
Now, let's look down here at the bottom. You see this
black one?
A. Yes.
Q. Can I order it -- is that injection-molded, or blow-molded?
A. That's blow-molded.
Q. Can I order that in natural?
A. Yes, you can.

Q. Or could I?
And you started making those -- how many of those between January, '92, and April, '95, did you make with the -- this Allied -- can we call it the Allied Chemical package?
A. That's fine.
Q. So shorthand, we'll call it the Allied Chemical package. How many of those did you make with the Allied Chemical package?
A. Zero.
Q. Zero. Now we'll go to the next one, No. 4. See this light
blue one there, the baby blue?

blue one there, the baby blue?
A. 30-gallon, yes.
Q. 30-gallon. Can I order that in natural?
A. Yes, you can.
Q. How many of those did you make?
A. Between January 1, 1992 --
Q. Yes, always the same time frame. It will get you home quicker. Okay?
A. That was 300,000.
Q. 300,000. So we got 700,000, 1.5 million and 300,000. Correct?
And could we just -- we've got one, two, three, four more here. Using the same parameters, could we -- could you just give me some numbers?
A. The numbers I gave you include all those.

Q. Include all of those?
A. Yeah. I -- I grouped them together for you. They're basically 55 gallons of just different colors.
Q. These ones back here are 55-gallons?
A. Well, there is a 64 in the back, but we never made with that additive, that package.
Q. Okay. So you made using this package -- you made barrels in three different sizes. Correct?
A. Basically, yes.
Q. And during that period of time, there is a total of 2 million; correct?
A. Yes.
Q. Now, did you use that package for any other product other than the ones depicted on this page, which is the page that I have, just for our reference, marked 005 of Exhibit E99?
A. Excuse me. What was the question?
Q. Okay. We've just been looking at these barrels; correct, sir?
A. Yes.
Q. For the record, I'm going to show that's page 005. You see
that at the bottom?
A. Yes.
Q. Other than the barrels that are depicted here, did you make any more with that package?
A. No.

Q. Other than that? Right?
A. That's correct.
Q. So there are 2 million of those things out there; correct?
A. Yes.
Q. Have you done tests to determine how many of the 2 million -- excuse me. Have you done tests to determine how many times a barrel can be reused?
A. No.

Q. Are you in the business of marketing the barrels to people?
A. Am I -- the what?
Q. I mean is it a part of your job to try to convince people to buy your barrels?
A. Yes. I work with the sales department.
Q. And is one of the things that makes the barrels attractive to people that they can be reused?
A. Yes.
Q. Well, do you make representations to people about the number of times your barrels could be reused?
A. No.
Q. Do they ask?
A. The -- the Department of Transportation that regulates the barrels that we make have decided that there is no legal limit to the use of the containers. Really, the -- it's up to the packager, people who fill the container, whether the container is fit for reuse. We encourage reuse of the container.

Q. Now, is the use of calcium carbonate as a tracer -- all right -- is that something that you or that Allied Chemical came up with?
A. We did.
Q. And you did that beginning in 1991 and then began using it in 1992; is that right?
A. No, the tracer was -- my earliest record that I could find was '88, official records; but we used that formulation before that period of time.
Q. Okay. That calcium carbonate formulation, you mean?
A. Yes.
Q. And how long has Tinuvin 622 been around?
A. A long time.
Q. Well, is it still under patent?
A. The patent has expired, but you can still buy 622.
Q. Oh. So -- now, the life of the patent is 17 years; correct? Is that right?
A. Basically.
Q. Okay. So when is the first time that T622 began to be used
in this industry?
A. I can't tell you.
Q. As long as you've been connected with the industry?
A. Yes.
Q. More than 17 years?
A. Yes.

Q. And were you a part of the team that decided to use this calcium carbonate?
A. No.
Q. Now, in addition to Department of Transportation standards,

there are also U.N. numbers that are attached to things; correct?
A. That is correct.
Q. And does that mean "United Nations"?
A. Yes.
Q. Well, what's the significance of the U.N. numbers?
A. The -- because drums are made in all different countries, the U.N. is trying to standardize the testing and the performance requirements of plastic drums. The Department of Transportation, the DOT, has basically accepted the U.N. guidelines for physical testing and performance standards of plastic drums.
Q. And is the DOT principally interested in the integrity of the drums or their recyclability?
A. The integrity of the drums.
Q. Now, the U.N. standards are also addressed to recyclability; correct?
A. To their performance standards.
Q. The number of times they can be reused: Is that one of the
things the U.N. standards are concerned with?
A. Not directly.

Q. Do you manufacture drums that are suitable for use in the European community?
A. Yes, we do.
Q. Are there standards relating to reuse that you have to observe in order to do that?
A. The European community has standards based on size and color as well as utilizing the U.N. performance criteria.
Q. Now, the -- when did the FBI first come to you, sir?
A. About two years ago.
Q. And did they bring you some plastic?
A. Yes, they did.
Q. And how many pieces of plastic did they bring you?
A. There were bags full. Bags and bags full.
Q. And did you -- how many -- can you tell me how mean pieces they had?
A. Well, I had a conference table covered with the plastic pieces, so it -- I couldn't tell you. There were different sizes and shapes and sizes, so . . .
Q. And who was it in the FBI that brought you these pieces?
A. Monica Knuckles.
Q. And when Ms. Knuckles brought them, did you all spread them out on this table and look at them?
A. Yes.
Q. What colors were the ones that she brought you?
A. They're blue, natural. I think there might have been -- I

remember the blue and natural particularly. There might have

been other colors as well.
Q. Do you remember black plastic?
A. Not directly, but there could have been black.
Q. Did you examine the plastic first to determine what kind of plastic it was?
A. I examined the plastic to see if I could separate it out -- the plastics into different categories that may or may not have been used to make a drum.
Q. And so you were looking for HDPE; correct?
A. No, I was looking more for texture, size, as well as color.
Q. And how many pieces did you select -- did you select a certain number of pieces then?
A. We zeroed in on, I think, two -- two separate bags that had pieces in it.
Q. All right. And of the two separate bags that you zeroed in on, how many -- what percentage of the total of all the plastic pieces that were on your conference table did that represent?
A. I couldn't count how many. It was a small percentage of the total.
Q. When you saw those two plastic bags, then what did you do with them when you picked them out?
A. Well, we did a melt index test on them to determine if it felt -- fell into the range of material that we used.
Q. And that is the only test that you were able to perform, or

did you do some other tests?
A. I think we did quick density tests.
Q. And what did you find when you did the density tests?
A. Well, one piece that we looked at did not fall into the range of our products.
Q. And did the one piece you looked at: The reason it didn't fall into the range of your products is that you have a procedure -- you have a procedure for density tests; correct?
A. Yes, we do.
Q. And the procedure requires you to drop the piece of plastic that you're testing into some vessel that contains a liquid. Is that correct?
A. That's correct.
Q. And is that what you did on this occasion?
A. Yes, we did.
Q. Now, you drop it into a vessel that contains a liquid and you try to get it into a vessel where it floats up at the midpoints; is that right?
A. That's correct.
Q. And this particular piece, you dropped it into several vessels and it kept sinking. Right?
A. That's correct.
Q. And even with the last one, it sank all the way to the bottom. Right?
A. That's correct.

A. That's correct.

Q. Do you remember if the piece that sank all the way to the bottom had a Q number?
A. It did, but I don't recall it. I don't recall the number.
Q. And -- but it was one of the pieces in the bags that you had selected with Ms. Knuckles; correct?
A. Yes.
Q. Now, what did the -- if the thing had floated up in the middle of one of these containers, what was that supposed to tell you?
A. It would indicate the density of that piece of plastic.
Q. And density is one of the characteristics of polyethylene; right?
A. Of everything.
Q. Well, of everything. But you've got low-density polyethylene and high-density polyethylene, and I mean you've got initials on there; right?
A. That's correct.
Q. So you're looking for HDPE. Right? Is that what you were looking for?
A. Yes.
Q. And -- but the sample kept sinking; right?
A. On that particular sample, yes.
Q. Yes. Now, the others floated; right?
A. No. We only tested one piece.
Q. But the one piece you did sank. Now, did that mean it was

consistent with high-density polyethylene, or not consistent with it?
A. That was consistent with high-density polyethylene but did not have the melt index of the ones we were using.
Q. And so you gave that back to Ms. Knuckles?
A. I gave everything back to Ms. Knuckles.
Q. Did you perform any further tests on the piece that sank?
A. I believe we did two tests; that we did a density and a melt index.
Q. Now, at what temperature does that thing over there, that barrel, Government's Exhibit 190, get to be liquid?
A. We process the material over -- about 400 degrees Fahrenheit.
Q. And what is that Celsius?
We can figure it out; right?
A. Right. Yeah.
Q. And do you know at what temperature it vaporizes?
A. No.
Q. Do you have standards with respect to the performance of these barrels if you involve them in a fire that involves burning gasoline, for example?
A. I don't follow you.
Q. You sell them to Conoco to put lubricants in; right?

A. That's correct.
Q. Do you discuss with Conoco what's going to happen to this

barrel if there is a fire?
A. No.
Q. All right. Is the flammability/meltability any part of the decision as to whether you're -- they're going to buy this product, or use some other product to store their stuff?
A. I would think they would consider that.
Q. But have you ever talked to them about it?
A. No.
Q. You don't have any personal knowledge about that; right, sir?
A. No.
Q. Now, is this meeting with Ms. Knuckles where you spread out plastic pieces all over a whole conference table the only meeting you had with the FBI at which you looked at pieces of plastic?
A. That's the only one that we looked at pieces of plastic to try to determine which parts may have come from a plastic drum.
Q. Now, when was it that you were asked by the FBI to call up your competitors and find out what proprietary formulas they were using?
A. That was before the first trial.
Q. Now, in addition to your Tight-Head drums, do you also manufacture some drums that can be -- excuse me. Are these Tight-Head drums the sort that can be handled by a parrot's beak?

A. That's correct.
Q. And a parrot's beak is a certain kind of a loader; correct?
A. It's a hook.
Q. A hook. And do all of your barrels that you're discussing here -- are they all handleable by a parrot's beak-type hook?
A. 30 through 55's, yes.
MR. TIGAR: Thank you, your Honor. I have no further questions.
THE COURT: Any redirect?
MR. MEARNS: Very briefly, your Honor.

REDIRECT EXAMINATION

BY MR. MEARNS:
Q. Mr. Udell, with respect to the calls that you made to determine whether or not Smurfit plastic -- that is, the plastic that is used to make these natural drums -- was unique, did you do that in order to be prepared for your testimony?
A. Yes, I did.
Q. And did -- when you made those calls, did you tell the people you were calling why you were calling them?
A. Yes, I did.

Q. What did you tell them?
A. I told them may name. I told them I was working with the FBI on the Oklahoma City bombing case. I asked (sic) them that
I was looking for some information whether they used a certain type of resin. I didn't want to know what they were using at

the present time or if they had information that they felt proprietary but if they could let me know if they used calcium carbonate or the similar type of material describing the physical characteristics of the material, not the name brand of the material.

And basically, the key here was that no one was using calcium carbonate, even with -- even though they might have been using similar materials. But in every case, they were not
using calcium carbonate in natural drums. And I felt very strongly that they were telling me the truth.

Q. As you sit here today, do you have any doubt that the recipe Smurfit uses to make natural drums is unique to Smurfit?
A. I'm absolutely certain that that package is unique to Smurfit Plastics Packaging.
Q. Mr. Tigar asked you certain questions about the reusability, the recycling of the drum. And you specifically told him that you were aware of a recycling program at Ecolab; is that correct?
A. That is correct.
Q. Are you aware that other customers of yours have similar reusability programs, recycling programs?
A. A number of companies have programs, including Conoco. The -- the unit itself has, like I said earlier, no limited life. It can be reused. We actually encourage reuse of a container.

My new company, Russell Stanley -- part of that -- the
Russell Stanley family is a company called Container Management Services that -- they actually lease the container. You get to use the container. It has a logo actually embossed on the drum, "Property of CMS." That has an 800 number. You call and
they will pick up -- have that drum delivered back to them so they can clean it and then reuse the drum. The market that we are looking at in plastic drums is the replacement of all fiber
and steel, and that market presently is approximately 100 million containers a year.

So during the period of time that we're talking about,
there are more than 250 million steel and fiber -- steel and

there are more than 250 million steel and fiber -- steel and fiber containers made. And look at the same number of drums produced natural: There were only 1 million. That meant only 1 in 250 containers have the additive package in it.
Q. Does the existence of those recycling programs and the market-share information you just spoke about -- does that make it more, or less likely that if you went to a landfill, as Mr. Tigar indicated, that you would find a Smurfit 55-gallon natural drum?
A. Most plastic companies have a stewardship program on preserving the environment --
MR. TIGAR: Excuse me, your Honor. Nonresponsive.
THE COURT: Sustained.
BY MR. MEARNS:

Theodore Udell - Redirect

Q. Mr. Udell, with respect to the existence of those recycling programs and the characteristics of the drum and the market-share information that you testified about a moment ago, does it make it more likely, or less likely that if you went to a landfill, as Mr. Tigar said, you would find a Smurfit 55-gallon natural drum?
A. Less likely.
Q. Finally, with respect to Defense Exhibit E99, Mr. Tigar showed you certain pages from it; and he asked you specifically some questions about page 5 from that.
A. Yes.
Q. Just so that the record is clear, are there any natural drums of any volume depicted in that brochure?
A. No.
MR. MEARNS: Thank you.
THE COURT: Mr. Tigar?
MR. TIGAR: Very briefly, your Honor.

RECROSS-EXAMINATION

BY MR. TIGAR:
Q. Are you aware of businesses that are set up expressly to resell empty containers that you make -- manufactured by you and other manufacturers after they have been emptied of the original product? Do you know of any businesses like that?
A. Yes.
Q. Do you know of any businesses like that in Kansas?

Theodore Udell - Recross

A. No. I couldn't -- there are reconditioners throughout the country that recondition plastic. I can't give you their exact locations.
Q. Now, these reconditioners: What do they do?
A. They clean the drum and resell it.
Q. You mean like this drum here, Government 190?
A. The Ecolab drums -- Ecolabs has their own reconditioning program.
Q. I understand. Do you know whether or not Ecolab drums are acquired by reconditioners and put into commerce? Yes, or no?

A. No.
Q. And the question whether it's going to be reconditioned by sending back to Ecolab or given to one of these other reconditioners is going to be the decision of the consumer of that Klenzade product; correct?

A. I'm not sure.
Q. Well, if I -- if a dairy barn buys that stuff there, STER-BAC, and they use up everything that's in the barrel, the owner of the dairy barn can decide whether to send it back to Ecolab or to give it to one of these reconditioners; right?
A. There might be a return associated with that drum. They may have a deposit on the drum that might --
Q. Whatever they have, sir, the decision whether you're going to do it belongs to the person that bought the product. Right?
A. Yes.

Q. The plastic police aren't going to come and enforce what you do with it; right?
A. That's correct.
Q. And there are people that you know of that are in the business of acquiring drums, reconditioning them, and selling them; correct?
A. Yes.
Q. And you're not aware of any particular names of any particular places in Kansas; correct?
A. Correct.
Q. When the FBI had you calling up a lot of people, did they have you call up reconditioners and ask them how many drums they handle?
A. No.
Q. Did the FBI give you a list of the questions that you were supposed to ask the witnesses that you were interviewing on their behalf?
A. I think I gave them a list of questions.
Q. Did they accept your list?
A. I believe so.
Q. Did you make a report to the FBI, a written report as to your findings?
A. No.
Q. Did you keep notes as to your findings?
A. Yes, I did.

Q. Do you have the notes?
A. Not with me.
Q. All right. And what -- would those notes tell us what questions you asked and what answers you received?
A. Yes.
Q. After you interviewed these witnesses on behalf of the FBI,

you rendered a report orally?
A. Yes.
Q. Were you ever asked to make a written report?
A. No.
Q. Did you tape-record the interviews?
A. No.
Q. And when you say you're certain -- did you know all of these people you were calling up personally?
A. No.
Q. Did you know some of them?
A. Yes.
Q. And had you been at trade shows with them?
A. Some of them.
Q. Yes. They're your competitors; right?
A. Yes.
Q. Okay. And where are the notes today of your conversations with these people?
A. I believe my office.

MR. TIGAR: Nothing further, your Honor.

MR. MEARNS: Just one question, your Honor.

THE COURT: All right.

REDIRECT EXAMINATION

BY MR. MEARNS:
Q. Did you reduce the results of your telephone calls to a chart form?
A. Yes, I did.
Q. And do you have in your folder Government's Exhibit 2055? Do you have a --

THE COURT: I'm not going to receive it without the notes, and we're not going to have him go back and get the notes.

MR. MEARNS: I wasn't intending to offer it. I was just going to have him identify it.

THE COURT: Well, if you're not going to offer it, why identify it?

MR. MEARNS: Simply to indicate that Mr. Tigar has the results of that study, Government's Exhibit 2055 --

MR. TIGAR: I object to the colloquy, your Honor.

THE COURT: Sustained. Stricken.

MR. MEARNS: I'm sorry, your Honor. I was trying to answer the question.

THE COURT: He was asked about notes, not about a chart.

MR. MEARNS: I have no further questions.

THE COURT: All right. So the witness may now be excused?

MR. TIGAR: Yes, your Honor.

THE COURT: You can go home.

THE WITNESS: Thank you.

THE COURT: Members of the jury, you can't go home. You can go to recess, and we'll take our usual recess till 1:30 and, of course, with the usual cautions and conditions of keeping open minds, avoiding discussion of anything connected with this trial with yourselves, other jurors, and all other

with this trial with yourselves, other jurors, and all other
persons, and continuing to be watchful and careful about
things
outside of the evidence coming to your attention.
You're excused now till 1:30.
(Jury out at 12:00 p.m.)
THE COURT: Okay. 1:30.
(Recess at 12:00 p.m.)
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INDEX

PLAINTIFF'S EXHIBITS

Exhibit	Offered	Received	Refused	Reserved	Withdrawn
190A	10867	10867			
190B	10870	10871			
785	10842	10845			

PLAINTIFF'S EXHIBITS (continued)

Exhibit	Offered	Received	Refused	Reserved	Withdrawn
785C	10865	10865			
785A	10870	10870			
786E	10865	10866			
786A	10869	10869			

DEFENDANT'S EXHIBITS

Exhibit	Offered	Received	Refused	Reserved	Withdrawn
E79	10891	10892			
E80	10912	10912			
E99	10876	10876			

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REPORTERS' CERTIFICATE

We certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter. Dated at Denver, Colorado, this 26th day of November, 1997.

_____

Paul Zuckerman

_____

Bonnie Carpenter