EA03-010

Ford

10/22/03

Attachment F

Book 24 of 24

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI
JACKSON DIVISION

[redacted]

PLAINTIFFS

VS.

CIVIL ACTION NO. 3:01CV403BN

FORD MOTOR COMPANY, BUDGET RENT-A-CAR SYSTEMS, INC. and TEAM FLEET SERVICE FINANCING CORPORATION

DEFENDANTS

FORD MOTOR COMPANY'S DESIGNATION OF EXPERTS

Pursuant to Federal Rules of Civil Procedure 26(a)(2), Ford Motor Company designates the following experts who are expected to testify at the trial of this case:

1. Verne L. Roberts, Ph.D., #7 Surf Court, Figure 8 Island, Wilmington, North Carolina 28411-0248; (910) 686-9945. A copy of Dr. Roberts' *curriculum vitae* and testimony record are attached hereto as part of Exhibit "A."

Dr. Roberts' testimony will be based on his education, training and experience, relevant documents and photographs, various pleadings in this civil action and the documents outlined in his report. A copy of Dr. Roberts' report is attached hereto as Exhibit "A."

2. Gerald E. Corwin, Carr Engineering, Inc., 12500 Castlebridge Drive, Houston, Texas 77065-4532; (281) 894-8955. A copy of Mr. Corwin's *curriculum vitae* and testimony record are attached hereto as part of Exhibit "B."

Mr. Corwin's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Mr. Corwin's report is attached hereto as Exhibit "B."

3. Roger C. Wagner, Ragan Research Corporation, 14050 Eckless Road, Livonia, Michigan 48150; (734) 542-6500. A copy of Mr. Wagner's *curriculum vitae* and testimony record are attached hereto as Exhibit "C."

Mr. Wagner's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Mr. Wagner's report is attached hereto as Exhibit "C."

4. Robert Gratzinger, Gratzinger Engineering & Consulting, Inc., 2201 Martin Street, Suite 103, Irvine, California 92612; (949) 955-3400. A copy of Mr. Gratzinger's *curriculum vitae* and testimony record are attached hereto as Exhibit "D."

Mr. Gratzinger's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. This designation will be supplemented with Mr. Gratzinger's report as soon as it is available.

5. Carl G. Brooking, Economic Systems, Inc., Box 150109, Jackson, Mississippi 39210; (601) 974-1261. A copy of Dr. Brooking's *curriculum vitae* and testimony record have been previously produced to Plaintiffs.

Dr. Brooking's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Dr. Brooking's report has previously been produced to Plaintiffs.

6. Ford reserves the right to call any treating physician as an expert witness in this matter.

7. Ford reserves the right to call Phillip Hardeman as an expert witness in this matter.

Mr. Corwin's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Mr. Corwin's report is attached hereto as Exhibit "B."

3. Roger C. Wagner, Ragan Research Corporation, 14050 Eckless Road, Livonia, Michigan 48150; (734) 542-6500. A copy of Mr. Wagner's *curriculum vitae* and testimony record are attached hereto as Exhibit "C."

Mr. Wagner's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Mr. Wagner's report is attached hereto as Exhibit "C."

4. Robert Gratzinger, Gratzinger Engineering & Consulting, Inc., 2201 Martin Street, Suite 103, Irvine, California 92612; (949) 955-3400.

Mr. Gratzinger's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. This designation will be supplemented with Mr. Gratzinger's report, *curriculum vitae*, and testimony record as soon as it is available.

5. Carl G. Brooking, Economic Systems, Inc., Box 150109, Jackson, Mississippi 39210; (601) 974-1261. A copy of Dr. Brooking's *curriculum vitae* and testimony record have been previously produced to Plaintiffs.

Dr. Brooking's testimony will be based on his education, training and experience, relevant documents and photographs, and various pleadings in this civil action. A copy of Dr. Brooking's report has previously been produced to Plaintiffs.

6. Ford reserves the right to call any treating physician as an expert witness in this matter.

7. Ford reserves the right to call Phillip Hardeman as an expert witness in this matter.

8. Ford reserves the right to call any involved law enforcement officers as an expert witness in this matter.

9. Ford reserves the right to call as expert witnesses and/or elicit expert testimony from any and all experts designated by Plaintiffs or co-defendants.

10. Ford reserves the right to supplement this Designation of Expert Witnesses.

This the 6 day of June, 2002.

Respectfully submitted,

FORD MOTOR COMPANY

By Its Attorneys,
BAKER, DONELSON, BEARMAN
& CALDWELL

By: ______________________
BRADLEY W. SMITH

Walker W. Jones, III, Esquire (MSB #3303)
Barry W. Ford, Esquire (MSB #5410)
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JM BWS 157927 v1
124774-00204 06/06/2002

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served via United States mail, postage paid, to:

Jay M. Kilpatrick, Esquire
YOUNG, WILLIAMS, HENDERSON & FUSELIER, P.A.
2000 AmSouth Plaza
Post Office Box 23059
Jackson, Mississippi 39225-3059

Forrest Stringfellow, Esquire
DANIEL, COKER, HORTON & BELL
Post Office Box 1084
Jackson, Mississippi 39215

This the 6 day of June, 2002.

B Smith
BRADLEY W. SMITH

JM BWS 157927 v1
924774-02204 06/06/2002

Verne L. Roberts, Ph.D.
#7 Surf Court
Figure 8 Island
Wilmington, N.C. 28411-9248

Telephone (910) 686-9945
Fax (910) 686-9940
Email vroberts@isaac.net

June 5, 2002

Mr. Bradley W. Smith
Baker, Donelson, Bearman & Caldwell
4268 I-55 North
Meadowbrook Office Park
PO Box 14167
Jackson, MS 39236

Re: [redacted] v. Ford

Dear Mr. Smith:

Relative to the above matter I have reviewed the following materials:

Medical Records of [redacted]	Lauderdale County Coroner Toxicological Analysis Report Helen Keller Memorial Ambulance ECG Report
Medical Records of [redacted]:	Mississippi Methodist Rehabilitation Center Arizona Home Care/Sunset Care Eliza Coffee Memorial Hospital/Dr. Charles Marchman Verde Valley Medical Center/Dr. Daniel Goldsmith UMC Orthopaedics Dr. Dave Schillington Sedona Orthopaedics/Dr. Geoffrey Cook Dr. Pahul Vohra Eliza Coffee Memorial Hospital University Hospitals and Clinics/Jackson, MS. Institute for Bone and Joint Disorders Dr. Brant Oxford, DDS Northern Arizona Physical Therapy
Other Materials Reviewed:	The Barnett Group Investigation Report Report of Irving Brock Statement of Mike Engelman

[redacted]

Home Towing and Recovery
Lauderdale County Volunteer Fire Department
Vehicular Accident Report
Newspaper report of accident from *The Times Daily*
Ford Motor Company's Response to Plaintiff's First Set of Interrogatories Propounded to Defendant Ford Motor Company
Nancy Lobb's Responses to Ford Motor Company's First Set of Interrogatories
Plaintiffs' Response to First Set of Interrogatories Propounded by Budget-Rent-A-Car Systems, Inc. and Team Fleet Financing Corporation
Complaint
Summons
1 laser copy of accident scene taken by *The Times Daily*
24 laser copies of accident site taken by Chris Walker 7/3/01
33 laser copies of accident scene and deceased
Plaintiff's Designation of Expert Witnesses
Plaintiff's Supplemental Designation of Expert Witnesses
Report of Steven Haynes
Report of Wayne Ross
Report of Theodore Zinke
Report of Thomas Kuechler

In addition to my review of the above materials, I had the opportunity to inspect the subject vehicle on April 4, 2002 and the three point restraint systems for the front seat occupants on May 6, 2002. Inspection of the vehicle revealed a 2000 Ford Taurus with obvious, severe impact damage to the center front of the vehicle. The collision deformation appeared to be consistent with impact between the front of the vehicle and the end of a concrete bridge abutment at or near the posted speed limit of 50mph. This would provide a change in velocity of the vehicle during the collision in the approximate range of 41 to 45 mph. Review of the accident scene diagram indicates that [redacted] was traveling southbound on the Natchez Trace when his vehicle gradually crossed into the northbound lanes before striking the end of concrete bridge abutment. During this period of time he was off the road and on the shoulder for an extended distance.

The three point restraint systems had been removed from the vehicle, however, the latch assemblies were still in place. The pretensioner system that was installed with the vehicle had deployed in the collision. The supplemental restraint systems did not deploy for either the driver or the right front passenger.

Examination of the three point belts was possible after the initial vehicle inspection. Both systems were found to have been worn in the collision and to have performed appropriately during the collision from a mechanical standpoint.

There are only sparse medical records available for [redacted] The coroner's report indicates that he died as the result of blunt head and chest injuries, however, no postmortem examination was performed. He was noted to be without a pulse and not breathing by the emergency rescue workers at the scene. There is no indication that any individual witnessed the collision nor that anyone observed any indication that [redacted] was alive immediately post accident or that he was alive immediately prior to the collision.

[redacted] sustained a number of serious injuries in the collision. She was found to have lacerations of the forehead, lip, nose and right thumb as well as fractures of the left tibula and fibula, the left acetabulum with dislocation of the femoral head, the left foot, the left illiac crest of the pelvis, the right thumb and the nasal bone at the bridge of the nose. She has had an extensive and prolonged recovery.

In addition to my review of the file materials provided, I have also analyzed the collision data collected and maintained by the National Highway Traffic Safety Administration, NHTSA, of the U.S.Department of Transportation. The data are collected and made available for analysis as a part of the Crashworthiness Data System, CDS, of the National Automotive Sampling System, NASS, database. I have appended two printouts created from data that are a part of the NASS data. The first chart illustrates the cumulative distribution of 36,014 frontal collisions, in terms of the Delta V of the collision, for those collisions wherein the Principal Direction of Force was 11,12 or 1 o'clock. The data helps to place the violence of the Schaeffer accident in the context of the collisions investigated by NHTSA.

The second chart shows the distribution of frontal collisions where either a driver or a right front seated passenger were wearing their three point restraint systems, a supplemental restraint system deployed and the occupants sustained fatal injuries. The data are consistent with the data cited by Steven Hayne in his report where he reported an 11% reduction in fatalities with deployment of the supplemental restraint system.

Based the materials reviewed, my inspection of the accident vehicle and restraint systems, my analysis and review of the NASS database as well as my background, experience and research in Biomechanics, occupant kinematics, crashworthiness and motor vehicle accident database analysis, I have reached the following conclusions.

1- The collision in question was caused by the failure of [redacted] to maintain proper control of his vehicle, allowing it to cross the Natchez Trace Parkway and strike the bridge abutment.

2- The cause of death of [redacted] has not been determined to any degree of scientific certainty at this time. The conclusion of the coroner does not appear to consider the very real possiblity that [redacted] had a medical emergency that caused not only the collision, but also his death. Motor vehicle fatalities that are the result of a disease rather than trauma are uncommon but not unknown and are documented in the scientific literature and accident databases.

3- The severe orthopedic injuries sustained by [redacted] were the result of the violence of the collision, particularly for occupants in her age group, and were not related to the absence of the supplemental restraint system.

4- Supplemental restraint systems when combined with a three point restraint system represent the best available occupant protection that we have at this time. They do not ,however, guarantee that no serious injuries or death will occur particularly with motor vehicle occupants when they are involved in collisions that are a violent as the one that forms the basis of this litigation.

5- The collision between the [redacted] vehicle and the bridge abutment, as shown by the NASS data, was more violent that 98.9 percent of all of the frontal collisions investigated by the U.S.Department of Transportation.

6- The NASS data also show that in those collisions wherein an occupant in an outboard front seat position was restrained by a three point restraint system with a supplemental restraint system that deployed and received fatal injuries, that 88.9 percent of those occupants were involved in collisions with a Delta V less than that experienced by the Schaeffer vehicle.

I am being compensated for my time at my normal hourly rate of $400/hour. To date I have received payment in the amount of $12,500. I have appended to this report a copy of my current Professional Biography and a list of those matters in which I have given testimony in the past four years. Should additional information become available that substantially modifies my opinions, I will provide a supplement to this report.

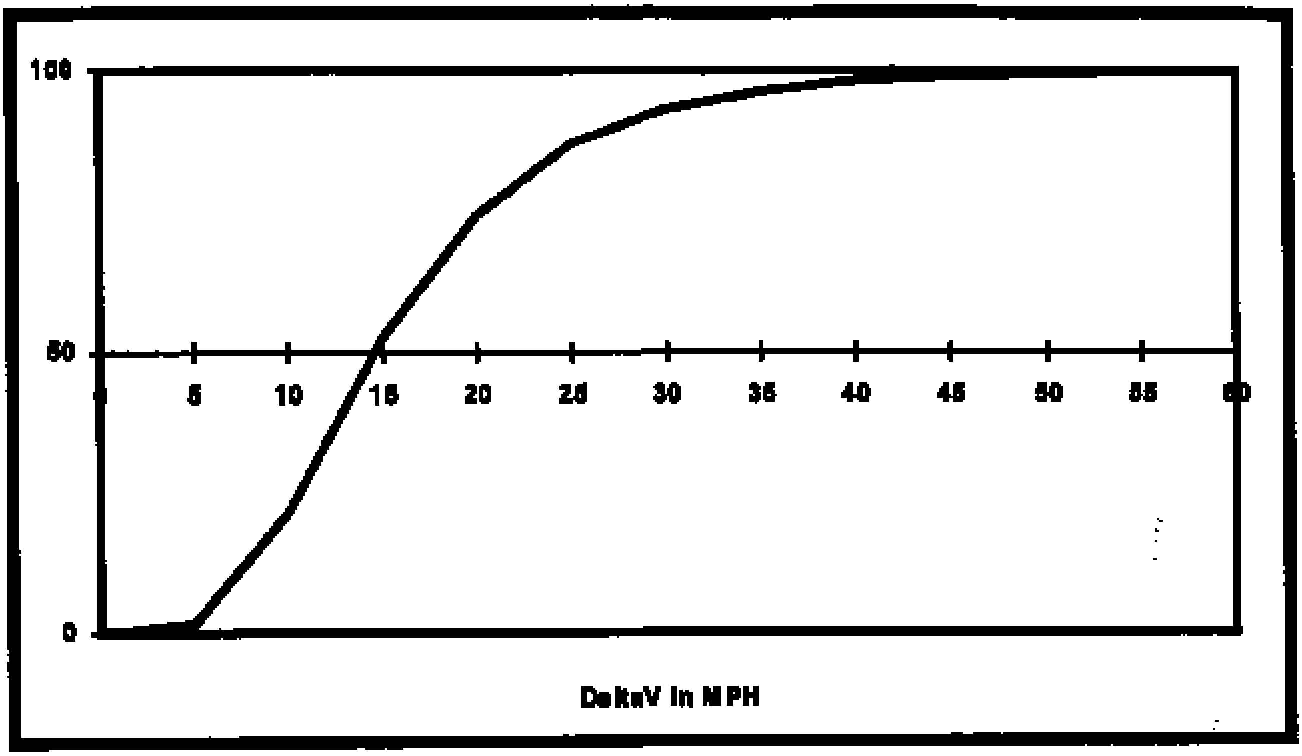
Sincerely,

Verne L. Roberts

Verne L. Roberts, Ph.D.

[redacted] V. FORD

Direction of Force, Horiz.



36014 Vehicle records. Plot #1: In List 1 O'Clock, 11 O'Clock, 12 O'Clock.

NASS Planar (since 1981) Database

Delta-V MPH	Count	Plot #1 Cum	Percent	Remain
0 DeltaV	0	0	0.0	0
0-5	621	621	1.7	767
6-10	7117	7738	21.5	5471
11-15	11238	18976	52.7	6703
16-20	7769	26745	74.3	3698
21-25	4624	31369	87.1	1863
26-30	2185	33554	93.2	768
31-35	1145	34699	96.3	366
36-40	624	35323	98.1	169
41-45	300	35623	98.9	88
45-50	175	35798	99.4	32
51-55	108	35906	99.7	27
55+	108	36014	100.0	0

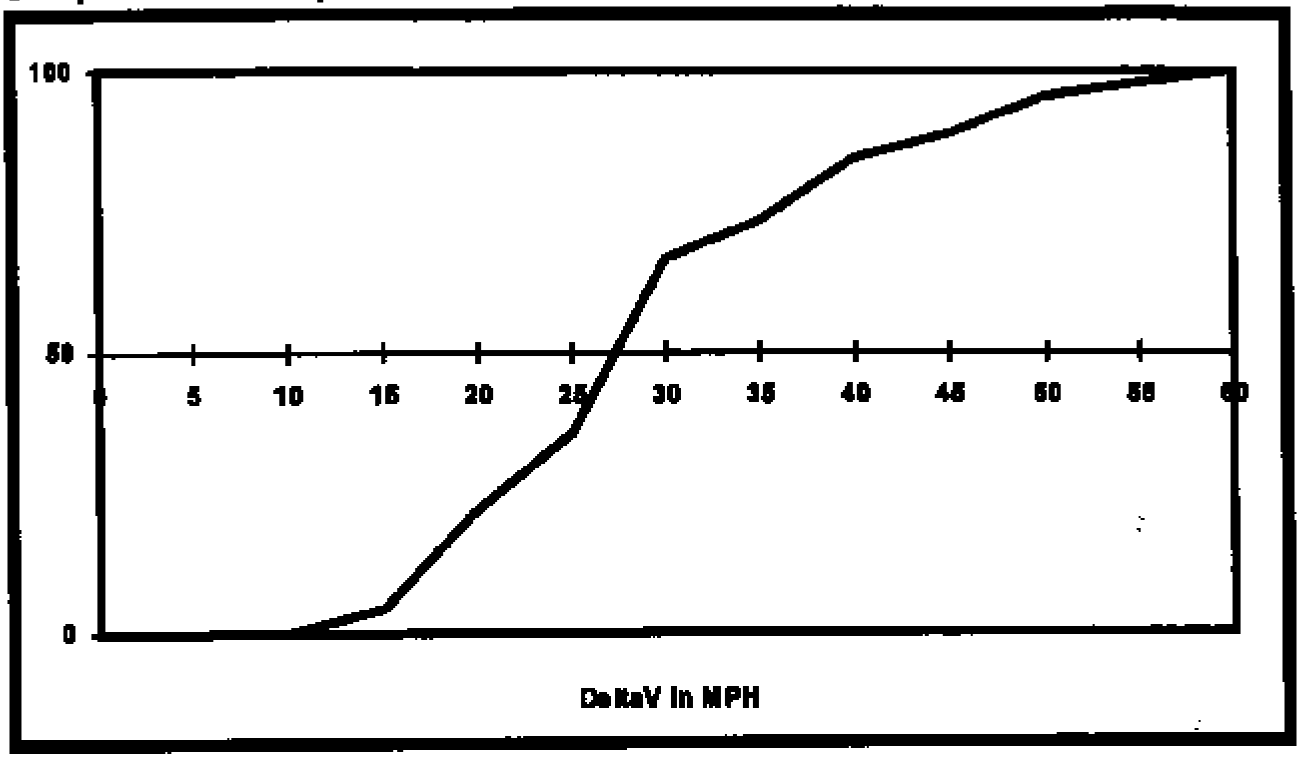
All cases in the database were tallied.

06/05/2002

ΔV®

[redacted] V. FORD

Seat position of occupant



45 Occupant records. Plot #1: In List Front left, Front right.

NASS Planar (since 1981) Database

Delta-V MPH	Count	Plot #1 Cum	Percent	Remain
0 DeltaV	0	0	0.0	0
0-5	0	0	0.0	0
6-10	0	0	0.0	0
11-15	2	2	4.4	0
16-20	8	10	22.2	0
21-25	6	16	35.6	0
26-30	14	30	66.7	0
31-35	3	33	73.3	0
36-40	5	38	84.4	0
41-45	2	40	88.9	0
46-50	3	43	95.6	0
51-55	1	44	97.8	0
55+	1	45	100.0	0

Case selection criteria:

INLIST(DIRECTION,11,12,1) AND ACTIVEUSE = 3 AND PASSIVUSE = 3 AND TREATMENT = 1

06/05/2002

ΔV®

Depositions and Trials – T Denotes Trial; 'D' Denotes depo

1998

[redacted]. Ford, State Court, Detroit, MI D
[redacted] v. Ford, State Court, Tuscumbia, AL D
[redacted] v. Nissan, State Court, New Orleans, LA T
[redacted] v. Ford, State Court, Philadelphia, PA D T
[redacted] Porche, Federal Court, Harford, CT T
[redacted] Ford, Federal Court, Toledo, OH T
[redacted] v. Isuzu, State Court, Raleigh, NC D T
[redacted] v. Makita, Federal Court, Aberdeen, MS D
[redacted]. Ford, Federal Court, Miami, FL D
[redacted] v. Ford, State Court, Charleston, SC D
[redacted] v. Ford, State Court, Detroit, MI D
[redacted] Pride Health Care, State Court, Kansas City, MO
[redacted] v. Hodgson Concrete et al, State Court,
[redacted] AL D
[redacted] v. Ford, State Court, Rutledge, TN D T

1999

[redacted] v. Mazak, State Court, Atlanta, GA D
[redacted] v. Ford, State Court, New Roads, LA D T
North Carolina v. Lowes Foods, State Administrative Hearing, Charlotte, NC T
[redacted] v. Volvo, Federal Court, Cleveland, OH D T
[redacted] v. Ford, State Court, Pinellas County, FL D T
[redacted] v. Toyota, State Court, Owen County, KY D
[redacted] v. Ford, State Court, Lancaster, PA T
[redacted]. Ontario Sewing Machine Co., State Court,
[redacted] County, GA D T
[redacted]. Ford, State Court, South Bend, IN D T
[redacted] Toyota, Kershaw County, SC D
[redacted] Ford, Lake County, OH D T
[redacted] v. North American Van Line, Angelinas County, TX D T
[redacted]. Volkswagon, State Court, Bergen County, NJ D
[redacted] v. American Augers, State Court, Tuscaloosa County, AL D
[redacted]. Nissan, State Court, Franklin County, KY D T
[redacted] v. Chrysler, Federal Court, Cleveland, OH D T
[redacted]. Nissan, State Court, St. Lucie County, FL D
[redacted] v. Ford, State Court, Mobile County, AL D
[redacted]. Chrysler, State Court, State Court, Huntington, WV
[redacted]. Glock, State Court, Birmingham, AL D
[redacted] v. Mazda, Federal Court, Bowling Gree KY D

2000

[redacted] v. Ford, State Court, Wayne County, MI D T
[redacted] v. Nissan, Federal Court, Jackson, MS D
[redacted] v. Toyota, State Court, Louisville, KY D T
[redacted]. Ford, State Court, Bullock County, AL D
[redacted]. Ford, State Court, Jefferson County, WI D T
[redacted] v. Advance Mixer, Federal Court, Long Island, NY T
[redacted] v. Ford, Federal Court, Atlanta, GA D T
[redacted] Ford, State Court, Wayne County, IN D
[redacted] Ford, State Court, Oranjge County, FL D
[redacted] v. Ford, State Court, Dallas County, TX D
[redacted] Polaris, State Court, Crookston, MN D
[redacted]. Ford, State Court, Philadelphia,PA D T
[redacted] v. NUMMI, Federal Court, Opelika, AL D T
[redacted]. Ford, State Court, Fairfax County, VA D T
[redacted] v. Nissan, State Court, Bessemer, AL T
[redacted] v. Ford, State Court, Orange County, FL D

2001

[redacted]. Ford, State Court, Okaloosa County, FL D T
[redacted]. Isuzu, State Court, Jasper County, MS D
[redacted]. Volkswagon, State Court, Hinds County, MS D T
[redacted]. Ford, State Court, Queens, NY T
[redacted] Chrysler, State Court, Cleveland, OH D T
[redacted]. Mazda, State Court, Leflore County, MS D
[redacted] v. Boyd, State Court, Jefferson County, AL D T
[redacted]. Ford, State Court, Bibb County, AL D
[redacted]. Isuzu, Federal Court, San Juan Puerto RicoT
[redacted]. Ford, State Court, Palm Beach County, FL D, T(02)
[redacted] v. Honda, State Court, New Iberia Parish, LA D
[redacted] v. Mazda, State Court, Oklibbeha County, MS D T

2002

[redacted]. Volvo, Federal Court, Memphis, TN D
[redacted]. Ford, State Court, Jefferson County, AL D
[redacted]. Chrysler, State Court, Cuyahoga County, OH DT
[redacted] v. Ford, State Court, Hidalgo County, TX D

EA03-018 0509

PROFESSIONAL BIOGRAPHY

VERNE L. ROBERTS

Birthplace and Date:

Kansas City, Missouri, August 11, 1939

Education:

B.S., Mechanical Engineering, University of Kansas, 1960
M.S., Mechanical Engineering, University of Illinois, 1961
Ph.D., Theoretical and Applied Mechanics, University of Illinois, 1964

P.E. Safety Engineer (CA. #1769)

Experience:

1997-Present	Verne L. Roberts, PhD, Inc.
1977-1997:	Director, Institute for Product Safety, 1410 Duke University Road, Durham, N.C. 27701
1974-1985:	Associate Staff, Transportation Safety Institute, U.S. Department of Transportation, Oklahoma City, Oklahoma.
1973-1982:	Adjunct Professor of Mechanical Engineering and Materials Science, Duke University, Durham, N.C.
1973-1976:	Director, National Driving Center, Research Triangle Park, N.C.
1968-1973:	Head, Biosciences Division, Highway Safety Research Institute, The University of Michigan, Ann Arbor, MI.
1966-1968:	Coordinator, Biomechanics Research, Highway Safety Research Institute, The University of Michigan, Ann Arbor, MI.
1966	Associate Professor, Department of Neurosurgery, Wayne State University, Detroit, MI.
1965-1966:	Associate Professor, Department of Engineering Mechanics, Wayne State University, Detroit, MI.
1964-1966:	Consultant in Biomechanics, Veteran's Administration Hospital, Deaborn, MI.
1964-1966:	Associate, Department of Urology, Wayne State University, Detroit, MI.
1963-1965:	Assistant Professor, Department of Engineering Mechanics, Wayne State University, Detroit, MI.

Membership in Honor Societies:
Sigma Xi, Pi Tau Sigma, Sigma Tau and Tau Beta Pi

Honors:
American Men of Science
A.S.T.M. Research Award, 1966
Award of Merit, Society for Technical Communication, 1977
Certificate of Commendation, American Society of Mechanical Engineers, 1974
Metropolitan Life Award of Merit for Research in Accident Prevention, 1970
Wayne State University Faculty Research Fellowship, 1965
Who's Who in the Midwest
Commendation from Brock Adams, Secretary, U.S. Department of Transportation as a Recognized Expert in Highway Safety, 1980
Who's Who in Technology Today

Membership in Technical Societies:
American Society for Mechanical Engineers
American Society for Safety Engineers
Systems Safety Society
American Society of Biomechanics
European Society of Biomechanics
Society of Automotive Engineers
Association for the Advancement of Automotive Medicine

Committee Memberships:
Chairman, Biomechanics and Human Factors Division, American Society of Mechanical Engineers
Committee on Biomechanics, Biomechanics and Human Factors Division, American Society of Mechanical Engineers
Planning Committee, First International Congress on Vehicle Mechanics
Crash Test Dummy Task Force, Society of Automotive Engineers
Human Simulation Test Devices Task Force, Society of Automotive Engineers
ANSI Committee Z90.1, Head Protection
ASTM Committee F-4 on Surgical Implant Materials
Chairman, 14th Stapp Car Crash Conference
Human Factors Committee, Society of Automotive Engineers
Canadian Standards Association Subcommittee on Child Seating Systems for Motor Vehicles
ASTM Committee F-8 on Protective Equipment for Sports
Chairman, Bioengineering Division, American Society of Mechanical Engineers
ANSI Committee Z89, Industrial Head Protection
ISO Committee on Human Exposure to Vibration
Chairman, Southeastern Conference on Safe Product Design and Failure Analysis
Member, General Committee, Design Engineering Division ASME
Member, Medical Devices and Sporting Equipment, Design Engineering Division ASME
ANSI Committee Z354.1, System Safety for Products Equipment, Facilities and Services

Verne L. Roberts

Editorial Affiliations:

Editor-in-Chief, Product Safety News
Editor-in-Chief, Journal of Products Liability
Editor-in-Chief, Journal of Biomechanics
Editorial Advisory Board, Journal of Bioengineering
Editorial Advisory Board, Journal of Biorheology
Editorial Advisory Board, Mechanics Research Communication

Patents:

U.S. #3,791,694--Child Safety Seat
U.S. #3,954,280--Child Restraint Harness

Publications, Books:

Byars, E.G., Contini, Renato and Roberts, V.L.: Biomechanics Monograph, American Society of Mechanical Engineers, 1967.

McElhaney, J.H., Roberts, V.L. and Hilyard, J.H.: Handbook of Human Tolerance, Japanese Automobile Research Institute, 1976.

Roberts, V.L.: Product Standards Index, Second Edition: Pergamon Press Ltd., 1977.

Roberts, V.L.: Machine Guarding, Institute for Product Safety, 1980.

Thomas, Elaine, Benton, C.E., Roberts, V.L.: Safe Chain Saw Design, Institute for Product Safety, 1983.

Verne L. Roberts

Publications, Articles and Reports:

Aston, R., and Roberts, V.L. "The Effect of Drugs on Vibration Tolerance." Arch Internationales de Pharmacodynamie et de Therapie, Vol. 155, No. 2, pp. 289-299, 1965.

Hopkins, W.F., Pierce, J.H. and Roberts, V.L. "Observations on Pressure and Flow Measurements in the Lower Urinary Tract." J. Urol., Vol. 94, pp. 479-482, 1965.

Roberts, V.L., and Terry, C.T. "Radiological Studies of Organ Displacement due to Impact." Proceedings of the 19th Annual Conference on Engineering in Medicine and Biology, November 1965.

Roberts, V.L., and Lissner, H.R. "A Correlation Between Cadaver and In Vivo Results," Eighth Stapp Car Crash Conference Proceedings, pp.134-146, 1966.

Lissner, H.R. and Roberts, V.L. "Evaluation of Skeletal Impact of Human Cadavers." Studies on the Anatomy and Function of Bone and Joints, pp.113-120, Springer-Verlag, Heidleburg, 1966.

Pierce, J.H., Martyn, F.E. and Roberts, V.L. "Lower Urinary Tract Resistance: Pressure-Flow Relationships." J.Urol., Vol. 94, pp. 671-673, 1965.

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Roberts, V.L. "Strain Gage Techniques in Biomechanics." Experimental Mechanics, Vol. 6, No. 3, pp. 19-22A, 1966.

Roberts, V.L., Moffat, R.C. and Berkas, E.M. "Blunt Trauma to the Thorax- Mechanism of Vascular Injuries." Proceedings of the Ninth Stapp Conference, pp. 3-12, 1966.

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Roberts, V.L., Hodgson, V.R., and Thomas, L.M. "Fluid Pressure Gradients Caused by Impact of the Human Skull." American Society of Mechanical Engineers, Paper No. 66-HUF-1, 1966.

Moffat, R.C., Roberts, V.L. and Berkas, E.M. "Blunt Trauma to the Thorax- Development of Pseudoaneurysms in the Dog." J. of Trauma, Vol. 6, No. 5, pp. 666-680, 1966.

Roberts, V.L. and Terry, C.T. "Review of Mathematical Models which Describe Human Response to Acceleration." American Society of MechanicalEngineers, Paper No. 66-WA/BHF-13, 1966.

Thomas, L.M., Roberts, V.L. and Gurdjian, E.S. "Biological Engineering - A New Discipline in the Life Sciences." Proceedings of the Symposium on Biomedical Engineering, Vol. 1, pp. 243-245, 1966.

Roberts, V.L. "The Bioengineering Program at Wayne State University." Proceedings of the Fourth Bioengineering Symposium, Rose Polytechnic Institute, Terre Haute, Indiana, October 17-18, 1966.

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Roberts, Verne L. and Melvin, John. "Mechanical Properties of the Skeletal System." Proc. International Conf. on Accident Pathology, pp. 107-113, 1968.

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Roberts, Verne L. "The History of Biomechanics", History of Structures Section, Institution of Structural Engineers,London, July 7, 1993.

Roberts, Verne L. "The Role of the Change in Velocity in Motor Vehicle Injury Production", Iowa Association of County Medical Examiners, Des Moines, November 7, 1997.

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June 5, 2002

Mr. Bradley W. Smith
BAKER, DONELSON, BEARMAN & CALDWELL
4268 I-55 North
Meadowbrook Office Park
Jackson, Mississippi 39211

Re: [redacted] v. Ford Motor Company

Dear Mr. Smith:

At your request, I have investigated the crash involving a 2000 Ford Taurus that led to the referenced lawsuit. As part of my investigation to reach preliminary conclusions and opinions, I have analyzed the Complaint, various interrogatories, Alabama State Trooper's Accident Report and scene photographs, various scene photographs taken by Chris Walker, reports by Wayne K. Ross, Thomas E. Kuechler, and Dudley T. Zinke, vehicle specifications for a 2000 Ford Taurus, and crash test report number 99124-1 for a 2000 Ford Taurus conducted by TRC.

In addition, I inspected the crash-involved 2000 Ford Taurus on April 16, 2002. I have also inspected the safety belts which were removed from the vehicle and were not available for inspection in April.

I have not inspected the scene of the crash. I plan to complete that inspection in the near future.

Based on my investigation to date, I have reached the following preliminary conclusions and opinions:

1) This crash occurred on the Natchez Trace Parkway near Sheffield, Alabama, on April 20, 2000. According to the Trooper's report, [redacted] was driving a 2000 Ford Taurus when it crossed the opposing lane of traffic at highway speed and struck the NE bridge abutment head-on. At the time of the crash, [redacted] was the right-front passenger. The report also states that both [redacted] were wearing

[redacted]

their safety belts and the driver and passenger-side air bags did not deploy. The Trooper did not find any tire skid marks prior to impact which would indicate that [redacted] did not apply the brakes. The speed limit on this roadway is 50 miles per hour.

2) Using standard crash reconstruction techniques, I have determined that the change in velocity, or Delta-V, experienced by the Ford Taurus as it collided with the end of the bridge abutment was approximately 43 miles per hour. Delta-V is a measure of crash severity. As a comparison, the National Highway Traffic Safety Administration conducts crash tests of vehicles into immovable barriers at a speed of 30 miles per hour as part of their compliance requirements. This crash, with its Delta-V of approximately 43 miles per hour, would represent a crash that is approximately 99 percent more severe than a 30 mile per hour barrier impact. Analysis of the crash scene photographs confirm that the Ford Taurus traveled some distance in a relatively straight path with its left-side tires off the roadway prior to impact with the bridge abutment. Following impact with the abutment, the Taurus rotated clockwise coming to rest approximately 10 feet from the abutment. This was a very violent crash which posed a risk of significant injury to the occupants regardless of restraint system design or use.

3) I inspected the safety belt components and found that both safety belt restraints exhibited load marks on the webbing, D-ring, and latch plate consistent with use during the crash and consistent with proper lock-up. It is my opinion that both occupants were using the safety belt restraints at the time of the crash and that both safety belts locked properly to provide restraining forces to the occupants.

4) I inspected the steering system, front suspension, and rear suspension components of the crash-involved Ford Taurus and found them to be properly installed and in proper working order except for those components damaged during the crash. It is my opinion that a malfunction of these components did not cause the vehicle to lose directional control and did not cause the vehicle to cross the oncoming lane of traffic, exit the roadway, and collide with the bridge abutment.

In summary, it is my opinion that this crash was caused by the failure of [redacted] to control the path of his vehicle and to allow it to cross the oncoming lane of traffic and collide with a bridge abutment. Based on the Trooper's report and the scene photographs, there was no attempt by [redacted] to avoid striking the bridge abutment which would lead to the conclusion that he likely fell asleep, suffered some type of some medical problem, or was inattentive. This was a very violent crash that would pose a significant risk of severe injury or death to its occupants.

Included as Attachment 1 to this report is my current Curriculum Vitae. Attachment 2 is a listing of other cases in which I have testified either in deposition or at trial. Carr Engineering, Inc., of which I am an employee, is being compensated at the rate of $260 per hour for my time in study and testimony. I reserve the right to supplement this report based upon information or opinions that may become known as part of the discovery process.

Sincerely,

Gerald E. Corwin

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GERALD E. CORWIN

Specialized Professional Competence

- Design and evaluation of automotive crash protection systems, including driver and passenger air bag systems.
- Analysis of vehicle crashworthiness, including vehicle structure, fuel system integrity, occupant kinematics and passive restraint performance.
- Accident reconstruction and mechanical design analysis.
- Application of Federal Motor Vehicle Safety Standards to automobiles and MPVs.

Professional Qualifications

- Bachelor of Science (Automotive Engineering), Western Michigan University, 1980
- Graduate Engineer,
  Carr Engineering, Inc.- 1990 to Present
- Specialist - Vehicle Safety Programs,
  Chrysler Corporation - 1988-1990
  (Vehicle engineering to meet safety standards.)
- Senior Engineer - Business Group,
  Chrysler Corporation - 1985-1988
  (Product quality engineering.)
- Design Engineer - Impact Test and Development,
  Chrysler Corporation - 1984-1985
  (Crash testing to assure compliance to safety standards.)
- Design Engineer,
  Ford Motor Company - 1973-1984
  (Design, testing and manufacture of motor vehicles.)
- Member, Society of Automotive Engineers

04/04/00

ATTACHMENT 2

DEPOSITION TESTIMONY

OF

GERALD E. CORWIN

Peterson (Kenneth) v. Ford Eastern Dist., LA	96-1902	06/19/98
Daniels, J. Dennis v. Chrysler Tarrant Co., TX	352-169403-97	07/17/98
Gillespie, Jacqueline v. Morton International Waller Co., TX	94-08 13,164	07/20/98
Garcia (Lynni) v. Pool Energy Services, Inc. Brooks Co., TX	97-03-07679-CV	08/24/98
Mack (Abe) v. Suzuki Brazoria Co., TX	95-C-1509	10/08/98
Cruze (Margret) v. Ford Grainger Co., TN	6764	10/19/98
Rodriguez (Luis) v. Midwest Industries, Inc. Travis Co., TX	97-12648	12/16/98
Hart (Cecilia) v. Mazda Bexar Co., TX	97CI-15195	01/21/99
Hartshorn (Douglas) v. Chrysler Wood Co., WV	96-C-196	01/22/99
Castillo (Maria) v. Mazda U.S. Dist., Puerto Rico	97-2555 (RLA)	02/26/99
Hayes (Susan) v. Mazda Northern Div., MD	WMN97-4378	03/31/99 - Part 1
Hayes (Susan) v. Mazda Northern Div., MD	WMN97-4378	05/05/99 - Part 2
Cummings (Brian) v. Ford Central Dist., CA	98-8294 GHK (AJWx)	06/23/99

Robinson (Leslie) v. Dornier Dallas Co., TX	97-04629-G	04/06/00
Gutierrez (Irene) v. Isuzu Ventura, CA	CIV 171967	05/24/00
Pagan (Anthony) v. Ford Parish of Jefferson, LA	536-131	06/27/00
Gabriel (Theresa) v. Chrysler San Antonio, TX	1:98CV488RG	07/06/00
Elizondo (Angie Maria) v. Chrysler Houston, TX	00-E-21752	08/09/00
Judson (Danita) v. Nissan Dale Co., Alabama	CV-98-338	09/08/00
Vasquez (Victor Manuel) v. Hyundai Bexar Co., Texas	99-CI-14064	0912/00
Johnson (Brenda Holland) v. Ford Houston, TX	96-3877	9/20/00
Kedzuch (Cherryl M) v. Ford Cook Co., Illinois	97-L-012931	11/20/00
Holland (Precious) v. Hertz Hillsborough Co., Florida	99-1301	12/28/00
Ramirez (Charles) v. Isuzu Jefferson Co., Texas	D-160, 692	02/26/01
Dourado (Barbara) v. Ford Broward County, Florida	99-021429	03/19/01
Thibodeaux (Monica) v. Ford US District Court - Eastern District of Louisiana	00-0785	04/27/01
Bravo Santiago (Amaris Maria) v. Ford US District Court for the District of Puerto Rico	99-1823 (SC)	08/28/01
Bazer (Eleanor Haik Btie) v. Honda Motor Iberia Parish, Louisiana	889-74F	10/23/01

Garland (D'Arcy) v. BMW Harris County, Texas	2000-07904	01/04/02
Amell (Heather) v. Ford Houston, Texas	CV-98-08236	02/13/02 & 3/15/02
Lozano (Rachel) v. DaimlerChrysler, Houston, Texas		03//26/02

TRIAL TESTIMONY

OF

GERALD E. CORWIN

Misplay (Taylor) v. Isuzu Allegheny Co., PA	GD 93-17493	05/08/98
Bryant (Pamela) v. Mazda Jefferson Parish, LA	502-725	09/16/98
Garcia (Lynni) v. Pool Energy Services, Inc. Brooks Co., TX	97-03-07679-CV	10/15/98
Cruze (Margaret) v. Ford Grainger Co., TN	6764	11/20,23/98
Woodbury (Maria) v. LP&L St. John the Baptist Parish, LA	28174 Div "C" & 29048 Div "B"	12/22/98
Gillespie, Jacqueline v. Morton International Waller Co., TX	94-08 13,164	01/28,29/99
Hart (Cecilia) v. Mazda Bexar Co., TX	97CI-15195	03/25/99
Robin (Christi) v. Mazda Monroe, LA	CA97-0118	04/20/99
Cummings (Brian) v. Ford Central Dist., CA	98-8294 GHK (AJWx)	10/01/99
Ramos (Randy) v. Bay Jim Wells Co., TX	98-02-36425	01/14/00
Martin (Lessie) v. Ford Monroe, LA	42834	8/1/00
Gray (Robin) v. Ford		11/00/00
Dourado (Barbara) v. Ford Broward Co., Florida	99-021429	05/07/01

Kedzuch (Cherryl & Timothy) v. Ford Cook Co., Illinois	97-1-012931	05/24/01
Thibodeaux (Monica) v. Ford New Orleans, LA	88333	01/30/02
Tyson (Irene A. & Robert M.) v. Ford Jacksonville, FL		03/11/02

RAGAN RESEARCH CORPORATION
14080 [illegible] ROAD, LIVONIA, MICHIGAN 48150
734 [illegible] FAX 734 542-8887

June 6, 2002

J. Randolph Bibb, Jr., Esquire
Baker Donelson Bearman & Caldwell
Commerce Center, Suite 1000
211 Commerce Street
Nashville, Tennessee 37201

Re: [redacted] *vs Ford Motor Company*

Dear Mr. Bibb:

Per your request, I am providing expert opinions with respect to the design and performance of the 2000 Ford Taurus operated by John Schaeffer that was involved in a very serious head-on collision with a bridge abutment on April 20, 2001. All findings and opinions in this letter are expressed with a reasonable degree of scientific and engineering certainty.

Background

The 2000 Ford Taurus was being driven by [redacted] southbound on the Natchez Trace Parkway in Lauderdale County, Alabama. The vehicle crossed over the northbound lane and collided with a bridge abutment on the opposite side of the roadway. The right-front passenger seat was occupied by [redacted]. Both front seat occupants were using the three-point continuous loop restraint systems at the time of the collision. The vehicle was equipped with a driver and supplemental air bag restraint system, seat belt buckle pretensioners and seat belt energy management retractors. Both the driver's and passenger's air bag were dual-stage inflators designed to be activated by a forward electronic crash severity sensor and a personal safety system restraint control module.

In order to form my opinions with respect to the design and performance of the 2000 Ford Taurus occupant restraint system during this very severe frontal collision, I have reviewed the following information:

- Police report, dated April 23, 2000;
- Plaintiff's expert reports from Wayne Ross, D. Zinke and Thomas Kuechler;
- My vehicle inspection of the 2000 Ford Taurus on August 11, 2000;
- Federal Motor Vehicle Safety Standards 208, 209 and 210 for the 2000 Ford Taurus as well as compliance testing records;

[redacted]

- The 2000 Ford Taurus Owner's Guide;
- Ford Motor Company's responses to plaintiff's interrogatories and request for production;
- My experience and knowledge of passenger vehicle occupant protection systems during static and dynamic loading conditions.

Opinions

My opinions are based on a reasonable degree of scientific and engineering certainty, my knowledge, training and education. These opinions are as follows:

(1) The 2000 Ford Taurus front seat occupant restraint systems met and exceeded all applicable requirements of Federal Motor Vehicle Safety Standards 208, 209 and 210.

(2) The front seat occupant restraint systems in the 2000 Ford Taurus were reasonably safe and not defective in their design.

(3) This was very serious collision with a bridge abutment and serious injuries to vehicle occupants occur in this type of accident regardless of restraint system design.

If any additional information is provided during subsequent investigations and discovery, my opinions may be revised or supplemented to reflect this additional information.

My *curriculum vitae* and prior testimony is attached.

Sincerely,

Roger C Wagner, P.E.

Roger C. Wagner
Principal Engineer
Ragen Research Corporation

Attachments

RCW/db

Roger C. Wagner

Specialized Professional Competence

- Automotive engineering component and structural design
- Body structure, active and passive restraint systems, seating systems and interior occupant protection systems
- Dynamic and static testing involving vehicle crashworthiness and system performance
- Federal Motor Vehicle Safety Standards rule making and compliance process
- Design analysis and evaluation of body components and structures in laboratory or real world crash performance
- Safety analysis of vehicle structure and occupant protection systems

Education

- Bachelor of Science Mechanical Engineering – Detroit Institute of Technology, 1966
- Professional Development Engineering Degree – University of Michigan, 1980
- Registered Professional Engineer, State of Michigan, 1970

Continuing Education

Traffic Accident Reconstruction; Biomechanics and Human Tolerance; Passive Restraints; Head and Neck Injury Symposium; Rollover Cause and Prevention; Lower Limb Safety; Side Impact; Air Bag Design and Performance; Rescue and Extrication; Sensor Design for Air Bag Systems

Professional Experience

1962-1966	General Motors Corporation Project Engineer Body Structure Mechanisms and Body Systems Testing, Fisher Body Division	
1966	Chrysler Corporation Design Engineer, Design and Testing of Body Seating Systems	
1966-2001	Ford Motor Company	
	1966-1968	Design Engineer Advanced Body Structures Car Research design development of advanced structures and human factors evaluations
	1968-1970	Design Engineer Advanced Pre-program, Product development design and development of concept vehicles and systems
	1970-1973	Design Engineer, Body Safety Engineering Design and development of passive restraint systems

1973-1978	Senior Design Engineer, Advanced Body Engineering Design and development of advanced body safety, structural and lightweight systems and components
1978-1994	Design Analysis Engineer, Car Design Analysis Analysis of vehicles, systems and components
1994-2001	Design Analysis Engineer, Global Core Engineering Design Analysis Analysis of vehicles, systems and components

2002-Present Ragan Research Corporation
Principal Engineer

Memberships

Member, Society of Automotive Engineers (SAE)
Member, National Society of Professional Engineers (NSPE)
Member, Michigan Society of Professional Engineers – Fairlane Chapter (MSPE)

RCW Testimony Log.

8/26/98	McVey, Kelly	30,B,6 Deposition	Seat Belt/Seat
9/12/98	Newmam, Anna Belle	30,B,6 Deposition	Seat/Seat Belt
10/1/98	Wilder, Shelley	30,B,6 Deposition	Seat Belt
11/12/98	Ashby, Rex	30,B,6 Deposition	Seat Belt
11/16/98	Romo, Juan R.	30,B,6 Deposition	Roof Crush/Rollover
1/28/99	Rodriguez, Noemi	30,B,6 Deposition	Set Belt
1/28/99	Domingo, Erving C.	30,B,6 Deposition	Seat Belt
2/23/99	McVey, Kelly	Expert Deposition	Seat Belt
4/9/99	Waligora, Sandra M.	Expert Deposition	Seat Belt
4/27/99	Domingo, Erving C.	Expert Deposition	Seat Belt
5/11/99	Cerini, Lonna	Expert Deposition	Seat Belt
6/22/99	Cerini, Lonna	Expert Trial Testimony	Seat Belt
6/23/99	Cerini, Lonna	Expert Trial Testimony	Seat Belt
6/24/99	Cerini, Lonna	Expert Trial Testimony	Seat Belt
6/28/99	Cerini, Lonna	Expert Trial Testimony	Seat Belt
7/28/99	Garcia, Consuelo	30,B,6 Deposition	Air Bag
7/29/99	Garcia, Consuelo	30,B,6 Deposition	Air Bag
8/17/99	Sparks, Diana	30,B,6 Deposition	Seat Belt
8/24/99	Ashby, Rex	Expert Deposition	Seat Belt
9/28/99	Rollins, Harley	30,B,6 Deposition	Seat Belt/Seat
9/29/99	Rollins, Harley	30,B,6 Deposition	Seat Belt/Seat
10/13/99	McVey, Kelly	Expert Trial Testimony	Seat Belt
10/19/99	Newman, Anna Belle	Expert Deposition	Seat Belt
11/16/99	Wolfe, Judy	30,B,6 Deposition	Seat Belt/Seat
11/30/99	Story, L.F.	Expert Deposition	Seat Belt
12/21/99	Schweizer, Carlin	Expert Deposition	Seat Belt
1/6/00	Forbis, Jennifer Jean	30,B,6 Deposition	Seat Belt
1/28/00	Schweizer, Carlin	Expert Trial Testimony	Seat Belt
3/15/00	Ford, Kelly Lynn	30,B,6 Deposition	Seat Belt

E003-016 0035

RCW Testimony Log.

3/21/00	Sommer, Sharon	Expert Deposition	Air Bag
7/20/00	Shores, John Montroy	30,B,6 Deposition	Air Bag
7/26/00	White, David	30,B,6 Deposition	Air Bag
8/15/00	Wolfe, Judy	Expert Deposition	Seat Belt
8/21/00	Coughlin, April	30,B,6 Deposition	Seat Belt
9/26/00	Zamora, Magdalena	30,B,6 Deposition	Seat Belt
10/13/00	Rutherford, Carolyn F.	Expert Deposition	Air Bag
11/13/00	Hanebutt, Althea D.	30,B,6 Deposition	Seat Belt
11/16/00	Janson, Candy S.	30,B,6 Deposition	Seat Belt
11/16/00	Janson, Kyle	30,B,6 Deposition	Seat Belt
12/7/00	Fahey, Jonathan	Expert Deposition	Seat Belt
12/21/00	Coughlin, April	30,B,6 Deposition	Seat Belt
2/6/01	Dourado, Barbara	30,B,6 Deposition	Seat Belt
2/7/01	Quesada, Gerardo	30,B,6 Deposition	Seat Belt
2/14/01	Rafferty, Penny	30,B,6 Deposition	Seat Belt
2/16/01	Gibbins, Dawn Louise	Expert Deposition	Seat Belt
3/5/01	Savage, Michael	Factual Testimony	Seat Belt
3/20/01	Bradford, Melissa	30,B,6 Deposition	Seat Belt
6/4/01	Dourado, Barbara	Trial Testimony	Seat Belt
6/1/01	Rainford/Walker	30,B,6 Deposition	Seat Belt
6/26/01	Roland, Herman Charles	30,B,6 Deposition	Seat Belt
7/17/01	Zamora, Magdalena	Expert Deposition	Seat Belt
8/21/01	Kincaid, Terry	30,B,6 Deposition	Seat Belt
8/23/01	Lopez, William	30,B,6 Deposition	Air Bag
10/3/01	Havill, Georgiana A.	30,B,6 Deposition	Seat Belt
11/6/01	Vonderharr, Timothy	Expert Deposition	Seat Belt
11/13/01	Lynch Kenneth	30,B,6 Deposition	Seat Belt
1/4/02	Camara, Noele	Expert Deposition	Seat Belt
2/13/02	Rainford/Walker	Trial Testimony	Seat Belt

RCW Testimony Log.

2/26/02	Rainford/Walker	Trial Testimony	Seat Belt
3/13/02	Banks, Kimberly	30,B,6 Deposition	Seat Belt
3/25/02	Banks, Kimberly	30,B,6 Deposition	Seat Belt

ROBERT J. GRATZINGER, MS, MBA

CURRICULUM VITAE

EDUCATION: Master of Business Administration, December, 1989
University of Michigan, Ann Arbor, Michigan

Master of Science - Engineering Mechanics, May, 1973
Case-Western Reserve University, Cleveland, Ohio

Bachelor of Science - Mechanical Engineering, June, 1971
General Motors Institute, Flint, Michigan

EXPERIENCE

7/94 - Present GRATZINGER ENGINEERING & CONSULTING, INC. - Irvine, California
President; Principal Engineer

- Automotive safety consultant; engineering consultant on automotive design performance, particularly crashworthiness components and occupant protection. Expertise includes: airbags, passive and manual seat belts, body structures, interior components, occupant kinematics, biomechanics and injury mechanisms, accident reconstruction, and crash testing.

NISSAN

9/90 - 7/94 NISSAN NORTH AMERICA, INC. - Torrance, California
Corporate Manager; Engineering Analysis Department

7/88 - 9/90 NISSAN MOTOR CORPORATION IN U.S.A. - Carson, California
National Manager; Engineering Analysis Department

- Manage engineering activities related to analysis of Nissan field product performance.
- Corporate technical consultant on engineering design performance matters, particularly crashworthiness components. Also review technical and other corporate publications and provide engineering advice.

[redacted]

GENERAL MOTORS CORPORATION

3/83 - 7/88 **G.M. TECHNICAL CENTER - Warren, Michigan**
Staff Analysis Engineer; Engineering Analysis Department

- Corporate consultant on light truck structures, restraint systems and crashworthiness testing and product development.
- Field performance analysis of crashworthiness components.
- Designed and conducted numerous rollover tests, including portions of GM 'Malibu' series.

11/78 - 3/83 **G.M. PROVING GROUND - Milford, Michigan**
Senior Project Engineer; G.M. Engineering Staff

- Crash sensing 'Systems Manager' of corporate airbag development program (1978-1981).
- Developed numerous advanced concepts for crashworthiness testing and product development.
- Chairman and secretary of unrestrained occupant task force; consultant to steering system design coordination committee on design analysis for unrestrained occupants.
- Consultant on new vehicle and restraint system development: design guidelines, performance objectives (including biomechanical), test data analysis.
- Conducted over 1,000 full scale, sled and lab-component tests between 1973 and 1983.

5/76 - 11/78 **G.M. PROVING GROUND - Milford, Michigan**
Project Engineer; G.M. Automotive Safety Engineering Dept.

- Major contributor to GM responses to NHTSA proposals for crashworthiness FMVSS regulations

4/73 - 5/76 **G.M. PROVING GROUND; Milford, Michigan**
Test Engineer; G.M. Automotive Safety Engineering Dept.

- Conducted and developed Hyge sled, full scale crash, and component tests for evaluating crashworthiness components.

2/71 - 9/71 **G.M. PARTS DIVISION**
Junior Project Engineer

- Developed specifications for re-manufactured clutches and water pumps

CASE-WESTERN RESERVE UNIVERSITY

9/71 - 3/73 Research/Teaching Assistant; Department of Civil Engineering and Applied Mechanics.

- Research, testing and thesis on analysis of thermal buckling of thin, cylindrical steels
- Taught undergraduate Strength of Materials Lab

AWARDS AND HONORS

Beta Gamma Sigma - National Honorary Business Administration Fraternity, 1987
Sloan Foundation - Graduate Assistant Award, 1971

PROFESSIONAL AFFILIATIONS

American Management Association
American Society of Mechanical Engineers
Association for the Advancement of Automotive Medicine
Society of Automotive Engineers

CONTINUING EDUCATION

AMA - Improving Your Managerial Effectiveness, Newport Beach, CA., September 20 - 25, 1992.

NHTSA - Region IX, Occupant Protection Update, San Francisco, CA., June 30 - July 1, 1993.

AAAM - Biomechanics of Impact Trauma Seminar, San Antonio, TX., February 15-17, 1989, and Torrance, CA., March 30-31, 1992.

UM-TRI - Anatomy, Injuries and Biomechanics of the Vertebral Column, Ann Arbor, MI., May 18-19, 1994.

PUBLICATIONS AND PRESENTATIONS

Chairman: Passenger Vehicle Safety and Risk. Safety Engineering and Risk Analysis Division. American Society of Mechanical Engineers Winter Annual Meeting. New Orleans, LA. December 9, 1993.

Gratzinger, Robert J. - "GM Rollover Testing". Presentation at Accident Reconstruction Conference. Illinois Association of Technical Accident Investigators - Normal, Illinois, October, 1987.

Kicher, T.P., T.C. Esselman, and R.J. Gratzinger - Thermal Buckling of Stud Supported Liner Shells. 2nd International Conference on Structural Mechanics in Reactor Technology. Berlin, Germany, September 10-14, 1973.

EXPERT TESTIMONY LIST
ROBERT J. GRATZINGER
FOUR YEAR HISTORY

DATE	CASE	LOCATION	D/T
6/17/98	DEMAREE V. TOYOTA	COSTA MESA, CA	DEPO
6/26/98	STRANO V. GOODYEAR	LOS ANGELES, CA	TRIAL
8/7/98	HANOVER V. TOYOTA	TORRANCE, CA	DEPO
8/14/98	MCGEE V. NISSAN	SANTA ANA, CA	DEPO
8/21/98	DICKERSON V. MAZDA	COSTA MESA, CA	DEPO
9/16/98	THOMASSON V MAZDA	COSTA MESA, CA	DEPO
9/29/98	HORTON V. NISSAN	TORRENCE, CA	DEPO
10/14/98	DICKERSON V. STEWART	SUGAR LAND, TX	TRIAL
10/23/98	HOWARD V. ISUZU	TORRENCE, CA	DEPO
11/20/98	HALIM V MAZDA	IRVINE, CA	DEPO
12/10/98	HALIM V. MAZDA	SAN ANTONIO, TX	TRIAL
2/9/99	CYPHERS V. SUBARU	COSTA MESA, CA	DEPO
3/5/99	DENNEY V. NISSAN	TORRANCE, CA	DEPO
3/24/99	BRAVERMAN V. MAZDA	INGLEWOOD, CA	TRIAL
4/14/99	CLINGENPEEL V. TOYOTA	IRVINE, CA	DEPO
5/9/99	CLINGENPEEL V. TOYOTA	COSTA MESA, CA	DEPO
5/14/99	JERETINA V. NISSAN	COSTA MESA, CA	DEPO
5/27/99	TAYLOR V. FORD	BREA, CA	DEPO
6/4/99	JERETINA V. NISSAN	TROY, MI	DEPO
7/14/99	LEONARD V. SUBARU	SALT LAKE CITY, UT	DEPO
7/21/99	SCOTT V. NISSAN	TORRENCE, CA	DEPO
7/29/99	GARCIA V. ISUZU	SANTA MONICA, CA	DEPO
8/5/99	CLINGENPEEL V. TOYOTA	OKLAHOMA CITY, OK	TRIAL

8/10/99	GREGORY V. TOYOTA	COSTA MESA, CA	DEPO
8/13/99	TSUCHLARE V. MAZDA	IRVINE, CA	DEPO
8/16/99	CLINGENPEEL V. TOYOTA	OKLAHOMA CITY, OK	TRIAL
8/24/99	LOUAPRE V. TOYOTA	COSTA MESA, CA	DEPO
9/22/99	NIEMIEC V. VOLKSWAGEN	NEWARK, NJ	DEPO
9/28/99	HAN V. FORD	PASADENA, CA	DEPO
9/30/99	WORKMAN V. NISSAN	COSTA MESA, CA	DEPO
10/5/99	HARPER V. NISSAN	PHOENIX, AZ	DEPO
11/3/99	ZABOLI V. MAZDA	SANTA ANA, CA	DEPO
11/12/99	WALSTEAD V. NISSAN	COSTA MESA, CA	DEPO
12/14/99	MARTIN V. NISSAN	COSTA MESA, CA	DEPO
2/4/00	GASS V. NISSAN	TORRENCE, CA	DEPO
2/10/00	DEESE V. MAZDA	AUSTIN, CA	DEPO
3/17/00	WOODYARD V. NISSAN	COSTA MESA, CA	DEPO
3/22/00	GREGORY V. TOYOTA	LOUISVILLE, KY	TRIAL
4/13/00	GASS V. NISSAN	LOS ANGELES, CA	TRIAL
6/1/00	HOWARD V. ISUZU	WORCESTER, MA	TRIAL
6/14/00	CROSS V. NISSAN	COSTA MESA, CA	DEPO
7/19/00	NELSON V. FORD	COSTA MESA, CA	DEPO
8/15/00	WALSTEAD V. NISSAN	TYLER, TX	TRIAL
8/22/00	NELSON V. FORD	DENVER, CO	TRIAL
8/25/00	CHANDLER V. FORD	LOS ANGELES, CA	DEPO
8/30/00	JUDSON V. NISSAN	TORRANCE, CA	DEPO
9/1/00	ZABOLI V. MAZDA	SANTA ANA, CA	DEPO
9/7/00	WYATT V. NISSAN	COSTA MESA, CA	DEPO
11/17/00	MULERO V. MITSUBISHI	SAN ANTONIO, TX	DEPO
12/14/00	PALMER V. VOLKSWAGEN	COSTA MESA, CA	DEPO

2/8/01	SIEB V. VOLKSWAGEN	COSTA MESA, CA	DEPO
3/7/01	LOONEY V. MAZDA	COSTA MESA, CA	DEPO
3/9/01	GIBBINS V. FORD	SAN FRANCISCO, CA	DEPO
3/13/01	GRIFFIN V. KIA	COSTA MESA, CA	DEPO
3/23/01	PALMER V. VOLKSWAGEN	JACKSON, MS	TRIAL
3/27/01	ASKUE V. NISSAN	TORRANCE, CA	DEPO
5/2/01	LOONEY V. MAZDA	GREENVILLE, TN	TRIAL
5/18/01	TRAWICK V. NISSAN	COSTA MESA, CA	DEPO
6/8/01	ROWLEY V. FORD	SANTA MONICA, CA	DEPO
7/13/01	NGUYEN V. GM	NEWPORT BEACH, CA	DEPO
7/18/01	CLIBURN V. FORD	HUNTINGTON BEACH, CA	DEPO
7/20/01	LONG V. FORD	HUNTINGTON BEACH, CA	DEPO
8/23/01	KOENIG V. TOYOTA	IRVINE, CA	DEPO
9/26/01	BLACKMON V. FORD	HUNTINGTON BEACH, CA	DEPO
10/12/01	BAZER V. HONDA	LOS ANGELES, CA	DEPO
10/24/01	MORSE V. FORD	COSTA MESA, CA	DEPO
10/30/01	SCHLOSS V. GM	TORRANCE, CA	DEPO
11/12/01	VONDERHARR V. FORD	LOS ANGELES, CA	DEPO
11/29/01	DIMASO V. FORD	IRVINE, CA	DEPO
12/14/01	PHAM V. GM	COSTA MESA, CA	DEPO
1/23/02	AMELL V. FORD	IRVINE, CA	DEPO
1/25/02	CAMARA V. FORD	LOS ANGELES, CA	DEPO
2/7/02	RICCI V. VOLVO	TORRANCE, CA	DEPO
4/9/02	BROWN V. MAZDA	REDONDO BEACH, CA	DEPO
4/12/02	ZIEMER V. NISSAN	SHORT HILLS, NJ	DEPO
4/25/02	GIBSON V. NISSAN	DENVER, CO	DEPO

5/23/02	FORD V. FORD	PLYMOUTH, MA	TRIAL
5/30/02	BLAIR V. TOYOTA	COSTA MESA, CA	DEPO

IN THE UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF MISSISSIPPI
JACKSON DIVISION

[redacted]

Plaintiffs,

Case No.:

v.

3:01-CV403BN

FORD MOTOR COMPANY, BUDGET RENT-A-CAR SYSTEMS, INC., and TEAM FLEET SERVICE FINANCING CORPORATION,

Defendants.

______________________________________/

DEPOSITION OF ROGER C. WAGNER

Taken at 30559 Flynn Drive, Romulus, Michigan, on July 17, 2002, commencing at or about 11:05 a.m.

APPEARANCES:

Co-Counsel for the Plaintiffs:

MR. ROBERT L. WELLS
MR. JAY M. KILPATRICK
Young, Williams, Henderson & Fuselier
2000 AmSouth Plaza
Jackson, Mississippi 39201
601-948-6100

For the Defendants:

MR. JOHN RANDOLPH BIBB, JR.
Baker, Donelson, Bearman & Caldwell
Commerce Center
211 Commerce Street, Suite 1000
Nashville, Tennessee 37201
615-726-5600

REPORTED BY:
Dora L. Doletzky, CSR-6110
Certified Shorthand Reporter

I N D E X

Romulus, Michigan

July 17, 2002

At or about 11:05 a.m.

* * *

MR. WELLS: This is the Rule 30B6 deposition of Ford Motor Company taken pursuant to notice dated July 17, 2002.

I want to attach a copy as Exhibit 1, and I'll just mark it and you can put your label on it later. You got the notice so you can make sure we're all talking off the same page?

MR. BIBB: It looks to be the same one.

MR. WELLS: Okay.

MR. WAGNER: Okay.

(Wagner Deposition Exhibit No. 1 marked for identification)

ROGER C. WAGNER,

having first been duly sworn or affirmed, was examined and testified as follows:

EXAMINATION

BY MR. WELLS:

Q Okay. State your name please, sir.

A It's Roger, R-o-g-e-r, C, middle initial, Wagner, W-a-g-n-e-r.

Q Okay. And it is Mr. Wagner?

A Yes.

Q Okay. It's not Dr. Wagner?

A No, no Ph.D.

Q Okay. I just did not know that because I just looked at this part.

You understand you're here today to testify on behalf of Ford Motor Company in the litigation we're dealing with?

A Yes, sir.

Q Have you ever been a Rule 30B6 designee in a deposition before?

A Yes, sir.

Q Okay. Do you understand how that works?

A I think I do.

Q Okay. There is a notice that we've attached as Exhibit No. 1, and what it does is it has a series of categories that are numbered here. You are the person who is -- who has the information to testify as to the information that is under the control of Ford Motor Company with regard to these categories. And you're educated with regard to these categories?

A Yes, sir.

Q Okay. Tell me what you did to get ready for the deposition.

A I basically went back and determined what had been produced in the discovery process, and I attempted to review a good deal of the documents. I don't know whether there was

25 boxes or so of documents. There's quite a number. I didn't count them specifically, but there's an awful lot of information that's been produced as far as, you know, engineering documents. I think there were some other business kind of documents that were produced that I really didn't look at because that's not my background. I'm an engineer, and I look at technical information.

Q Okay. Are you a present employee of Ford Motor Company?

A No, sir. I retired from Ford on December 31st, 2001.

Q Okay. Have you gone in preparation for this deposition or as part of this litigation and talked to any employees at Ford Motor Company?

A I think I've had some conversations in the last few months with people, yes.

Q Tell me who.

A I had a brief conversation with Paul Bacina.

Q Okay. And who else?

A That's the only one that I recall.

Q Who is he?

A Paul Bacina, he was one of my co-workers that I worked with when I was at Ford, and he is currently still employed by Ford. He's an engineer.

Q What's his position other than just engineer?

A I think he's a design analysis engineer currently.

Q Okay. And is he in a department or section?

A He's part of the design analysis engineering department, and from time to time they change names of different groups within it, so I never memorized which name it was at the current time. I -- God knows what it could be, but I think it's interior -- vehicle interiors or something like that.
Q Does Mr. Bacina deal with seat belts and/or airbags?
A I think he has, yes.
Q Okay. Why did you talk with him versus somebody else?
A I was trying to recall what was the characteristics of some of the systems initially and refresh my memory with respect to what I remembered when I was looking at some of the documents.
Q Okay. And did he give you any information other than just refreshing your memory?
A That's about it. Actually, he wasn't really of any great help. I asked him questions and he didn't recall what I was talking about, because I think the fact when you start reading, you know, 25 boxes of documents and you call somebody up and say, well, what does this mean, they say I don't remember. Basically, I think that was the context of the conversation.
Q He didn't provide you any information; is that correct?
A Not anything meaningful.
Q Okay. So thus far what you've told me is you've reviewed the documents in discovery. You talked to Mr. Bacina. Have you

done anything else to prepare for this deposition?
A Well, I don't know whether -- I mean, at one point in time I inspected the vehicle, but, you know, that is as far as preparing for a deposition of this nature. It certainly wouldn't have a great deal -- I mean, it's general knowledge to have, but I did inspect the vehicle at one time.
Q Okay. Now, in this case you've also been designated as an expert. Today you're testifying as a corporate representative, but other than reviewing the documents produced in discovery, inspecting the vehicle and talking to Mr. Bacina, what have you done in this case?
MR. BIBB: With respect to preparing for the 30B6 or just in general in this case?
BY MR. WELLS, CONTINUING:
Q Any -- as an expert, as a witness, as a 30B6 designee, anything.
A Certainly, the things that -- I prepared to write an expert report, and preparing for that aspect were quite different than what the 30B6 preparation would be because that's more -- a 30B6, my understanding, is to review documents and look at the way things are engineered and tested and specifications and things of that nature that help design and manufacture and put into production products of certain types. That's a completely different kind of thing than looking at the kind of background information that you would

have to have in order to do an expert's report, because an expert's report you would have to form opinions and you would have to look at reports --

Q I understand all of that.

A -- generated by --

Q But since you're sitting here I need to know what you know and what your source of information is, and you have dual hats, but they are going to end up crossing over. So I just need to know with regard to both of these what have you done in this case? I've got your expert report right here. I understand what you say, but I want to know what you've gone and looked at, what you've done, what you've gathered that would be your source of knowledge right now. You looked at the documents produced in discovery --

A Let's go back to the beginning. I was asked to be part of an investigation of the vehicle before I think there was any litigation involved and be part of -- and help the NHSTA people, the special crash investigation team that was involved, early on and also try to provide any information from downloading the information that might have been stored in a module and try to understand what had occurred in this accident to some degree.

And that all took place, I believe, way before any litigation was involved in the case, because we had an interest, because, it being a new product, that -- we wanted to try to understand what had occurred and try to explain and see what we could do, if there was something that had to be corrected or whatever. I mean, that's the normal feedback process that engineering would do to -- anytime you put a new product out, you try to keep -- be apprised of what happens in the field, because things that occur in accidents in the field help you design and change products in the future. So that was part of what we were doing.

It's a function that we've had when I was employed by Ford in design analysis, was to look at real-world incidents and provide information back to the engineering community as to what was happening during crashes and other things that could occur while a consumer was using the product. Because that's a function that the engineering community doesn't necessarily have. They have specifications and they have testing and things that they do that have to conform to Federal Motor Vehicle Safely Standards and those kind of things, but that was the first part of it.

And then as it turned into litigation -- I don't recall when the suit was filed, but I think I was still employed by Ford -- some of the interrogatories and things started to -- requested information and that -- I assisted to supply some of that information before I retired. And more recently I was requested by Mr. Bibb to look at the documents and prepare for deposition and so forth.

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Q Okay. As far as this case, did you look at anything to -- any documents or photographs or anything before you actually went to Nashville and looked at the car?
A I don't recall having any photographs. I think what was provided to me by the NHSTA, National Highway Safety Transportation people -- Transportation Administration people -- that they provided me with the police report from the -- I'm trying to think of the name of the organization.
Q That's fine.
A Park patrol or something -- because it was actually written by some park rangers. I know I received -- I received a faxed copy of that, and beyond that I don't think there was much more than that prior to going to the Budget Rent-a-Car facility in Nashville.
Q Okay. Then you went to Nashville and you examined the car?
A Right.
Q Have you done it once or more than once?
A I've only examined the car once.
Q Okay. As a result of examining the car did you go and look at any publications or documents or anything of that nature?
A I probably did, but I don't recall. Usually when something like this would occur, then you start trying to look at shop manuals and procedures for, you know, obtaining information, how things were put together and things like that, but I don't recall specifically what I may or may not have done at

that time. I certainly had to acquire some kind of
information, but I don't recall what it was.
Q Did you go and look at any publications to get any
information from after your first --
A Let me understand what you mean by publication. You mean
like a shop manual?
Q Anything. Publications that are internal to Ford or external
to Ford or in the automotive industry or anything.
A I don't recall. Like I just told you, I don't recall
specifically what I looked at, but generally you would try to
understand what the system was doing and try to get some
background information on it. But I don't recall
specifically what I'd done.
Q Okay.
A Typically you would look at a shop manual, perhaps you would
look at some kind of -- shop manuals are pretty good because
they give you illustrations and they give you troubleshooting
kind of information to give you some preliminary information
if you're not totally familiar with all the details, because
there's so many different products, you can't memorize
everything anyway. I haven't been able to.
Q Did you keep a file of what you did in this case; notes,
anything?
A When I was at Ford I did, yes.
Q Okay. Subsequent to --

A When you say notes --

Q Do you have a file for your expert testimony and all the things you do as an expert?

A I do have a file for that, yes, sir.

Q And where is that kept?

A It's kept at my place of business.

Q Okay. And you've got some notes in there?

A When you say notes --

Q You made some notes somewhere. I make them. You make them. Everybody makes their notes. Do you have a notes file of some sort?

A Not necessarily. I had -- it's sometimes confusing. Some people write extensive notes. I usually just take photographs. I may at the time write down where I'm at, the date, things like that until I put together a photo book so that I can remember, you know, what was the date and so forth and things of that nature, but I don't tend to write extensive notes.

I know some people use tape recorders and -- I've never been in the habit of doing that because my photographs usually are extensive enough that I can understand -- if I look at them, I can review them and see what occurred.

Q Okay. When you looked at something in this case, did you generally make some -- did you make some notations somewhere or some evidence of what it is that you looked at?

A Not that I can recall.
Q Did you make photocopies of any articles or shop manuals or documents or anything that you put in your file?
A I probably did, because certainly I knew that -- at that time I had a copy of the police report that was sent to me by the special crash investigation people who I have known for a number of years, and I probably had some other information, but, again, I don't recall what I had in my Ford file. When I left Ford, I couldn't -- you know, it's Ford's file, so I can't take it.
Q Let me say where we're going. You looked at the car. You went back. You may have looked at some shop manuals. You don't know whether you did or not?
A Well, I think I did because we were talking about trying to obtain information from the restraint control module, and I would have probably tried to determine what was the procedure. I mean, that makes sense to me and I generally would do that. And I probably would have made inquiries with other people to try to understand what to do.
I know there was an issue that the -- special crash investigation people wanted to know how to understand how to measure the load limiting device and the seat belt retractors, and I don't think we -- when I was at Ford, we never resolved how to do that because I made inquiries to some of the suppliers, and it becomes -- it would be a

difficult thing without doing destructive tear down of the seat belts. And you'd have to have a protocol and so forth and agreements with you folks and others to make sure we had done it appropriately.

Q Well, I hear what you're saying. I hear you say that you probably would have done certain things because that would be the normal course. But in this case do you remember doing those things?

A I did make inquiries to some of the seat belt suppliers, and I remember calling TRW. And they told me -- no, that's not their product. It happened to be Allied Chemical which ended up being Breed Corporation seat belts, and because of some of the changes that were happening within Allied Chemical and Breed, I was not able to get any substantial answer from people because people were moving around on that issue.

So because of the destructive nature that would have taken place in order to look at the torsion bar and how much load limiting had occurred, I think we kind of put that on the back burner. I think I might have had a discussion with in-house counsel about that, and we decided not to do it. So I don't know what has transpired with that.

And I think there was some confusion about who the airbag manufacturer was, and, again, I think I contacted TRW, because TRW supplied us with a lot of those different components. But things were changing, and this particular

product had Autoliv, which is a foreign company that acquired
Morton, who used to produce airbags.
Q But what about manuals, do you recall actually looking at any
manuals in this case?
A You mean like owner's manuals?
Q Shop manuals, owner's manuals, design manuals; do you
remember looking at any documents?
A To be honest -- I'm only speculating -- I don't recall what I
looked at, and it was in my Ford file wherever that went when
I left.
Q Now, what do you mean a Ford file? You had a Ford file of
your investigation?
A No. I would have had documents that were part of the
Office of General Counsel's file on the case because these
things would either be claims or what they call if-come kind
of things. And somebody within the Office of General Counsel
provided me with information. Other parts of the company
would have provided me with information. So whatever was in
the Office of General Counsel's file, I may have copies of
it, you know, such as the police report. Somebody acquired a
police report --
Q Okay.
A -- so eventually -- I know initially I got a bad fax copy
that I could hardly read from the SCI people, and later on I
got an official copy that was more legible that you could

read through the Office of General Counsel.
Q So you were doing some of the investigating while you were still a Ford employee and then you've done some work on this case after being a Ford employee and retiring?
A That's correct.
Q The work that you did as a Ford employee, did it go into a file somewhere?
A Yes. It went into the Office of General Counsel's file.
Q Okay. What would be in that file?
A I don't know. You'd have to check that file. I mean --
Q Okay.
A -- I didn't keep the file. I supplied information to it. For example, when I went back and looked at interrogatory responses -- I think some of them came in -- were sent out in 2001. I seen dates of that.
Q Yeah.
A And since I was assigned this case -- I don't have any independent recollection of obtaining information, but it would have been in the course of business I would have said if there's certain documents, whether it was drawings or whatever, crash tests or something like that, in order to help the discovery people within the Office of General Counsel, I would have asked people to go out and acquire that information and then send it to them to provide it to local counsel and in turn provide it to people like yourself.

Q Gotcha. And some of it would have been when you went down to Nashville and what you did as far as looking at things or if you made any notes or subsequent to the litigation being filed if you helped in the discovery process, all that stuff that you did before you left Ford would ultimately have been gathered and shipped to the Office of General Counsel's file?
A That's correct.
Q Okay. The photographs you took at the investigation, were they also ultimately sent to that file?
A I believe they were, yes.
Q Any notes that you made would have gone into that file?
A They would have, yes.
Q Any pages from manuals or Ford documents that you thought pertinent to the issues in this case you would have sent to that file when you were still at Ford?
A If that was the case. Like I indicated, I don't recall specifically what the -- what they were.
Q Is it correct to say that everything you would have done before leaving Ford on this case would have been organized and put into the Office of General Counsel's file as you refer to it as?
A Yes, sir.
Q Okay. Now, would you have kept a separate file from the Office of General Counsel's file?
A Yes. I typically would have kept copies of the photographs

and other things that were the same material that was in the Office of General Counsel file in case somebody asked me a question or there was additional work to be done and so you didn't have to go and try to get it out of their file, because sometimes their files are stored in different locations, and you can't always get them back. If somebody calls you on the phone, it's been my practice to keep copies of photographs and things like that that if somebody was going to ask you a question, you had them to refer to rather than waiting two weeks to get them out of storage.

Q Gotcha. Those things that you kept separate from the Office of General Counsel's file, once you left Ford, where did they go?

A It's Ford's property. I left them at Ford. I don't know who has them.

Q Was there a file or a box that you kept them in?

A I had file cabinets with, you know, typical file folders with different case numbers on them, so somebody at Ford would have continued to work on that.

Q Did you have a file folder or something for this case?

A Yes.

Q And so there would have been -- let's call it the Schaeffer case.

A Right.

Q Would you have had a file folder or a box that would have had all your material for the Schaeffer case that you were keeping that were separate from the Office of General Counsel's file?

A That's correct. But I did not know it as the Schaeffer case.

Q Okay.

A In the beginning I think it was referred to as the Budget Rent-A-Car, and I think some of that changed after the litigation was filed, because it really came to us as a Budget Rent-A-Car, and we did not know that there was any litigation involved at that point.

Q And your file, you would just call it the Budget Rent-a-Car file?

A Initially. But then it was changed when it became -- I don't know whether it was filed as a claim and then a lawsuit, but sometimes cases come in as claims and then they're escalated to lawsuits, and I don't recall what occurred.

Q Okay. When you went down to examine the vehicle in Nashville, what was your purpose in going?

A To help the Department of Transportation people. They requested us because -- my recollection was that they had a contract to -- and I don't know who was funding the contract. I think -- you know, I never get into those details. I don't know whether Ford or the federal government was contracting them to investigate a number of these vehicles because it was one of the new advanced restraint systems that was in a massed-produced vehicle. Certainly other people had them and they were interested in them, but it certainly was one of the first advanced restraint systems that was mass produced, and the government was quite interested as to what its field performance was.

So when we were initially contacted, it came through the SCI people because they wanted our assistance because they didn't understand some of the issues in the product. Apparently they had investigated -- my recollection was they had investigated some other accidents and they had a lot of questions and they wanted some help.

Q That's a normal thing for Ford to do when the federal government got involved investigating the file?

A Sure. Through the years I've helped police agencies and federal government people and National Transportation Safety board people, people of that type. I think that's perhaps why I was asked to get involved, because I knew the people and I kind of knew what they wanted to have done. And I in the past in other cases have assisted them to try to determine causes of problems and things like that. So I had some knowledge of how they work and what they needed.

Q You were down in Nashville looking at the car, doing your thing, taking pictures. That was something you were doing in the ordinary course of business at Ford of assisting and dealing with the government agency and investigating the wreck of this car?

A That's correct.

Q At that point there hadn't been any lawsuit filed; is that correct?

A That's correct.

Q You weren't acting as a claims adjuster or anything like that; you were a Ford employee going down to look at a government investigation?

A That's right. We were helping the federal government with their investigation.

Q When is it that you opened up a claim file and started doing something because you were preparing for a lawsuit or something; was that later on?

A Oh, yeah, it was later on. I was trying to recall. I think that was -- I'd have to go back and look at some documents, but I believe the initial investigation was, like, in August of 2000, and sometime during 2001 I think the lawsuit might have been filed.

Q And up until the time the lawsuit was filed, were you just, for the things you were doing, dealing with it as though it was a government investigation and you all were trying to deal with the government and this accident failure -- potential failure?

A We were trying to assist them with providing them information.

Q Okay. And up until the lawsuit was filed, you really weren't prepared for litigation or anything; you were just working with the government in the ordinary course of Ford business?

A That's correct.

Q Now, prior to the lawsuit being filed, when you were doing this helping the government, did Ford make an effort to find out what information had been obtained by the RCM? That's where the information goes, isn't it?

A Right. I think initially we had -- you had perhaps -- I don't know whether you were involved with that. Somebody on the outside was hired to -- as an independent, and I don't know who they were working for, whether it was the rental car company or somebody else. Mr. Kuechler was involved. He's an accident reconstructionist. He's an ex-police officer, isn't he?

Q I don't know.

A That's my recollection.

But he was involved at that time, and any time there are third or fourth parties involved, I always try to be open and understand that, you know, there's certain evidence and you establish protocols of how to evaluate things.

And I think before we had left the Nashville Budget Rent-A-Car facility we had removed the RCM and the satellite sensor and boxed it up, and I think maybe parts of the seat belt too. I don't know whether we removed the retractors at that time or not. I'd have to look at the photographs.

But we boxed this stuff up and sealed the box, and I think we left it in the possession of whoever. I don't know. I think there was an attorney involved, and I don't know who he represented, but we left it in his possession. And we agreed to take the next step to go to Dearborn to our engineering facilities and attempt to download the information that may or may not have been in the RCM. And I think at that time we decided some date in September -- this was in August because people -- we looked at schedules, I recall, and everybody was busy and so forth. And we decided on a date in September.

And somehow there was some issue -- I think the government -- because the SCI people work and wear different hats and they report to different agencies, that there was some interest by the government to push -- pull it forward. And we did do it within, I think, about a month after the initial investigation.

Rich Lawrence came from Buffalo. He was an employee of Veridian who was part of the SCI crash investigation group, and he brought -- maybe they had possession, because now that we're discussing it, I think he did maintain the possession in a sealed box, because I learned that you sign your name across it on the tape and so forth so if there's any tampering and so forth -- and because it was a government investigation, they do have the authority by the federal government to take parts for additional evaluation. I think they keep these in their possession. Because he brought it to our facility in Dearborn, and we went through the opening of the box and setting up the instrumentation and downloading what was there. And there was not any useful data that we were able to extract from that.

Q Okay. How did you know it wasn't useful data?

A Because the data that we extracted from it -- you should be able to -- if there was useful data, you should be able to get an acceleration versus time, a crash pulse from the RCM, and we could not do that. And due to the circumstances of this severe collision or whatever, the data was lost. And --

Q Okay. We'll come back to that, but going back into what your file might have, does it have the results of that download in it, the one when you were at Ford, the general counsel file I guess you call it?

A Yes, it would have had that information in it --

Q Okay. The --

A -- even though it wasn't useful. We did -- once you obtain information, you keep it. And we provided copies to -- I think it was part of the -- the decision to provide information to the other parties. I don't recall. I'm sure of that, because Rich Lawrence was there and the government had asked for that information. He walked away with whatever we had and we kept a copy of the data.

Q Once you --

A And I would assume, also, just to make it clear, that we did not keep that module. He took it with him. So I don't know if you have possession of it today or what happened to it. But Mr. Lawrence, representing the United States Government, took that with him back to wherever.

Q Okay. Is it a correct generalization to say that all of your files that you have had related to this case would be in three locations; 1, information you sent into the file of the Office of General Counsel while you were still at Ford and doing the normal business investigations you were doing?

A Yes, sir.

Q 2, a separate file that you kept that you originally called the Budget Rent-A-Car file -- it got another name later -- so that you wouldn't have to go and look at duplicates that were in the Office of General Counsel's file?

A Right. It was just merely copies of what was part of the Office of General Counsel's file.

Q Yes, sir.

And then the third file would be any files that you had after you left Ford as an expert witness or as a consultant dealing with these matters?

A That's correct.

Q Had the litigation been filed by the time you left Ford?

A I believe that's the case. I did not recall until I started looking at some of the documents in the last month or so that it appears that it must have been filed someplace in 2001, but I didn't have a clear recollection. Because sometimes -- I always used to have 50 or 60 files, so some of them are more -- you know, they're more active at certain points in time. I didn't have a certain recollection, and somebody probably said, yes, this is now a file and it's escalated to a lawsuit and so forth.

Q Your file when you were at Ford dealing with this matter, did you send any correspondence you had to the Office of General Counsel file?

A Any correspondence?

Q Somebody writes you and says just to confirm we're going to be at the airport.

A Oh, yeah. I think there might have been some kind of a letter from Mr. Kuechler at one time, because I think he was verifying some dates that -- because I think he was interested -- I'm not sure whether he was from Pennsylvania or Florida. I think he had a couple addresses, and he was interested in coming to -- to the inspection. And that's why we talked about doing in it September.

When all the people got their calendars out and -- there was some date in September that I recall. I don't know what date it was, but it was pushed forward, and apparently he

agreed that as long as, you know, the federal government --
well, they had possession and they were controlling it
anyway, so I think he had a conflict in dates so he did not
come. He was invited.
Q But if you had any correspondence, a piece of paper that came
to you that involved this case or these matters, would a copy
or the original of it had gone into the Office of General
Counsel file?
A Yes.
Q What about E-mails, did you work off E-mails?
A I used E-mails, but I don't recall that there was
correspondence with E-mails.
Q If there had been any E-mails that had involved these matters
when you were at Ford, would they have been printed off and
put in the Office of General Counsel file?
A Yes, they would have. I know that there was an interest by
the automotive safety office because they were overseeing the
field investigations of these Taurus and Sable vehicles. So
they did want information. And it's possible that there were
E-mails back and forth to the automotive safety office
because they wanted to be kept informed of what was happening
with this investigation.
Q But printed copies of those E-mails would be in the Office of
General Counsel file?
A If there were hard copies generated. A lot of times E-mails

are just discarded after somebody says can you do dah-dah-dah.

Q And then you click.

Did you keep any type of electronic files involving the matters involved in this case?

A Not that I recall.

Q Would you have had any word processing documents? Some people do that. They'll keep it in word processing and may or may not print them off; notes, correspondence, E-mails, just all kinds of things.

A I generally have not done that. I don't recall anything of that nature.

Q Did you have a log of any sort that you would maintain, printed or electronic, of your activities?

A Let me understand. A log of -- you mean like a daily kind of thing?

Q Possibly. Or a periodic. You could be recording phone calls or actions or -- it could be a number of things. Claims people have that a lot of times. Lawyers do it. Accountants do it.

A I understand. I do it today because of being in a different position, but I don't think I did at that time. I relied upon the Office of General Counsel's file at that time, and whatever was there, I could share.

Q Did you have someone at Ford who was an attorney that you

would deal with? I assume Office of General Counsel would be their legal counsel?
A Yes. At that time I was dealing with an attorney who had -- I think he initially made the request that I get involved with this investigation.
Q Who was that?
A Jonas Saunders.
Q Is he still there?
A I don't under -- since I've left, a lot of things have changed with Ford because of economic issues. And my understanding is that Jonas Saunders is no longer with Ford, and he may still be doing Ford work, but he's not with Ford. That's my understanding. He may still be employed by Ford, but I've heard -- it's hearsay information -- but Jonas is no longer working for Ford.
Q So when you were doing all these things, dealing with the federal government and looking at this car, was he your contact at Ford to coordinate what you were doing?
A Yes.
Q Did you ultimately have a different contact after Jonas?
A It was always Jonas, because up until the time I retired from Ford Jonas was still in that position.
Q So why were you involved in this investigation with the federal government?
A I think it was just because that I've probably spent a great

deal of my life doing this kind of work, that I knew the people, and I think once you know people and they -- you have a rapport with them, it's a lot easier to work with them, so I think they asked me to become involved because I had done these things before on many occasions.

Q Had you done litigation before?

A Oh, yes. Yes.

Q Your day-to-day operations at Ford, what kind of work would you generally do? Were you a design engineer, a safety engineer? Were you mostly dealing with litigation and claims? Were you mostly dealing with the federal government? Just give me an idea the best you can.

A Certainly. You know, depending on what period of time you're talking about -- I was with Ford 35 years.

Q The last year or two.

A The last year or two, primarily most of my work was concerning legal issues, and, you know, usually when you say how much, if you want to talk about percentages, in my mind it was -- like, 70 or 80 percent of my time was involved with lawsuits or claims. And there was certainly other issues. You know, you have corporate issues as to whether you're doing community projects or whether you're doing -- one of the big things we used to do in design analysis was to provide feedback to the engineering community which had necessarily no relationship to litigation.

And this certainly in the beginning was one of those projects where it was nonlitigation. It was helping the government, also providing feedback to the engineering community. Because whether it's restraints or structures or whatever group within the company, they need some liaison with the real world because they don't know the context in the real world, and lots of things happen in the real world where consumers use products, and they need to know that information. And we were able to know how to do investigations, work with police agencies, work with insurance carriers or whatever to obtain that information.

Q And your job in these positions, was it mostly to gather information, understanding the engineering side, determine what the pertinent facts were so that you could help in the investigation, or were you more of a legal kind of person?

A No. I think it, you know, certainly went beyond what you just characterized, but that was basically to acquire information and also try to understand different aspects of design and performance and things of that issue -- issues that were involved with these different cases.

Q The expertise you were lending to this investigation was mostly from an engineering perspective; is that correct?

A Yes, sir.

Q Okay. Now, the attorney, what was his name again?

A Jonas Saunders, S-a-u-n-d-e-r-s.

Q And I apologize. I'm not very good with names.
A Jonas like the whale.
Q Okay. I have in my mind and I need you to correct me and I short circuit a few of these. Up until the lawsuit was filed, were you dealing with anybody other than Jonas Saunders at Ford regarding the matters in this case?
A Yes. I had indicated that I had conversations and provided information to people within the automotive safety office because the automotive safety office is sort of an interface with Ford Motor Company and the government. And once you get involved in something like this and the government is doing an investigation, they want to make sure that they understand that -- because the automotive safety office is a liaison between the regulatory branch of the government for rules and regulations -- and also try to make sure they have compliance issues resolved. It's basically a liaison between any governmental agency and the company.
Q Did you send them anything in writing, the automotive safety office; E-mails, letters, summaries, anything like that?
A I know when I obtained a good copy of the police report that I provide it to those folks, and -- and I probably gave them -- it was generally -- I don't recall specifically, but I probably gave them a set of photographs because they wanted to see what it was all about.
Q Did you tell them what you had found?

A I think I had conversations on the telephone that I remember.
Q Who was it that you talked to there?
A A fellow by the name of Joe Marsch, M-a-r-s-c-h -- Joe Marsch.
Q Did you talk to anybody else at the automotive safety office other than Joe?
A Not that I recall. I'm sure I did, because I think we were trying to understand what had happened in this system, and I noted there was a number of discussions about it. But principally I would have talked to Joe Marsch.
Q Do you recall anybody you spoke to at Ford Motor Company up until the time that you left Ford about the matters involved in this case other than Jonas Saunders and Joe Marsch?
A I remember having contacted a fellow by the name of JB Drummond who had design responsibility for the electronics portion of the airbag system.
Q What department was he in?
A He was, I believe, part of inflatable restraints engineering, but I could be wrong on that, because JB could have been in some kind of electrical group as well.
Q He had --
A But he -- he had the responsibility of, I believe, the design of the electronics as part of body engineering.
Q And that's the electronics for this car, this 2000 Taurus airbag system?

A Right. He had -- don't -- I should clarify that because there are different people that had different responsibilities.

You had what is the electronics division of Ford, which is now part of Visteon. He had the restraint, the control module plus the satellite sensor. He certainly had that responsibility.

You had a group that used to be called body engineering. Some of these organizations have changed and names have changed, but generically it was called body engineering. It had a systems level responsibility as to how did the seat belts work in conjunction with the steering wheel, the knee bolster, the instrument panel, the other -- all performance. So there was a group that was part of the restraints engineering that had a systems level responsibility, and there was another group that JB Drummond was part of that had to do with the electronics portion, the packaging, the wiring characteristics, how you get the feedback from the pretensioners to the readiness indicator to the RCM.

So you had different -- you had components people, like the Visteon people, other suppliers like the airbag suppliers. Autoliv was part of the team. It's sort of a team where you have different people that provide different information.

Q Gotcha.

A You had Allied Signal which eventually became Breed -- and I don't know when that occurred -- that had the seat belt responsibility. So you had these different team members working together to make the product come together.
Q We'll go into that a little bit in a minute.
But you talked to JB Drummond, you talked to Jonas Saunders, you talk to Joe Marsch about the matters involved in this case. Anybody else?
A Certainly because Paul Bacina was assisting me with some of these things, he was doing things under my direction.
Q Who is he?
A He was an engineer in the design analysis group that -- he had the ability to do some of the downloading with the software that was available.
Q Anybody else?
A I'm sure that there were other people, but I don't -- I work for a manager by the name of Rick Ruth, and I'm sure he asked questions about what we were doing, but I don't recall any specific conversation.
Q Okay. What I'm doing in my mind here is making a list of people who might have knowledge regarding the facts and circumstances in this case or how Ford analyzed it after it occurred, and what I've made on the list, of course, is yourself, Jonas Saunders, Joe Marsch, JB Drummond and Paul Bacina. Anybody else?

A There had to be others, but I can't -- you know, because there were meetings and so forth that discussed this at different points in time, there certainly were other people, but I don't recall who was there.
Q Each of these people if they prepared some written document or gathered some investigation materials looking at this, would they have then shipped that to the Office of General Counsel file?
A I don't know.
Q Potentially they might have a separate file that they kept notes or something like that?
A It's possible. It was simple for Jonas. He was part of the Office of General Counsel, so --
Q Yes. And hard for others because of where it was?
A Right.
Q Was the Office of General Counsel file located in Dearborn?
A Generally I would say that's true, but depending on the activity of the files, there are different places that they store information. So I think that's probably a correct assumption, that it would be in Dearborn.
Q Have you looked at the documents that have been produced in this case, the 20-something boxes?
A I have.
Q Who gathered those up?
A I don't know.

Q Do you know where they came from?
A I believe they came out of -- you know, I guess I shouldn't even speculate. I don't know where they came from, but generally there is what is called a passive restraint reading room where since passive restraints began back when I first became involved in the late '60s or early '70s that information has been kind of stored and collected, this massive document collection. And it would appear that -- that the documents that were in those 25 boxes, a good deal of them came from that type of collection. I have to make the assumption that they were trying to be -- whoever made the decision -- trying to be responsive to the Request for Production and the interrogatories that were requested.
Q Have you looked at any documents in this case that are not in the documents that have been produced in discovery?
A Yes. In preparing for my expert's report I requested information from Mr. Bibb and Brad --
MR. BIBB: Smith.
THE WITNESS: -- Smith. I can never remember his last name. It should be easy to remember. They provided me certain information in order to write the expert report.
BY MR. WELLS, CONTINUING:
Q Is that information in your file? Is that in your file at your office now?
A Yes.

Q And what was that information, if you recall?
A Oh, I'd have to go back and look at the report. It certainly was the vehicle inspection photographs, the police report. I don't know whether there's specifications and Federal Motor Vehicle Safety Standards. Those kinds of things usually are, but I guess you'd have to refer to that report to see what I relied upon.
Q Okay. What was your E-mail address when you were at Ford? Did you have one?
A I had several. In the beginning when they first implemented E-mail, they gave me an E-mail address, and I think it was r-w-a-g-n-e. There's certain character -- maybe there was a one after that, but something had happened and I lost that and I was demoted to r-w-a-g-n-e 10.
Q And what was it --
A I don't know whether I was promoted or demoted, but there must have been other R Wagners and some numeric number. I don't know whether it was a certain number of digits you had to have in order to have an E-mail address, and I ended up -- I never had the R on the end of my name.
Q So that's -- I've got a guy in New York who has me on his E-mail, and I get all the copies of his -- he's part of -- I won't tell you which one -- it's Enron or Arthur Anderson, and I'm getting all the litigation E-mails. Don't send them to me. You have to be careful about nines and tens and all.

A Of course --

Q Last year what was --

A Just to correct that, I didn't give you my complete -- I mean, it's got the at Ford dot com.

Q The last year that you were there, during the time that you were doing the matters in this case, what was your E-mail address?

A R-w-a-g-n-e 10 -- numeric 10 -- at Ford dot com.

Q Okay. Thank you.

A I just gave you part of the address.

Q I understand.

A And I just wanted to make sure you understood that.

Q Now, these documents that I've got 20-something boxes of have all got numbers on them.

A Bates stamped.

Q I'm not sure what it is, but I'll pull one out that's the accelerometer sensor review, grabbed it at random. AACG 2792, what is that?

A Those are bate stamp numbers. I think they generally call it a bates stamp because that's -- that's a device -- a device -- a bates stamp that you can change the numbers and forward them and so forth, and that's just a code that, I believe, as the reading room people acquire documents and file them, they have some system, and I don't know what it is, but it's kind of like they -- and I think it was one of the interrogatory answers that you wondered how -- it's certainly not a sequential number.

It's kind of -- when they got the documents, they put them in a sequence for that document, but the next one may totally be in some other random number. But some of these follow; some of them don't. Like, for example, these pages that you have, and you haven't made this an exhibit, say AACG 2792 and 93, 94, and they follow some sequence, but not necessarily true.

Q Do you understand the sequence at all?

A I do not.

Q What's the AACG stand for?

A I do not know what that is. The only thing I ever understood was it was some kind of random thing; as they came in, they gave them numbers.

Q If I take the -- I've got one notebook in my lap here of these documents, and if I started asking you what's AAGQ, what's AADV, AAHI, or anything of those, you couldn't tell me?

A No, sir.

Q We'll get to that a little more later then.

MR. BIBB: They don't relate to a source. They're just a random letter-number code that's assigned when the document is collected. It doesn't relate to a department it came from.

MR. WELLS: Well, it doesn't – what we're trying to figure out, and that's – I'll get more into it when we get to the designation – there is no organization of the documents we've got. We've got 20-something boxes. I've looked at it. I can't -- there are huge gaps. We'll have it go along. There will be a gap of two or three numbers. There will be a change of prefixes, and since they're on there, I think we're going to have the right to find out, well, what file did that document come from.

MR. BIBB: You can go to the reading room and see them all.

MR. WELLS: I'll take you up on your invitation. Accepted.

MR. BIBB: You're welcome to do that. In fact, that was made in the initial response -- in the initial disclosures.

MR. WELLS: We didn't pick that up I guess. We can do that?

MR. BIBB: But it is -- you know, they can make arrangements. They'll have to make a time for you to go and look at them because they don't keep it – it's not a library, okay? I mean, it's a room, but it's – that's where these materials are kept, organized by crash tests or engineering documents or whatever. It depends on the question asked as to what documents are responsive to that.

MR. WELLS: We can do that though? We can set that up?

MR. BIBB: We can make arrangements for you to go look at the reading room.

MR. WELLS: That would solve a lot of the confusion and problems. Thank you. We'll set that up.

MR. BIBB: Because as Mr. Wagner said, they've been collecting these documents, I don't know, 20 or 30 years, whenever they started doing passive restraint.

THE WITNESS: Some of these go way back.

MR. WELLS: That will save us a couple hours of questions regarding those numbers and whatever. We'll accept your invitation.

MR. BIBB: The numbers -- really the numbers and letters don't correspond to a source. They're just assigned when materials are collected.

BY MR. WELLS, CONTINUING:

Q Now, have you looked at the responses to interrogatories in this case?

A Yes, sir.

Q And in looking at all the documents produced in this case, did you go through the entire 22 boxes and look at that?

A I attempted to. I have to admit that because of the massive amount of material and the time, that I was looking for things that kind of made sense. I didn't review page -- I mean, it would have taken me a long time to read page by page. For example, at the crash test I was principally interested in what the tests were about. You know, if there was sensor information on it, I kind of looked at that, and I might have looked at some of the curves and so forth. But each crash test, some of those go for a hundred, 150 pages, and I was looking for certain information that would help me try to understand issues that I was looking for with respect to this system, because there were photographs of the vehicle, and you kind of leaf through those.

I mean, if you look at each page and spend -- I don't know how many pages are in 25 boxes, whether it's 500 or a thousand per box or whatever, you know, it's a lot of paper. And if you spend a minute on it, I probably wouldn't live long enough to read each one in detail.

MR. WELLS: Why don't we take a few-minutes break.

MR. BIBB: Okay.

(Recess taken)

BY MR. WELLS, CONTINUING:

Q Mr. Wagner, I want to know something about the organization of Ford in dealing with the design of airbags, and I'm almost afraid to ask because you were telling me how things were consistently changing. Can you give me some sort of break down, hierarchy of how an airbag system such as this is initially designed, what the departments are and then how it's decided to go into production and who is doing that sort of thing?

A I think I gave you some bits and pieces. People that -- like I said, the names have changed from time to time, but there was a group called body engineering which by the time we get into this time frame was in a transition to be called something else, and I don't know what they call themselves today. I think they call them vehicle centers, where they had small car, large car, trucks and things like that. But they were generally called body engineering, where they would have the responsibilities of basically the restraint system.

I mean, you have different groups. You have a structures group, because you have to deal with the stiffness or the crash pulse of the vehicle, so that's part of it.

Q Okay.

A You have people that are involved with computer-aided engineering that look at the rigidity of the vehicle so that when you put an airbag and restraint system in you tailor it to the crash pulse or the structure, the relative stiffness of it. And there are differences between small cars, trucks, body frame, unitized construction. There's many differences.

So you have to have a structured group that is part of the organization. That would be like the front-end structure and the occupant compartment and so forth.

Q Okay.

A I mean, even chassis components sometimes enter into crash pulse analysis, so you can't discount them, but they don't play the same role that the body structure people would.

Then you have -- obviously occupants have to have seats, so there are different people that do interior trim in seating that work with the seat cushion structure, the articulation of the seats, whether it's recliners or seat tracks, those issues. And they're all part of how to design an airbag system and tailor the occupant kinematics for that type of vehicle.

Then you would have instrument panel people that deal with certainly the gauges, radios, air conditioning, but more importantly with airbags. They deal with knee bolsters and energy absorption characteristics when the occupants would come in contact with them.

You have steering column -- steering wheel people for the driver's position, so they -- they have to look at the controls on the steering wheel, whether it's washer controls or horns and things of that nature, but it's principally the steering wheel, steering column.

Then you have the inflatable restraints people which would deal with the airbag modules and wiring and circuitry. And there would be subgroups within the restraints people that would deal with the active portion, the seat belts, whether it's the buckle, retractor, webbing, those issues.

And also within the restraints group you would have the electronics people. And I told you previously that within

Ford we used to have components -- groups. When we started the project for the 2000 Taurus, we actually had a group that was called the electronics engineering portion of Ford. It was called ELD, Electronics -- I probably won't get that right, but it was called ELD.

MR. BIBB: Lighting?

THE WITNESS: Yeah, Electronics Lighting Division. They took care of all those issues, and they had their own plants. Within Ford we used to have captive component divisions, whether it was a transmission, engine, but I believe in the late '90s they started the process of spinning off part of the company which ended up being called Visteon. And Visteon is now an independent company that's a supplier to Ford and other people that provides part of the airbag system just like I had indicated that Autoliv provided the airbag modules for the driver and the passenger.

The seat belts were provided by Allied Signal which later became Breed, and there were other people that provided wiring harnesses. There was slip rings in the steering column that -- different components that made up this system, the different suppliers.

So when you have a team effort to actually have certain suppliers actually physically sit and work with the Ford people in -- or maybe they don't sit in the same office, but they are part of the team, and they're within the same area that – they work together. They attend meetings and resolve problems together. So the engineering is done today – the suppliers are part of the team.

It used to be that they were isolated, and then they got to the point they manufactured it. We designed everything up to a point, but today they participate from the very beginning. That's generally how it happens.

But let me give you a little history lesson.

BY MR. WELLS, CONTINUING:

Q Okay.

A Stepping backwards, in order to do any of this work you have to have decisions made at a high level to finance this. You have to say, okay, for 2000 we are going to provide – you know, this is at a very high level because it costs millions of dollars to do that. We are going to design and test and manufacture a system for the 2000 Taurus that would have this level of airbag restraint system. And you would have to appropriate money to that and get people in with the technology to support that design.

And those things take place. You've probably seen that in some of the documents. It goes back into the mid, you know, '93, '94 time frame. Because I believe at one time they were targeting this for 1999 and for some reason it slipped to 2000. I mean, there's always -- you always have a goal, but quite frequently on very high-tech items it's very difficult to meet those objectives, and you have to develop this.

And certainly you don't want a system put out that you don't have confidence it's going to reduce the risk of injury in these accidents. So there's a lot of development, a lot of invention took place in order to get this product into production. So you had to have approval by finance people at the high level of the company who could do this, appropriate the money, and then get the various groups, whether it's body engineering, whether it's Visteon -- you've seen documents where it talks about Siemens, Bosch, Intel, Arrow Jet, General. I mean, I can't remember all the different documents that are in that collection, but you have to sort out the alternatives to try to understand what is the appropriate design that you believe can improve your product and provide the restraint system that you desire.

So you have to go through a number of -- as it turned out, I think it was a number of years of sorting out the alternatives to try to understand what is appropriate. And that's why you have this massive collection, and it's part of the thought process. Nobody sits down -- I mean, you could go backwards and write a book about it, but there's no clean script that would tell you how you went from Point A to Point B, C and so forth.

It's sort of like you have to look at it and have an understanding of how the products go into production and say, well, okay, they looked at Siemens, they looked at that and they finally made a decision at a point in time and said Visteon has the manufacturing capability, they have the engineering capability, and they can get it to us at a high reliable cost level.

So the same thing happened with the seat belts. There's various seat belt manufacturers, and you've probably seen different talk about whether you have retractor pretensioners, whether you have buckle pretentioners and even when you talk about -- I think there was -- they were initially trying to get proximity sensing devices because there's talk about infrared sensing. There's talking about sonar pre-sensing. And some of these things have pretty much blue-skied. We've been looking at them for a number of years. So you go back to the aerospace industry perhaps where you think there's a lot of technology and you see whether it's doable and you try to sort through that.

Q Is this one of these processes that we have in our firm; it's organized and it's kind of not organized at times?

A Organized chaos perhaps.

Q And it kind of comes together and then it centralizes and decisions get made and it gets adjusted over time until people get a comfort level that works?

A That's essentially it. I mean, you have to -- you have to look at research ideas, and perhaps you have to invent technology. That's where you get delays in the program. And one of the keys I think when you're talking about, you know, single-point electronic technology, is it doable, is it reliable. And we looked at other people's systems and decided that we needed a satellite sensor on this vehicle because we weren't satisfied with a true single-point sensor where you put in a box and -- I mean, it sounds like a good idea to have everything in one box, but if it doesn't meet your performance criteria, you have to do other things.

Q And I saw some of the documents on that. When you do all this, there's got to be a certain amount of organization that some central thinking had in the engineering side that kind of says, yeah, we're going to go off and work in this area and we're going to go off and work in this area and it all comes back somehow to the middle, doesn't it?

A Basically -- I think --

Q That wasn't a very good question.

A I think that's correct, but when you look through the documents, you'll see that there are certain periods of time as you're going through this invention and retesting and redesign and testing sequence that they have major meetings, and, like I had indicated, I believe we were targeting something prior to 2000 to put this on, but we didn't quite meet those goals.

So when you go through this process, you – you look at it and you say are there open issues that we haven't resolved? What's the confidence level? You know, what's the risk benefit kind of thing? Those are the kind of questions that you have to flush up to higher management and say, look, we were targeting 1999 but we can't make it. We're going to put it into 2000, you know, or can you give me, you know, another $10 million? Perhaps I can meet those goals.

That's the kind of negotiation you go through. And, you know, some of those things are in those documents and some of those things I'm using as examples.

Q I gotcha. Now, were you involved in the development of this electronic sensing airbag system or is this something that you've learned from some other source?

A I did not have hands-on development, but because I have spent a great deal of my life involved with automotive safety, I've worked on some of the original airbag programs, hands-on design and so forth, so I had an interest in it.

And being part of Ford you go to meetings and you're apprised of technology advancements and, you know, what's the next level that you're going to get to, and I have worked on – you know, whether it was the Tempo airbag program or the Continental dual-bag program and understanding some of the sensing technology and things like that, I'm aware of what the technology is, but I did not have any hands-on design release responsibility if that's what your question was.

Q Yeah. Who is it that -- who are the people that were at Ford in the last year or two before this thing went into the 2000 Taurus that were kind of the decisionmakers -- the ultimate decisionmakers? Usually there's one or two people. Even at NASA, when they press the button for the space shuttle to go, there's a guy that says go.

A I think you'd have to go back and look at the document. Some of the reviews I know that depending on -- you'd have to go back and reconstruct historically the right organizational charts, but I know that there were vice presidents such as Lou Ross. I think there were some Lou Ross reviews. I think you seen at some points in time Nassar [phonetic] reviews when Jack Nassar was the CEO. I know there were documents like that, but I never commit to memory at -- you know, in September of 1997 who made that decision. I think that you'd have to go back and look at the documents.

I know there were a number of documents. I think Lou Ross was there and was the vice president for some period of time, and I know that Jack Nassar was there for a period of time. And I know there were high-level product reviews to make sure that they understood where the company was going with this technology.

Q Okay. Let's go back then and let's do the history a second.

Some of this I have been able to glean from the documents and some of it I have lots of question marks on it.

But as I understand it, we're dealing here with the 2000 Ford Taurus that was the first year that they had a new type airbag sensing system in it, is that correct, that was not previously in the '99 version?

A That is correct. I was having a little bit of a problem answering that question because electronic sensing systems were not new to us. Our first one was in the 1997 econoline, the production, and certainly through the years, you know, probably if you go back 20 years, we became interested when Mercedes had some primitive systems that Bosch made. And we looked at that those, and I don't know if it was the mid-80s, but certainly that was something that people were looking at, because electromechanical always has some limitations.

And when -- it's a matter of feedback. If you can do things purely electronically, when you're talking these little milliseconds to make decisions, electronics and telemetry and things like that, multiplexing, those kind of concepts certainly are product improvements over something that's like our previous design with ball-and-tube sensors where you had to take a mass and roll it in a tube and so forth. I think you understand those to some degree.

Q Okay. Well, what I want to do then is try to understand a little bit of the history as you have gleaned it from the documents and your experience of the develop of this type system that occurred in the 2000 Taurus. As you understand it, can you kind of walk me through the history of the development of that system in the 2000 Taurus?

A. Okay. Basically we were interested in electronic systems because they had the ability to provide feedback from different characteristics, whether it was buckle pretentioners, dual-stage inflation, just troubleshooting technology. Because an important part of airbags is to have a system that can sense and look at each component in the system, and if there is a problem, you want the ability for the restraint control modules, which it's called the brains of the system, to -- if you have a wiring problem, if you have a service problem, if the vehicle is improperly repaired, you want the system to disable -- be disabled and give you a fault code and seek service.

So part of the concept is to make sure you have a feedback of different controls within the system so that if you wanted to just have a firing of a pretensioner or if you wanted to have one stage of the dual-stage inflation -- primarily to look at the problems that we were aware of that we didn't know how to solve.

When initial airbags came out, we had some aggressive systems because we had to meet the federal criteria, which is a 50th percentile, male in a midseat position, as defined in

208. Then we were trying to look at some of the these concepts, and we had to get the federal government to agree with a different test procedure to depower the systems in order to look at principally smaller women and children that became identified as a problem because of the positioning to the airbag.

So the ultimate solution was to have a system that would have feedback controls to provide some degree of protection, reduce the risk of injuries in these accidents to a 50th percentile female, which is five foot tall, in that range, about a hundred pounds, and also six year olds.

The government started writing regulations taking three-year-olds and 18-month-old dummies and so forth -- and there's still development issues, as I understand it, with some of those dummies to get repeatable, reliable injury information. Plus, also the fact that hybrid-3 dummies were coming out where you could now accumulate neck loading and neck moments and stuff like that -- even though there's been 50 years of development in anthropomorphic dummies, they still are not human beings. So you use what's available and what you believe to be reliable and repeatable test devices to test these systems.

So during this evolution of changing the feedback systems, the dummies were also being evolved and the injury criteria was being established and fine tuned. So some of that still is -- you know, if you go to these conferences where there's a staff crash conference through AAA or other conferences, they talk about these on a continuing basis, and it's way too confusing to talk about here, but basically the interest was to have a system that was called a SMART airbag initially or the intelligent airbag that would -- if you had a child in an out-of-position situation, that you could either grossly depower or turn it off.

And that's why we were looking at infrared sensors at one point in time, to say, okay, if a person misuses the system -- even though we gave advice, even sometimes people put children in car seats in the front seat -- if you put them out of the zone, the airbag is probably not an issue, but if you have the seat in the zone where the airbag could cause injury to the child, then it becomes a major problem.

Or if you improperly restrain a child -- we used to call it the standing child, where even though there's been a lot of education, people -- I still see it today. I am appalled by it -- they drive around with children unrestrained. If you're on top of the airbag, because of the aggressive nature of it that you have to have to comply with the Federal Motor Vehicle Safety Standard 208, you have to have injury criteria for a 50th percentile male in a midseat position that's 167 pounds, five foot nine, you have to meet that criteria in order to sell the product. Then you have to be responsible and look at all these other situations to try to -- to have the best system to minimize the risk of injuries in these different types of accidents. So that was the idea.

Go to the next stage, having the feedback system. Do you need the pretensioners? Are the belts fastened? What's the position of the driver's seat? We were looking at weight sensors, which we didn't get in this particular product to try to understand what was on the passenger side. We looked at a lot of other things, as you probably seen in the documents, to try to sort out whether people were using child seats.

There's a lot of different technologies out there, but for 2000 we certainly weren't prepared to do that.

Q It was the thought over the years that you at Ford and other automobile manufacturers were learning some of the limitations of the electromechanical systems, and they were learning some limitations of their previous airbag systems and realizing they had to have an electronic system in order to incorporate all the information and all the options to make everything go just right?

A Right. It's the old Darwinism principle; once you get something out there and you start seeing what it does, you say I can make it better, but you didn't know how to make it better until you got that experience. So it's an evolutionary kind of process.

Now, sometimes people look at -- from the outside -- look at the industry and say, you could have invented that 40 years ago. Well, maybe you could have invented it, but you didn't know how to manufacture it or you didn't know how to do it at a reasonable price to put it in a product. The kind of products that Ford and General Motors sell are certainly not like some of the manufacturers that don't worry about costs or weight or whatever.

So, I mean, you have to be aware that even though somebody has an idea and it's -- I've always been impressed. You go back and look at patents, and some of those things are -- you know, the ideas are never new, but technology changes. And one of the things that was changing was the -- was the computing capacity. And I think if you go back and look at PCs, personal computers, and you say what did we have in 1990, they were pretty primitive. And that whole industry was coming along with the Motorolas and Intel and so forth, so, you know, in the computer business they talk about Pentium 3s and things like that. Well, we had -- that same kind of technology was becoming advanced, so now it was becoming doable to put in small package controls that could be thinking and -- not like a human being -- but looking at parameters, looking at the algorithms and looking at the -- the velocity and acceleration changes, depending on what approach you used, to give you feedback in very short periods of time.

In order to make these decision processes, it's in a very small number of milliseconds. And there are a thousand milliseconds in one second. A blink of an eye is 250 milliseconds, depending on who you believe. And you have to make these decisions in, you know, 10 to 20 milliseconds, and you have to have vast computing speeds in these systems to say, yes, this is the crash that requires this to do this and that to do that. And when you look at these specifications, they are very complex. The whole system is very complex.

Q So for a number of years you guys had things that you wished it would do; dual-stage airbags, pretensioners going off at certain times, different things you wanted to see happen in a wreck, but the computing ability and some of your experiences lead you to believe that you needed some internal computer in the car to gather the information from various areas and send out a coordinated response of some sort?

A That's a good analogy.

Q Okay. And this was not as available -- this response was not as available in your mind as the result of these ball-and-tube systems and that sort of thing; is that correct?

A That's correct. I think everybody knew that there was a period of time that ball-and-tube sensors were the best system out there. In fact, if you look at the history of ball-and-tube sensors, when we first put airbags out, we had a five-sensor array where we had three crash sensors up front and we had a safing sensor up front and we had a safing sensor in the back, and, you know, you had to have this to verify that.

And then we got confidence that we didn't need the five-sensor array to do the job. We narrowed it down to a four sensor and to a three sensor and, finally, before -- I think most systems were a three-sensor system unless there was some kind of product that required -- again, it goes back to looking at the vehicle, the crash pulse, and how the structure reacts as to what you can do. So it's an evolutionary type of process.

Perhaps we were overconservative in the beginning, but we didn't know what we were dealing with. We knew from a laboratory point of view, but there were concerns about sensing angular crashes, sensing under-rides and over-rides and poles and trees and things that, you know, offset barriers. Those kind of things we check in the laboratory. There's certainly a lot of concern.

So once you get the confidence that maybe you don't need five sensors you can go to four sensors, then you make that change and you retune the system. And there's always this constant technology improvement until you do have feedback ability to tailor the airbag performance to the conditions of the accident.

And who knows, maybe in the future we'll have an infinite variable inflator out, but -- you know, people keep looking at some of these things, and how do you make it, rather than two stage, maybe three or four stage. I mean, it has -- these systems have that potential. You know, certainly nobody has it today.

Q All these variables of how a wreck can happen, I assume that in the laboratory they try to think of all the variables, but they can't get them all and they have to wait for real-world experiences to tell them something else later on?

A That's correct.

Q And with their real-world experiences, then they adjust and it evolves into hopefully a better and better system?

A That's correct.

Q Okay. And you mentioned a minute ago that in the beginning you guys may have been -- I don't know what your word was for it -- but more conservative or excessively conservative or too conservative with, what is it, five sensors?

A Initially our products had five sensors because we didn't have the knowledge what was going to happen in the field and we didn't know whether we could really sense the angularity of a frontal collision, because when you look at the specifications, you're looking at plus or minus. The federal government tells you plus or minus 30 degrees from a center line. So you do have a lot of variability across the front of vehicles, and some vehicles change with their structure quite a bit.

So, again, you have to go back and do a lot of fine tuning with the computer-aided design. When you open the hood of a vehicle, you see convolutions and holes that maybe don't make sense to a layperson, but those are all designed into the product to make it crush at certain controlled rates so that you're trying to take -- I mean, if you wanted a vehicle to survive, you could build it like you did in the old days; make it big and stiff like a locomotive. That certainly -- you know, people will tell you stories when they ran tanks into trees at different places during, you know, testing. You open the tank, looks great. There's no problem. You got people dead inside.

So you have to have -- you have to have a controlled crushable structure. So the crash pulse on these vehicles vary grossly between, you know, some of the big vehicles that have more space versus the subcompact that just in the nature of the vehicle you have to cram an engine, transmission up front, and those become pretty rigid.

People have actually figured out how to use some of these components to absorb energy. Repairability becomes a problem, and people get upset with us that things have crushed that used to crush, but, you know, we look at the

total systems and how to mitigate the crash pulse to, again, reduce the risk of injury. And all this other stuff, whether it's seats, instrument panels, windshields, it's all part of the system to try to provide a survivable occupant compartment.
Q Is it correct that we're talking about two system types; one is the electromechanical, the ball-and-tube type, and the other is the type that is now in the Ford Taurus, which is the -- I saw the word for it -- electronic -- that's not correct -- electronic accelerometer type?
A Right.
Q Okay.
A Well, when you say in the Ford Taurus, it's now 2002. That's not the same system that was in 2000.
Q I realize there's some changes.
A I think you were talking perhaps between '99 and 2000.
Q Here's what my question is. Is it correct to say that there was a type system, lots of variations, one of which was basically the world of the electromechanical sensor types, the ball and tube, and then there is a new type, the SMART systems, that are now the electronic type that -- and these are really two different type worlds?
A That's correct.
Q Okay. Now, before the 2000 Taurus, the Taurus had had in it the electromechanical type airbag systems?

A That's correct.

Q Okay. And a lot of cars had electromechanical type systems?

A Right. And just to make it clear, you know, ball and tubes were one type. There were other versions. Some people used what was called a Rolamite. But there were different versions.

I mean, even back in the early days of airbags you used to have inverted pendulum crash sensors where you had a weight on a shaft that would deflect and close the contact. Other people within the industry used different systems, but Breed had a very good gas dampened ball-and-tube system that a good deal of the companies used. Not everybody used it. There certainly were others.

I just want to make that clear. Ford used ball and tube. In some applications we did use a Rolamite on a few vehicles in combination with ball and tube. So there were other electromechanical type of crash sensors.

Q The key to all of these is there's a mechanical type sensor?

A Well, electromechanical.

Q Yeah.

A I mean, if you go back, way back, there was strictly mechanical sensors that were not -- I guess they still had wires and they had contacts, but --

Q And, now, let's use by way of example the ball and tube. Is it correct to say that what basically happened was there was a momentum change that would cause the ball to go forward, it would strike something, it would make an electrical contact which would send just a signal that it's turned on or turned off, whatever the case may be, to an airbag and it would blow?

A Essentially that's right. The ball and tube was a ball that was held by a magnet and a change in velocity of a collision, which is sometimes called deceleration --

Q Okay.

A -- it usually is by engineers -- that the ball would roll a short distance, break away from that biasing force of the magnet, and because of the air contained within the sealed tube system, the gas dampening would allow it to move at a controlled rate to compress the gases in the tube and close the contacts. And if it stayed there long enough, it would cause the power to be transmitted through these contacts.

And these were gold-plated balls initially, and then I think they changed them to palladium or some other exotic metal because gold was too difficult to deal with. I don't know whether people were borrowing it from the company or -- they initially were gold-plated, because in the beginning we had some issues of being hermetically sealed and whether you had some corrosion problems, so you couldn't have that ball corrode and stick in place and cause a problem.

And these systems were tailored; you had crash sensors and you had safing sensors. So depending on where you located the safing sensor -- you usually put the crashing sensors up forward so that they were in the crush zone so that when you had a major deceleration, they would close. But you also had a safing sensor that would verify further back, either in the rear of the occupant -- the rear of the engine compartment or someplace in the occupant compartment.

You had to have a safing sensor and a crash sensor to close simultaneously, so you had this window that would provide the power through the system. And they say, okay, this is -- and it worked very well. It sounds a little complicated, but --

Q I understand.

A -- the systems worked very, very well. They're very reliable.

Q Both sensors may be -- the safing sensor and the crash sensor may both be a ball and tube, for example?

A Well, there were ball and tube, yes, but in some cases on some of the products the safing sensor was a Rolamite, which is a little bit -- it was a spring that had a -- would wind and unwind like a jelly roll with a weight on it.

Q Now, in the electromechanical airbag systems, if these -- for instance, if the safing sensor and the crashing sensor went off at the same time, they would send an electrical impulse of some sort to the airbag which would then go off as a

result of the electrical signal; is that pretty correct?
A Pretty correct. But I think what you have to understand is you had to have a dwell period so you have enough period of time -- you had enough milliseconds that they were both closed simultaneously. You couldn't have one hit the switch and bounce back, for example. They had to have that dwell period. And I don't recall whether it was two or three milliseconds, but there was some period of time that they had to close that circuit, and that was enough to set off the detonators or igniters within the airbag to provide the gases that fill the airbag.
Q And all these things with how much gas or how long the tube or short the study or how many sensors had to go off at the same time, you guys figured in to try to figure out what was the best time, what were the best circumstances for the airbag to go off?
A Right. Because timing is everything, because you have to -- depending on what the nature of the collision is, you have to have the bag deploy before the occupants head and chest moves very far. It has to be -- you have to provide the bag and get it inflated before the occupant moves. So you have to sense it, get it inflated, all before the occupant moves.
Q But in the electromechanical system there's not a computer that's sitting there interpreting all of this, is it, and then making a decision go or not go, is there?

A Not in the same -- there was a device that was in those systems that was called a -- it may have different names in the drawings -- but depending on what stage you were at, it had the ability to disable a system. There was -- some of the first ones has a fuse it in that if it seen a short circuit in a wiring, it would disable the system. A fuse would melt and disable the system.

Later on it had the ability to store fault codes; in other words, if somebody had a fault code where the light could come on and say, you know, hey, the right front crash sensor is shorted out or something is not within the specification, it doesn't have the right resistance or something, then it would start blinking that light.

Initially the light would blink and there was no information stored. Later on these systems would tell you how many key cycles that -- on and off. So it would give you an idea that it might -- there was a limitation, I think a 256 or something, because the -- the head goes, but you have to have an electronics person tell you why it was 256. But it had a number like that that wasn't maxed out.

You could say, okay, whether it was a hundred key cycles or it maxed out at 256, it could have been 10,000 that somebody ignored the fault code, but those systems really did have some primitive ability to store some data as it evolved from the '80s into the '90s.

Q But that's for fault codes and things like that.

A Well, disabling and -- there were different evolutions of it.

Q I'm with you. Yeah.

Okay. But when you went to the electronic accelerometer system, then you have -- instead of the ball and tube, you have something else determining deceleration, and that sends information to a computer. And that computer interprets the information and then makes a decision that it sends to the airbag?

A That's correct.

Q Okay. And in the world of airbags, can I kind of, for the purposes of our discussion, draw a bright line between the world of the electronic accelerometer systems and the electromechanical sensor systems? They're basically two different type things; there's a big quantum leap between the two?

A Yes, there are.

Q Okay. Now, the electronic accelerometer system that was in the Ford Taurus before 2000 -- the 2000 car, would you tell me how that kind of evolved? How many sensors? Did they change the sensors? Just give me the history of that if you know it.

A Prior to 2000?

Q Yes, sir.

A I mean, when -- you're talking about 1999?

Q Yes, sir. You say in early 1900s they had whatever.
A I just wanted to understand what your question was.
Q Yes, sir.
A Maybe I wasn't paying close attention to it.
Q I apologize. Sometimes I'm not very good at this.
A The Taurus -- if you're talking about the Taurus family -- I mean, we have different families. As I indicated before, Tempo had the first vehicles in 1985 with airbags in the GSA fleet, and then we sold them to the public in '86.
But let's just talk about Taurus-Sable. Sable is the Mercury version --
Q Are those the two in the family?
A Right.
Q Okay.
A They're pretty much similar with -- I mean, you know, styling they might have some plusher seats in the Sable or the hood might look a little bit different, but for all practical purposes the Taurus and Sable are similar vehicles.
The first airbag that went into the Taurus type of vehicle went in in 1990, and that was driver-only airbag, because the way the FMVSS was worded, there was a period of time that you could get credits for driver-only airbags, even though you had no protection for the passenger's side in those vehicles.
Then there became a time, I believe it was 1992, that it

became optional, but I'm not sure whether we ever put them out because we had a problem with the manufacturing facility that was making them. That -- they had an incident where they were shut down for a period of time. So it was in the '92, '93 time frame that the Taurus had a dual-bag system.

Initially, when we talk about sensors in 1990, Taurus had a five-sensor system.

Q As in the driver-only system?

A Driver-only airbag, five-sensor electromechanical ball-and-tube sensors, three crash sensors, two safing sensors.

During the model year 1991, like mid-year, we retuned the sensor system for the Taurus and went to a four-sensor system. We had -- we still had three crash sensors, but they had different calibration characteristics in the '90 and early '91s and one safing sensor. So it went to a four-sensor system in 1991 and a half.

Q All right.

A I -- from recollection I can't tell you precisely what year it was that we went to the three-sensor system.

Q I've got some documents that show some of that. I can't say that I understood it very well, but if you're off on a year by a little bit, I won't hang you.

A It could have been '93 or '94 that we went to a three-sensor system. I'm not absolutely certain about that.

But also you have different series of vehicles. When you talk about Taurus, you had a design that goes from 1990, there's a refreshing that occurs in '92, and it carries through until 1994 model year on the Taurus. And that's called the -- if you go back and you look at the documents, it's DN5.

Q Okay.

A Which is the designation that started -- where we started on the Taurus in, like, '86. So usually a product, once you design it, will stay -- the platform and major characteristics will stay around for eight to ten years. You do refreshing to keep competitive, you know, changes, things on the outside. Sometimes the product looks different, but there's a sequence.

And then in 1996 --

Q I always suspected that. Go ahead. I'm sorry. I should keep my mouth shut.

A You have to be practical. When you talk about power trains and you talk about floor pans and some -- they're expensive parts of the vehicle.

Q It makes sense.

A You have to keep it and then every two to three years, to be competitive with other people, you have to change its appearance because people have the expectation that when they buy a new car they can show the neighbors and family and friends that they got a new car. When you follow the principles like Volkswagen used to do and -- nobody knew what year you had, but those kind of people didn't care I guess.

So now we have a cycle that goes up through 1994 on the Taurus, 19 -- I said '94. I believe it was '95. Because the DN 101 is a new vehicle that comes out in 1996. That still has electromechanical sensors, but because the structure is different, the whole design is different. It's a different vehicle. And that follows through until 1999.

Q Okay. And --

A When you get to 2000, we refreshen that vehicle, and you look at those code names and it says -- the N is dropped for some reason. It says D 186.

Q So a D 186 is the 2000 Taurus?

A That's correct.

Q A DN 101 is a '96 to '99?

A That's correct.

Q And a --

A DN 5.

Q -- predates that?

A And it's really simple. Just to give you another historical lesson. That's the D class vehicle. That fits that category for weight and characteristics. N means North America design, because some of them you'll see CDW 27, for example, which is C-class vehicle that was designed for world car.

So, I mean, each one of these vehicles have different designations, but the Ford system kind of makes sense.

Q Okay. Good. If I have you right, the system was -- in 1990 there was a driver-only airbag with five sensors; three crash, two safing?

A Safing.

Q Safing -- '91 and a half model you dropped four sensors, three crash, one safing. In '92 and '93 there were dual airbags put in. Somewhere in the '93, '94 area there was the DN 5, but it went to a three-sensor system?

A That's my recollection, but I could be off on what year it was.

Q From '96 to '99 how many sensors were there?

A That was a three-sensor system.

Q Three sensor.

A Electromechanical.

Q Now, in all of these Taurus family cars from 1990 through 1999, were the sensors basically the same? I realize you change the gas a little bit, change the type of ball, but it's basically a ball and tube?

A Basically a ball and tube, yes. They were supplied by Breed.

Q And in all of the systems it was -- basically the ball in either the safing system or the crash sensor would close the contact, and if the appropriate contacts were closed at the same time, it would send a signal back here, if it would not have a computer that would interpret the information, it would then send it to the airbag and the airbag would blow?

A Well, it was called a diagnostic module, and it depends at which point -- or diagnostic monitor -- it had the ability, like I explained, to disable the system, and it had the ability, depending on what type we're talking about, to store fault codes and provide feedback information for people to repair the vehicle or to warn the driver or operator of the vehicle to get some service.

Q The event that would fire the airbag if there wasn't a fault code that has occurred somewhere was a ball rolled forward in a tube, it closed a contact, it might be more than --

A Two of them.

Q -- two contacts --

A Two simultaneous.

Q -- two simultaneous contacts that sends a signal to the airbags, the airbags blow?

A Well, when you say signal, all it is is transmitting power.

Q Power -- okay. No signal power?

A To turn on a light you have to have two switches close simultaneously. The light goes on because now you got the power going through the system, otherwise --

Q Good analogy. Now, the rationale from going to five sensors to four sensors to three sensors, who would make that decision?

A Well, it's not one person. You have to -- you have to get confidence. Like I said, we were conservative. The Tempo, which was a lead program -- actually, we had been looking at airbag systems from the '60s, and we looked at different sensing systems back in the '70s. And there was a program that had ball-and-tube sensors when we started really looking at them. It was called the 1991 Lincoln Program that had a limited number. It was a very small number of police vehicles that we were trying to get experience.

Because when you go back and you look at the regulations through a period of time, it said -- the government would say you have to have passive restraints and such and such, and then they'd say, okay, technology is not available. We have to delay it until it becomes available.

So there were peaks and valleys in the regulation process if you read 208, and we continued probably over a period of 30 years to continue looking at systems until finally we thought we had the confidence to do a program. We always were interested in having some high-volume program where we could get out and get field information. And we finally agreed that the kind of vehicle we should put it on was a fleet vehicle.

And the Tempo became a logical product because there was regulations being proposed to have passive restraints. And we used to think about looking at a 10,000 fleet program to -- you know, statisticians -- and I'm not a statistician -- would always say, you have to have 10,000 units at least. So we put together this program for the GSA and eventually went to insurance companies where there was a controlled fleet where we had a driver-only airbag in it, and we had these sensors that we thought we had confidence in.

There were Breed electromechanical ball-and-tube sensors. We put them out there, and we got a lot of experience off of that. And then that's when other manufacturers were watching what we were doing apparently, so all of a sudden, you know, airbags were showing up all over the place.

Because certainly some of the other alternatives -- we used passive belts, other people used different things. But when the regulation was phasing in where you had the 10 percent, 25, 40 and a hundred percent that we knew was coming because they always send you preinformation out, you had to prepare and make sure that your products are going to be able to be sold and comply with the federal requirements.

Q But the information they would send you from a five-sensor system to a four-sensor system has got to be interpreted somewhere to say, yes, this makes sense to drop a sensor and somebody has to make a call, let's do that.

A That's correct.

Q Okay. Was that something happening in Ford?

A Yes.
Q Okay. Was it based on statistics that were occurring out in the field or would it have been crash tests or both?
A Both.
Q Okay. And would it have been such that there would have been some sort of standards to determine the effectiveness of five sensors versus four sensors and what's appropriate to make that change?
A I'm not sure what you mean by standards, but there are specifications and performance criteria you have to meet. Ultimately you have to meet the HIC -- head injury criteria -- the chest deceleration, you have to meet the femur loads, and that's the criteria you're looking at to meet the FMVSS 208 criteria.
Q But that's not applicable to the question of how many sensors. The question of how many sensors says does it go or not. Go ahead.
A Performance is always the consideration. I mean, if you thought you could do it with one sensor and you thought you could do it reliably and repeatedly, you'd do it with one sensor. But we felt we needed five sensors in order to do it repeatedly and reliably until we had the confidence that we could recalibrate. Each one of those sensors when you went from a five-sensor system to a four-sensor system were recalibrated.

Q Okay.
A And sometimes the bracketry and positions were changed. So it was a matter of obtaining field experience and confidence in the system that I could make these changes.
Q Okay. There's a document in the production that shows the various years and where the sensors are located. Are you familiar with that?
A I've seen -- there's various versions of that.
Q Okay. With regard to the '96 to '99 three sensor, which would be two sensors and one safing sensor --
A Two crash sensors and one --
Q Two crash and one safing -- do you know where they were located?
A My recollection is the crash sensors were located up front on the radiator support, and they were probably located at about third points. If you look and divided the front end of the radiator support, which is just where the hood would latch -- the hood latches usually on the top of the radiator support and then you have the headlights and the grill and stuff that goes forward and -- that's where the radiator fits in there. It's like a big horse collar.
Q Yeah.
A Do you follow what I'm saying? A horse collar is, you know -- maybe I'm from a different generation.
Q I've been to museums.

A The crash sensors were located at third points where if you divided the front end of that radiator support they were like one-third of the way from the outboard --
Q Like this?
A -- ends. They weren't -- previously there was one at the center and there were two towards the end of the radiator supports. And we eliminated the center and readjusted the other two on the Taurus. Other vehicles had different locations.
Q When there were a total of five sensors -- when there were a total of five sensors I think you said there were two safing sensors. Were there three across the front of the car?
A There were three crash sensors.
Q Here it is. Let me show you what is AAC00898. I'm not going to burden the record with all of these. There's a 1995 sensor system, and there's a little code down here.
A See, it says 1990 that you pointed to on the left.
Q Yes.
A You said '95.
Q I'm sorry. The brain doesn't work sometimes.
It has five sensors. The little square boxes are a sensor. Is this correct that this is four across the front or is that three?
A There was four. There was a central box there at the center line that had two sensors in it. One was a crash sensor and

one was a safing sensor.
Q Okay.
A So if you counted up the boxes that they were in that were sealed, you would look at three up front but the center line had two sensors in it --
Q Okay.
A -- one safing and one crash.
Q And then we went to the '91 and a half. You have a good memory. It had three sensors across the front.
A Those were all crash sensors.
Q And then it had one safing sensor?
A That's correct. So the safing sensor was taken out of the center line of the 1990 model and they were recalibrated because the characteristics had changed somewhat.
Q Okay. And then it went to the '92 that had two sensors across the front and one safing sensor somewhere in the passenger area?
A Right.
Q Then in '94 --
A But just to make it clear, this is not necessarily representative of the Taurus. This is kind of like a generic chart, so they're talking about a lot of different -- I mean, this is all Ford vehicles. This is not just Taurus. Because, remember, we talked about life of vehicles. Certainly to go back and change a sensor system on a

carry-over vehicle might not be practical.

Q Gotcha.

A So you have some cycle problems here.

Q Then let me -- the information you gave me --

A I was --

Q -- for the dates would have been more of a Taurus date --

A Right.

Q -- as opposed to this document?

A Right. Because when you get over here to 1995, it says single point, which apparently it was speculation. We were working towards that, and I'd have to borrow some magnifying glasses to see the date on this chart, but it probably was speculating that we were going to have a single point in 1995, which we didn't have.

Q Yes, sir. Okay. So this chart -- skipping ahead of myself -- is generic. In the time that they were using five-sensor systems in the Taurus, would a five-sensor system in other cars be basically the same system; same location, maybe a little variance?

A Depending on the vehicle, that's essentially correct.

Q And then --

A When you had body-framed vehicles like the Ford Crown, the Lincoln Towncar, those vehicles you had a different structure, so some of those were -- the crash sensors were located within the fender, which you -- on a unitized body

you have different structures, so you could locate them on what was called the apron, which was the edge of the engine compartment, which if you open the unitized vehicle hood, you see some kind of angular structure that goes from the top of where the fender is down to some unitized structure that's welded together to carry the front suspension and the engine.
Q But across the Ford line of cars if we had a five-sensor system, generally what you would have is four sensors in the front, maybe it would be three crash, one safing?
A No. That's the way it was. It wasn't maybe. That's the way it was.
Q That's the way it was in all lines?
A Right.
Q And there would be one safing somewhere back here in the passenger compartment area?
A Right. It could be at the rear of the engine compartment or it was actually up under the instrument panel, or in some of the products they put it down in what's called the sides cowell, which is down on the edge -- it's the area where -- some people call it the kick panel down there at the lower part. If you look at A, B, C pillars starting at the front where the edge of the windshield is, it's that portion down there that they put the safing sensor.
Q Behind the engine somewhere?
A Right. It was a matter of calibration again and where you

could position it and what made sense to the packaging
characteristics of the occupant compartment of the vehicle.
Q All of those would be behind the engine somewhere?
A Right.
Q And I'll just use behind the engine.
All the five-sensor electromechanical systems would have three safing -- three crash sensors across the front, one safing, I'll say the front of the car, and then one safing sensor somewhere behind the engine?
A That's correct.
Q Then when all of the -- I'll assume a couple of things and you tell me if I'm wrong.
Then when Ford would do a four-sensor system, it would then have three crash sensors across the front and one safing sensor somewhere behind the engine?
A Right.
Q And then when Ford went to a three-sensor system sometime in the --
A '92, '93, someplace in there.
Q Okay. -- it would have two sensors -- crash sensors in the front of the car, somewhere in the grill, radiator-type areas, and it would have one safing sensor back behind the engine somewhere?
A That is correct.
Q Okay. Did Ford ever -- with the electromechanical system --

ever go to a two-sensor system?
A Not that I recall.
Q Okay. Why did Ford have more than one crash sensor in the pre-19 -- the pre-2000 -- or the pre-electro accelerometer systems?
A The question is why did we have two?
Q Yeah. Why would you have two crash sensors?
A The plus or minus 30 degrees.
Q On either side?
A Right. You got to pick up left and right, not only center but left to right.
Q Okay. Would these ball and tubes -- the tubes be pointed in some direction that would be important?
A Yes.
Q Okay. Would it be that in a, let's say, three-sensor system you might have one pointed more forward in the direction of the car, one more to the left and one more to the right to kind of pick up the --
A No. My recollection is because of vector analysis all you had to do was keep them square to the road, if you pointed them longitudinally.
Q Then why wouldn't one work?
A Because you had plus and minus, right and left. These are vector problems and structure. Do you have any understanding of vector analysis when you're looking at longitudinal,

transverse --

Q I can do that.

A -- X, Y, Z? I don't know what your background is, so --

Q I've got a chemistry degree.

A Okay. So you understand vectors.

Q Yeah. I got three years of physics and I got calculus and all that.

A Okay. So if you longitudinally mount a ball and tube --

Q Okay.

A -- the vectors that affect it on a structure always will translate so that you have transverse, longitudinal and -- I'm trying to think of the correct name for --

Q Whatever. You've got a vector that would send the ball forward?

A It's three dimensional. You're basically looking at the longitudinal vector, so that's what engineers talk about worst case scenario, because that's the G-forces that you have to deal with the longitudinal.

Q If I have a tube that looks like this and the front of my car is that way, is that the way it's set up?

A Right.

Q And I'll have my ball back here, and this car is struck from here.

A That's a vector.

Q That's a vector. I'm going to have a certain amount of

vector going that way?
A Exactly.
Q Now, if I have this one on the front, this on the passenger's side, this one on the driver's side and this one in the center, each one of those balls, wouldn't it have the same vector no matter whether it came --
A No.
Q It wouldn't.
Okay. Would this ball have the same vector for this force --
A Each one of them --
Q -- and this one and this one?
A Each location is seeing a different vector.
Q Is it because of the twist of the car?
A Because of crushing of the vehicle.
Q That makes sense. That makes sense. I apologize. Okay.
So when Ford was dealing with the three ball and tubes in a four-sensor system, when the car would initially touch the object, let's say a pole for instance, the crush of the vehicle may turn the tubes a little, it may change the momentum, the twining of the car, a number of things, and change the affect on the balls depending on where the sensor is in the car?
A That's certainly a possibility.
Q And the three sensors were there to make sure that the

crushing -- the deceleration was picked up by the sensor?
A At each one of those areas.
Q Okay. Was there ever a problem with the sensors being in the crush zone and the sensor being destroyed before the ball ever closed the contact?
A You're asking a question that applies to everything, so I can't answer that because -- the only way I can answer it is I don't know. I'm not aware of anything like that. I seen some very severe collisions, and because of the robust design of this electromechanical sensor, we had taken -- I mean, in a few collisions the vehicle was pretty well demolished and the bracketry was bent up and the wires were ripped off the sensor, and we'd take them back to the supplier, Breed in this case. They still thrusted and met the engineering specification.
Q Prior to adopting the SMART systems, had there been any problems with the airbags in cars in frontal collisions within the 30-degree angle not going off at high-speed collisions because the sensors were getting destroyed before the sensor went off?
A I thought I just answered that. I never seen a case where even though the sensor was bent up and the bracketry was destroyed that they still -- I think one -- one time maybe it was not quite meeting the -- when we thrusted them -- when a supplier thrusted these sensors, there were calibration

curves; three fire, three no-fire curves with threshold deployments, which translates back to that 14-mile-per-hour perpendicular barrier equivalent.

Q Okay.

A I've only seen one that was just outside of the specifications requirements. That's threshold requirements. I had seen it in the past on a few occasions of catastrophic collisions that airbags didn't deploy because of wiring issues, because of wires being cut, maintenance issues. When you have a product out there for a long period of time, people get fender-benders and they're not repaired properly. On a few occasions I had seen products where airbags did not deploy because of a loss of the power in the system; cut wires or some other issue.

Q But I'm not asking about maintenance stuff. I guess my question wasn't well-crafted. So let me ask it this way.

The specific occurrence with the electromechanical ball-and-tube systems, had you ever seen a situation with these multiple sensors that the front collision was so quick that it destroyed the sensors before they could fire and, therefore, the airbags did not go off?

A I said I knew of no incident where the sensors were destroyed, because there was a couple times that we had to do a complete analysis of the product and we found out that the wiring harness was cut on one, on another one it was a

manufacturing issue that the wiring harness had come apart or
was not put in place properly.
Q Those are maintenance or prewreck problems; is that correct?
A No. No. The cut wires was the result of a catastrophic
collision.
Q Okay. So that the collision cut the wire before the signal
could be sent?
A Right. The closure speed in the one incident I'm thinking of
was so high between two vehicles that the radiator support
rotated and cut the wiring harness, so it was not getting a
signal within a period of time to deploy the airbag because,
like I said, you have to have time for the ball to roll in
the tube, and then you have to have that window of
opportunity where you have the safing sensor and the crash
sensor to overlap.
So by the time you add up all these numbers, it might
have been in the range of, say, 20 milliseconds or so, and
the wires had already been cut. Because if you go through a
calculation and say how fast did this move to cut it -- I
mean, you'd have to actually run a test to verify it, and we
did not verify it.
But in my mind, when we went through that particular
case, it was the rotation of the radiator support that
actually cut the wiring harness so the airbag ignitors did
not get a -- they might have been power transmitted. It's

impossible to tell. But there wasn't a long enough amount of power applied to those ignitors for it to activate the airbag.

Q Other than that one case, did you ever have any other cases?

A That's the only one that I can think of.

Q What was the speed of the vehicles in that case?

A There was two vehicles coming together in the range of a hundred-mile-an-hour closure, which you start talking about 50-mile-per-hour barrier equivalent, probably 40, 50 mile per hour, because when you have two vehicles coming together, you have mutual crush. And it gets a little bit complicated versus a barrier, but -- usually the rule of thumb is, if you have two vehicles of a similar weight and matched up nose to nose, a 50-mile-per-hour vehicle coming in opposite directions will be equivalent somewhat to a 50-mile-per-hour barrier collision.

Q Okay. But in that case somehow the radiator support and the crushing before they were -- the sensors were actually supposed to fire came around and cut the wiring harness?

A That's correct.

Q And that would be a highly unusual case; is that right?

A It would be extremely unusual.

Q Had you ever seen that any other time?

A That's the only time I can recall it.

Q Okay.

A But, you know, maybe if I sat and -- sometimes cases come and cases go and you don't really get to do a full analysis, but in that case we went through complete analysis.

Q Had you ever seen any cases involving Ford where the airbags did not go off in a, say, 50-mile-an-hour head-on collision?

A That happened a few times. One other analysis that we did that we went through a complete tear down was this issue where we had a problem with the wiring harness not properly installed where the connectors weren't sitting nose to nose. And we'd done a lot of work with SEMs and optics and so forth that we could prove that -- in electrical connectors they're locking connectors and you have a male portion, female portion. When they go into the locking portion, if you look at these connectors, there's usually some kind of tang that's a little plastic thing that flips in the hole and locks it in place. And this particular vehicle, that was sheered off, and we were able to see the blistering on the SEMs, scanning electron microscope. You could see the nose-to-nose blistering, so it was never installed properly.

Because when you have a male and female connector come together, if you look at those electric connectors, they scratch the plating off. You can see it under high magnification. And we were allowed to go through an exhaustive project to establish what the issue was. And some people believed it to be one thing and other people believed

it to be other things, but I believed it to be a
manufacturing issue with the supplier.
Q Other than the connector issue that you just described on a
Ford vehicle, have you ever seen a Ford vehicle with either
electromechanical or the new SMART systems electro --
electronic accelerator where a 40-mile-an-hour collision
head-on into an object failed to have the airbags go off
other than this case and the one you described for the
connector?
A When you say this --
Q The case that we're dealing with today.
A I explained to you about the other case where there was a
car-to-car.
Q Yeah. It cut the wiring harness?
A Right. That's one.
Q That's one.
A The other one is this wiring harness issue. That's two.
Q Okay.
A And then there's this case.
Q That's three.
A The Schaeffer case.
Q Yes, sir. And those are the only three cases that you were
aware of in Ford's history where a head-on collision of some
sort, basically a head-on collision in the 40-mile-an-hour --
let's say 40-mile-an-hour-or-above range has failed to have

airbags go off?

A There was at least one, maybe two other cases that were back in that GSA fleet that had occurred. There was a case that I investigated down in -- I don't remember. It was southern Alabama not too far from Mobile. It's in the literature. A GSA vehicle impacted the front of a logging truck, and the nature of the collision was that this logging truck actually cut the car into about three pieces. And when it was all over, the airbag module was actually ripped out of the steering column and it did not deploy.

Q Is that an '80s accident?

A Yeah. That's about '86, '87 time frame, if you go back and look in some of the reported information within that Tempo GSA fleet -- and I believe there was another one that I looked at up in Maine that had that similar occurrence.

Q Is it one of the GSA fleets?

A Right.

Q But let's just make sure we can get it right then.

Other than the GSA fleet that was back in the 1980s --

A It was a 1985 Tempo.

Q Yes, sir. That -- you guys were starting to get your feel for airbags, from, let's say, 1990 when airbags first went into the Taurus until today, the only accidents you were aware of where a -- let's back the speed down a little bit -- 30-mile-an-hour-or-greater collision has failed to have the airbags go off when the collision is basically a frontal collision was the one where the radiator support cut the wiring harness where you said the closing speed of the two cars was about a hundred miles per hour?

A That's correct.

Q A wiring harness that had failed to have the contacts made because of some manufacturing defect?

A That's correct.

Q And, No. 3, the Schaffer case that we have today?

A That's the ones that I recall.

Q The situation with the electronic sensors -- electromechanical --

A Just to make the record clear, when you said you started backing off on the numbers, there were some issues when we went to dual-bag systems where we didn't get a driver's bag at threshold impact, but that was covered by -- when you look at this diagram -- and you never marked it as an exhibit -- but it says dwell enhancing circuit.

Q Yes, sir.

(Mr. Kilpatrick exited deposition room)

A When we put the Continentals out that had a dual-bag system, we were all quite shocked to find a couple cases where we got passenger bags in threshold collisions and we didn't get the driver bag. And after we analyzed that whole situation, we found out that because of the slip ring and resistance in the steering column, it was just slightly different for the driver's side than the passenger's side.

So the priority went to -- because you have a common sensing system, the priority went to the passenger's side, and the resistance was a little bit higher in the driver's side, so you didn't get a driver's bag.

So there are some of those that are reported, and you asked the question previously when you started coming less than 30, but those are threshold impacts, and they sometimes provided puzzling results. And that's why we added in this dwell enhancing circuit, so that once you had the threshold impact, it locked it in place so that you no longer had two bags go off.

Q Okay. Now, the question I asked a minute ago where you listed the three cases where no airbag had gone off on basically a frontal impact -- a frontal collision over 30 miles an hour, we -- I had not limited my question to just the Taurus vehicle. Does that include all vehicles in the Ford line? You only know of three cases where the airbags --

A I'm only aware of three. In fact, when you talk about those different vehicles, the other two were both Tauruses -- excuse me. I said that wrong -- both Tempos. The one with the wiring harness problem was a Tempo and the first one we talked about was an '85 Tempo in the GSA fleet.

(Mr. Kilpatrick reentered deposition room)

Q I wish I knew -- there were three. There was one that had a radiator support problem.
A That was a Taurus. That was about a '91 Taurus.
Q That was about a '91 Taurus. Then there was the one that had the wiring harness problem.
A That was a Tempo.
Q What year was that?
A It was a production vehicle, so it might have been '87, '88, '89 time frame. I don't recall.
Q Okay. So let me narrow it again. Since 1990 in the entire Ford line of cars -- since 1990 -- you only know of two cases in which there was a frontal collision over 30 miles an hour where the airbags failed to go off, one of which occurred in, I think you said, '91?
A I don't know what year it occurred. I remember it was, like, a '90 or '91 Taurus.
Q '90 or '91 Taurus where there was a closing speed of about a hundred miles an hour between the two cars and the radiator support somehow cut the wiring harness?
A The wiring harness was cut.
Q Yes, sir. And the second case would be the Schaeffer case today?
A That's the one I'm aware of.
Q And do you know of how we would find out if Ford is aware -- of course you're speaking for Ford today.

A Right.

Q Would you know whether they have any other information that would be contrary to what you know?

A There may be other cases that I was not involved in that -- that are out there. I don't know.

Q Okay. How long have you been involved in the litigation side of airbags -- litigation and claims side of airbags?

A Probably since the early '80s.

Q Okay.

A Just to make that clear, there was a period of time when people were saying that we should have put airbags in and we didn't have them.

Q Oh, I understand.

A So that goes back to what lawyers call a preemption motion and all that business.

Q I've been there.

A Okay.

Q Were you, in the '90s, dealing with airbag claims at Ford?

A Yes.

Q Okay. When there was an airbag claim at Ford, either litigation or something that resulted in a claim, did you generally get involved in it?

A I wouldn't say I got involved with all of them, but I got involved with a good deal of them.

Q Okay. Were there other people doing the same thing you were doing?

A Initially I was doing most of it, and there was another person that I worked with. He's actually my manager. When you start talking about in the beginning, was it -- the GSA fleet that we were trying to assist the government with, most of the GSA fleet were not litigation but trying to get information from the field as to field performance. So when a vehicle was involved in an accident, GSA would notify us and then we would try to decide whether we wanted to do that kind of investigation.

And a lot of it was threshold impact, so it was just a misunderstanding of how the system operated. So sometimes you could handle them over the phone, but there was one other person that I recall that was working. And I probably did two-thirds of the first hundred investigations and he'd done some other ones when too many of them started coming in.

Q Other than the two of you then, would there be anybody else dealing with your positions with these airbag cases?

A In the early stages, that's it, but then as product, you know, expanded into many different car lines, different -- lots and lots of issues, primarily about misunderstanding about threshold deployments or -- you know, either people expected an airbag or they got an airbag when they -- and then they had abrasions or issues of minor injuries that they didn't anticipate because people believed that if you have an airbag you shouldn't become injured, so there was a lot of confusion about that.

There was a lot of litigation as airbags -- and claims -- as airbags were being phased-in because of a lack of understanding of how the system worked. And people thought, you know, they should be able to do whatever and still not get some abrasions, bruises, whatever.

Q I understand that. Do you have a pretty high level of confidence that there had been other claims or litigation or occurrences where the airbags had failed to go off in a frontal collision over 30 miles an hour that you would have known about it at Ford throughout the '90s, early 2000s?

A I would say more in the early period of time before the organization had changed and there were more people involved, because sometimes these cases would come in and we wouldn't be able to investigate. The vehicle was destroyed or whatever. So I -- I think probably as the '90s progressed, a number of cases and claims were coming in, and I certainly wouldn't have been aware of all of them.

Q Excuse me just a second.

A Sure.

Q Mr. Wagner, I have a couple areas to kind of touch on this.

Category No. 20 talks about other legal causes of actions brought against Ford wherein passengers were severely injured or killed by the failure of airbags deploying. Have there been any -- any lawsuits filed against Ford for failure to have airbags deploy where people were injured other than the Schaeffer case? And let's say over 25 miles an hour.

A Yes.

Q Okay. How many?

A I don't know.

Q Okay.

A I explained to you the ones I knew about.

Q You mentioned there was a radiator case, and let's talk about from 1990 until now.

A Okay.

Q Other than the radiator case you mentioned and the Schaeffer case.

A Those are the only two I can recall that I was involved with.

Q Okay. What about for Ford Motor Company?

A I guess I have not seen that listing, so I don't know what the answer is. I don't know whether they supplied that to you or not.

MR. WELLS: Randy, can you follow up on that for us?

MR. BIBB: Well, you know, it depends on speed. If you're talking about high-speed impacts like the Schaeffer case, that's one thing, but, you know, low-speed cases --

MR. WELLS: Low speed -- I understand your problem with that, and I appreciate the education the public went through. I got a lesson in that myself.

Let's say 30 miles an hour and over. That should give you plenty of --

MR. BIBB: Well, you know, we certainly object to the discovery about the car lines and systems that are not similar to the one in this vehicle. I think we have answered for the 2000 Taurus, and if I recall reviewing some of the discovery -- but I'll -- you know, if you want to make a request of that, I'll make sure we'll respond.

MR. WELLS: I don't want to do it that way. You know, I've got a 30B6 --

MR. BIBB: Right. I would object to him to answer for all the car lines and all types of vehicles.

MR. WELLS: Well, let's break it down so we can have a clear understanding, and I've got three requests here. You can look at 20, you can look at 31, and you can look at 32. One has to do with SMART systems. One has to do with the limited Taurus. One has to do with causes of action. Let me see if I can make this simple for both of us so we don't have a problem.

The witness has already testified that the ball-and-tube systems were very similar configurations, basically the same type of systems, from 1994 -- and I haven't gotten into the length of electrical at this point. For those systems across the lines of the vehicles it shouldn't be a big matter, especially since what appears to be -- he may not have all the cases -- but he seems to be in the area that knows. We're not talking about a lot. We're talking about just a couple of these that even occurred.

So my question is, is for all Ford vehicles from 1990 until the present, those cases, those claims, those situations wherein airbags failed to deploy when there was a collision with a front end of a vehicle to be identified, and it appears as though this man with his massive amount -- and I'm not trying to blow smoke at you -- but massive amount of information with this particular subject since 1990, talking about all car lines, all vehicle lines, can only identify two right now. We're not talking about a burden.

MR. BIBB: Well, actually you are, because, No. 1, as he pointed out, you know, we get lawsuit complaints, and that's what we would have to be searching. People are going to say -- Ford Motor Company receives a lawsuit complaint. I was -- my airbag did not deploy in this severe accident. That severe accident may have only been 12 miles an hour. I mean, there's a lot of nondeployment, especially in the early 1990s; in other words, I had as many cases that I personally worked on where people were mad because their bag didn't deploy, and they would --

MR. WELLS: I gotcha.

MR. BIBB: And in their allegations they would say I'm permanently disabled. What happened was they got their nose broken.

MR. WELLS: What I want to know is where the allegation was 30 miles an hour or more at the point of impact. Now, the reason I say that -- and I will feel comfortable if you guys come back and say we know of none, and I will not complain if you ultimately find one after the litigation is over with. You just let me know if you ever find one.

But what I want to know is, I want to know kind of the environment here. The smaller the number the better for everybody concerned.

MR. BIBB: Let me say this. We will undertake to -- to do a reasonable inquiry into this.

MR. WELLS: Okay.

MR. BIBB: My hesitation, as I think would be Mr. Wagner's hesitation, is that, No. 1, there were a lot of nondeployment claims, especially in the early '90s.

MR. WELLS: Especially low impact.

MR. BIBB: And most of which were low speed, most of which never identified the delta V in the change of velocity in the accident. And even when there would be allegations that the change of velocity was above 30 miles an hour, in most cases a more serious look would determine that it was far less than that.

My -- I can inquire, but let me say this. To my knowledge we don't classify -- Ford Motor Company does not classify lawsuits and claims by delta V. I mean, we can determine what component or system was involved. We can determine what vehicle line was involved. We can determine model years and dates of loss and dates of claims, but as far as determining speeds, it may be more, as Mr. Wagner -- it would be a matter of anecdotal information than any kind of hard-and-fast determination.

MR. WELLS: I'll go with that.

MR. BIBB: For instance, even in this accident there's going to be a difference of opinion about what the delta V was in this accident, and there is in practically every lawsuit that I've been involved in. Sometimes it's a big difference; sometimes it's only three or four miles an hour difference. Sometimes three or four miles an hour makes a big difference in where the bag should or should not have deployed.

I am -- I preface this long-stated objection to all of this stuff in explanation just to caution you, but I will be glad to go back and inquire of the company and report to you whether we can, A, even make that determination --

MR. WELLS: Okay.

MR. BIBB: -- other than just getting anecdotal information from people like Mr. Wagner.

MR. WELLS: That would be fine. That would be fine. I want to know whether your company is aware of it, and I realize what your discussion is. But if -- if there is an epidemic problem, they would know it. I realize the low-speed impacts -- I realize those things. I understand that completely. I got my education on that too. But if there have been other situations where a Ford automobile with what Ford recognized to be a 30-mile-an-hour collision or higher -- Ford recognized it, not some doofus out there in yonderland who made an allegation.

MR. BIBB: Plaintiff's expert.

MR. WELLS: Yes. Or a defense slut. Not you. You've been very nice. I will give you that. That was being playful. I apologize.

MR. BIBB: And I take it all in the -- as I'm sure you took my comments about the plaintiff's expert.

MR. WELLS: Yes.

THE WITNESS: I thought I had a lawsuit going.

MR. BIBB: No defamation.

MR. WELLS: Now, let me back up.

Are we in agreement that you will perform an investigation to see whether or not -- a reasonable investigation -- to see whether or not Ford has since 1990 other frontal collisions where the airbags failed to deploy in any of its vehicles, Ford cars, where it recognized that the collision velocity was about 30 miles an hour or over -- or let's just say over 30 miles an hour?

MR. BIBB: With those caveats that your -- or limitations that you have placed on it, I will make inquiry of that --

MR. WELLS: Okay.

MR. BIBB: -- and advise you in writing as to whether we have made any such -- if we have any other information. I will tell you that I would expect that if there were a larger number of these, that it would also be the United States Government who would have taken a keen interest in that as they do in most high-speed nondeployment or high -- or high-speed nondeployment cases from whatever manufacturer it may be.

But I will make inquiry of it, but I must tell you that it will be largely anecdotal because of the limitations that we have on the determination of speed.

MR. WELLS: Anecdotal means you would be doing what, talking to people?

MR. BIBB: Talking to people and asking whether we have anybody -- anybody recalls anything like that. Because, frankly, that may be the only way to do something with a determination on the delta V like you've delineated it.

MR. WELLS: Okay.

MR. BIBB: Mr. Wagner, if you want to add anything to what I've said based on your experience --

THE WITNESS: Well, the only thing I can say is that sometimes information comes in and -- I can recall a claim at one point in time where it was claimed that it was a 15-mile-per-hour collision and there was no airbag. What wasn't described to us was that the vehicle was going 15 miles per hour and ran into another vehicle that was going 45, so you have to be very careful, unless you do a thorough investigation and analysis, to use data like that.

We were quite surprised to fly all the way to California to see a delta V of five mile per hour. It was somebody that was sensationalizing and believing that they were somebody that was involved in something that was of interest to us.

BY MR. WELLS, CONTINUING:

Q When you say they hit somebody that was going 45, it wasn't a head-on, they were going the same way?

A Right. And sometimes you have different types of collisions. I know that you've talked about the frontal barrier equivalent, but when you start getting into a wide variety of collisions, sometimes people, going back to those vectors, whether it's rollover, whether it's a 60-degree angular impact, those kinds of things affect performance.

Q What we're down to is we have two collisions since 1990 that you're aware of that were a frontal collision over 30 miles an hour where the airbags didn't go off across the Ford lines?

A Those are the ones that I can recall from my experience.

MR. WELLS: And then counsel will look to see whether or not they're aware of others based on the discussion we had and let us know that in writing; that's where we are?

MR. BIBB: That's where we are.

MR. WELLS: Okay. Thanks.

Let's take a quick break.

(Recess taken)

MR. WELLS: We just took a break a minute ago, and it is presently 2:15 in the middle of the 30B6 deposition. During the break counsel discussed whether or not we would continue this deposition into tomorrow, which we would be likely to do if we were going to end at 5, whether we would as a second alternative continue the deposition into the night, or as a third alternative, which is what we've agreed to, that we would finish today within the time frames that would let us make our flights back to Nashville and Jackson and have some sort of binding agreement between us so that we could finish the 30B6 at a later date within the discovery deadline.

For the purposes of the record and for the Court, the concern we have in making that agreement is that the discovery deadline is presently set for --

MR. KILPATRICK: August 6.

MR. WELLS: -- August the 6th. The deposition of Mr. Wagner as an expert has been noticed within the discovery deadline for August 1st. That notice was made because there was some concern that the Court may not grant additional time to take his testimony out of time. Brad Smith is going to be requesting the Court on behalf of Ford to accommodate schedules to allow Mr. Wagner's deposition to be taken sometime in the next couple of weeks after the 1st of August. Of course, we're in agreement with that.

Our concern is that in the unlikely event that the Court wouldn't let us do that -- especially since we all agreed to it -- in the unlikely event the Court wouldn't let us do that, the plaintiff does not want to be caught in a position where discovery is closed, the 30B6 has not been completed, and Mr. Wagner's expert deposition has not been taken.

Taking all that and balling it up, we've reached an agreement that works for all of us as follows:

1. We will take this deposition and finish what we can between now and the time it's necessary to go get our flights, which would be sometime around 5 or 5:30, somewhere in that range.

2. We will continue the 30B6 deposition at a later date which will be on the same date that we take Mr. Wagner's expert deposition. That date will either be the date allowed by the Court after August 1 or it will be at a date that will be before this discovery deadline ends. And we'll work that out, but plaintiff will not be at risk as a result of this agreement of not being able to take the 30B6 deposition, the

deposition of Mr. Wagner.

Next, if Mr. Wagner -- we take his deposition in Nashville or Jackson or Detroit, the plaintiff will not be responsible for his -- Mr. Wagner's travel costs. The plaintiff will not be responsible for the hourly rates of Mr. Wagner in either traveling or preparation or attending the deposition.

There's the 30B6 deposition, but at the point in time that we finish the 30B6 deposition, the watch will be noted, the time, and as I then begin the expert deposition, I will be responsible for his hourly rate for the actual time in that deposition.

Is that our agreement?

MR. BIBB: That is. The only notes that I would make to that is:

No. 1, I think the actual discovery cutoff is the 6th of August. I think you may have -- you probably said the 1st in your statement.

No. 2, I am prepared to put Mr. Wagner -- or make Mr. Wagner available for his expert deposition, and we'd might as well try -- if we can agree on it now -- on either the 14th or 15th or 15th or 16th. It's a Thursday-Friday, the week after the discovery cutoff. I think that's the dates that you and I had talked about; is that not? Those are not? You're not available for trial on these two dates?

Off the record.

(Discussion held off the record)

MR. BIBB: The agreement is as stated with the exception I think, just to correct the record, I believe August 6th is the actual cutoff date. And the good news is that all the lawyers in this case are busy and so are all the witnesses, and we will work out an agreement as to a date or dates that Mr. Wagner's 30B6 deposition can be completed and that his deposition as an expert witness in this case can be completed. And we'll just finish -- we'll do that the same day. It makes sense.

MR. WELLS: And one thing, just so we understand, we all agree that this action in doing this deposition will cause no need whatsoever for a continuance of the trial?

MR. BIBB: We're certainly not asking for one as a result of these.

MR. WELLS: If we finish it by August -- the trial isn't until January as I understand it.

MR. BIBB: I agree.

MR. KILPATRICK: But Judge Nickels had already indicated at one time that he doesn't want to go too far off into the future.

MR. BIBB: Right.

MR. KILPATRICK: And if he says he's only going to grant the extension by bumping the trial date, I don't think we would be agreeable any longer.

MR. WELLS: No, we can't do that.

MR. BIBB: Well, I don't -- I don't have any control over what the judge says, but all I'm saying is we're certainly not going to seek any continuance of the case. I don't -- I'm not sure that Mr. Wagner's 30B6 testimony is going to have any affect on this motion from either side's standpoint.

So why don't we -- let's go and get as far as we can get done today, and we've made an agreement we're going to provide it either by the discovery cutoff or by the extended discovery cutoff, and we'll make it work.

Okay. Let's do it then.

MR. WELLS: Okay. Let's go back to the testimony.

BY MR. WELLS, CONTINUING:

Q Mr. Wagner, this Ford Taurus we're talking about became the D186 with the 2000 model?

A That's correct.

Q Is there a number or a name for the sensor system -- airbag system that was in the 2000 Taurus model?

A Well, I'm sure there are part numbers, and there is a description someplace in the documents, which I don't recall, but there is a designation for the RCM module for this particular vehicle.

Q Now, there's a thing called an NGRCM. I think it stands for next generation restraint control module. Is that the module that's in this case or is that a generic term?

A That's a generic term.

Q Okay. Now, with the 2000 model we went to this new system. I referred to it a couple of times as a -- as one involving electronic accelerometers. What would you refer to this system as? Is it the SMART system I've heard on the television?

A Right. In some cases it's been called a SMART. In some cases -- I think you've seen documents -- it's called an intelligent airbag, and there's Phase 1, Phase 2, Phase 3, depending on when things could be invented and put into production. But it's generally been called a SMART bag prior to 2000.

Q Okay. Well, with the 2000 Taurus system it has an RCM in it, it has certain sensors, and it has an ability to, I guess, do its computing. Is that system basically the same system that is in other Ford models that have the SMART system in it?

A We'd have to -- it would -- generically the answer would be yes, but each vehicle has to have a system that is tuned to that crash pulse, the structure of the vehicle. So if you look at a vehicle like a Windstar or, you know, one of the other products that have subsequently had this system put into it, it would have to be unique for that vehicle. It's not like you can say take the components from a Windstar and put them in a Taurus or, even for that matter, the generations within a Taurus. I believe the Taurus now has a weight sensor, so it has different systems.

And even at this time there were two -- within a Taurus there were two different RCMs in 2000. One was a six loop and the other one was, I believe, an eight loop where you had side bags. This particular vehicle did not have side bags in it.

Q Okay. Now, is the difference between what you might have in the Windstar or in the Taurus basically the programming language to understand what the sensors say and what the response should be or is it the hardware?

A It's both.

Q Okay. Would the RCM be substantially different in other cars than it was in the Taurus?

A You said substantially different?

Q Yes, sir.

A I don't know what that means. I mean --

Q I understand. What kind of differences would you see between the RCM and the Taurus 2000 model and the other vehicles? Is that -- let me tell you what I'm getting to. Is this the cheap-o model in the Taurus or are they all pretty much the same cost there's just a little bit of difference in how many somethings it's going to have? Or does the Taurus get the cheap-o model and that's what happens when you buy a cheaper car?

A I would hardly say that this was a cheaper model. I think if you look at the cost analysis in some of the documents, it says there was an incremental cost on this particular design. Now, whether -- you know, maybe they found ways of saving money. Sometimes they do after a period of time, but initially, I think, depending on what documents you want to read and what time it was, it's probably a 17- to 25-dollar penalty, so -- I mean, I don't know what the actual --

Q What do you mean penalty?

A Increased cost over the ball and tube.

Q Okay.

A So sometimes when you -- even though there were some predictions that said this was going to be cost saving because you're reducing, initially going into it the numbers I seen in some of the documents say it was somewhere in the high teens to low 20-dollar penalty.

Q Okay. Let's go back for a second then. This new system -- the SMART system in the Taurus --

A By the way, those cost numbers are variable costs and those are predictions, and I know you've asked a lot of questions about costs and what -- when you talk about variable costs, it's not exactly what the consumer pays because there's a whole lot of other factors. That's why when you go out and buy service parts, when you look at some of these things, they're quite expensive to replace.

Q I understand. We looked at some diagrams a minute ago, and those diagrams had a small drawing of a car and it had the various sensors located in different places. There was the five sensor, the four sensor, the three sensor. With the 2000 Taurus, where were the sensors for the airbags?

A Well, again, it depends whether you want to talk about the one that had -- you don't want to talk about the one that had the side bags, do you?

Q No. Just the one that had the passenger and the driver.

A You had a satellite accelerometer that was out in front of the radiator support.

Q Okay.

A And then you had the safing system within the RCM.

Q Okay. Where was the RCM located?

A It was located near the center line of the vehicle up underneath the instrument panel, sort of like on the -- even though this is front-wheel drive, there's still sort of a hump in the floor pan, so it's up underneath the instrument panel near the center line of the vehicle in the occupant compartment.

Q Then the RCM, it had the ability to do some computing, interpret the signal that was coming and make decisions; is that correct?

A That's correct.

Q And it received the information by which it made a decision from the two sensors; one being at the radiator and one being inside the RCM itself?

A Right.

Q The sensor inside the RCM, was it called the safing sensor?

A There was a safing sensor within there, yes.

Q Was there a sensor other than the safing sensor in the RCM in the 2000 Taurus we deal with today?

A I guess I don't recall whether it did have an accelerometer within that or not, but I know there was an accelerometer up in the satellite sensor, and there was a safing sensor within the RCM. But I don't recall without going back and looking at some of those documents.

Q Our recollection was it was just the safing sensor and the accelerometer.

Would you define for me the difference between a safing sensor and an accelerometer?

A I'm not sure what they were using as far as the safing sensor, but it probably was an accelerometer, because electronically that's the easiest way to do it.

A safing sensor is usually just a different calibration, and when you're talking about electronic, I think for all technical purposes it was probably another accelerometer but it was calibrated differently than the crash sensor which was located up front on the front end of the vehicle -- satellite sensor.

Q Back in the ball and tube days there was a thing called a safing sensor. What did that mean?

A That was just -- if you want to talk in terms of Gs or deceleration, crash sensors were a higher G deceleration, and if you looked at the safing sensor, it was a lower G, basically the same ball-and-tube design.

Q Okay. And both of them had to go off in order for there to be an airbag deployment?

A Right. Simultaneously.

Q Now, with the SMART systems like in the 2000 Taurus, what was the purpose of the sensor in the RCM safing sensor versus the one in the satellite sensor?

A Just to check on the system.

Q Okay. Now, was there a requirement in the 2000 Taurus in order for the airbag to deploy that a certain signal was received from both sensors?

A Yes.

Q And tell me what that was. Tell me how -- explain to me how that occurred. What happened?

A Well, the accelerometer started picking up a signal as soon as -- if you want to say T zero was a time, some event started, it starts feeding the signal back to the module where it's calculating to try to understand the algorithms that had been put into it to match it. And early on you want to match to see if it's severe enough to actually require pretensioners, Stage 1, Stage 2, whatever. So it was trying to match some predetermined curves that had been put into the logic of the system to see if that was what was required from this particular incident.

Q Okay. Now, let's go to a frontal collision. When a frontal collision occurs, the safing sensor and the RCM and the accelerometer both start sending, as they decelerate, certain signals to the RCM; correct?

A Right.

Q And the RCM has to interpret what -- I don't know if they call it the safing sensor. The RCM has to interpret what the safing sensor is saying to it and what the accelerometer in the satellite sensor is saying?

A That's correct.

Q And in the case of the 2000 Ford Taurus, in order for the airbags to go off, a certain amount of information has to be received from the safing sensor and a certain amount of information has to be received from the satellite sensor that matches up the requirement for airbag deployment?

A That's correct.

Q Okay. In the 2000 Taurus, if the information necessary for a deployment came from the safing sensor but none came from the satellite sensor, would the airbag go off?

A I would think not.

Q Okay. In the 2000 Taurus, if the required information for an airbag deployment came from the satellite sensor but did not come from the safing sensor, would the airbag go off?

A Again, I believe it wouldn't.

Q Okay. So it's your understanding of the 2000 Taurus that there are two sensors in the car, one in the RCM, the safing sensor, and the other is the accelerometer in the satellite under the hood ornament or at the radiator support?

A Right.

Q And the requirement of the RCM is the required data for a deployment has to come from both sensors?

A Right.

Q And is that for safety purposes?

A Well, sure. Because there are certain issues that you have to deal with. Not only do you have to have the right crash event for it to go off, but you don't want service people to be working under the hood where they might have the ignition on or vandalism and issues like that where you could inadvertently set off the airbag by just, you know, slamming the hood or maybe using some kind of tools or hammering on it or something like that. I mean, you have to be careful with the system. When you have a single-point sensor that -- you would have what was called inadvertent actuations.

Q So there are multiple sensors in part to avoid accidental deployment?

A That's one factor. But it is also to determine what level the crash is, because you're trying to determine drive-size thresholds. Do you just need pretensioners? Are there belts? Are there not belts?

Q What's an X-Sensing accelerometer? I show you AAHC 8251, paragraph 3.2.1.

A Which paragraph? The ones that's highlighted here?

Q No. Here.

A Oh, I think we're talking about -- the way it's used here is X and Y, so I think you're talking about an X-Y-Z coordinate system. Yeah, you're talking about side impact as a Y sensing.

Q Okay.

A So you're talking X-Y-Z coordinate system. Again, usually when you measure things, you're looking at an axis that goes back to the vectors, because you're never sure what the angle of the vector is in a three-dimensional space.

Q Gotcha. Okay. Now, this sensor that's in the RCM, is it different in type from the sensor that's in the satellite sensor? Does it detect deceleration in the same method?

A I guess I don't know the answer to that. That's something that you'd have to go back to the Visteon people and ask that to make sure you've got the correct answer on that.

Q How does the accelerometer in the satellite system detect deceleration?

A The accelerometer -- I'm not sure how this one works, but generally an accelerometer change is a change in the voltage.
Q Okay. I understand. How does the satellite sensor in this vehicle detect deceleration?
A It's a change in voltage, usually like -- the ones that were originally used were called Peeeeeo [phonetic] Electric, and they would -- you could squeeze them and so forth and that would change the voltage. And then as you monitor the voltage, that's interpreted as a -- it's calibrated to acceleration levels.
Q But what is it that causes it? There's got to be some kind of switch or something. What happens to this thing to cause the voltage to change?
A I am not absolutely sure what this design is, but accelerometers usually are highly-mounted distortion of a material that changes the voltage passing through it.
Q Oh, okay. Like it might contort a balloon or something and that would change the resistance or something?
A I think that question should be asked of the Visteon people as to exactly what they were using.
Q But you're not sure?
A I am not sure.
Q Okay. But somehow as the car decelerates, a sensor in the front of the car changes the voltage, the change in the voltage is sent through the wire -- or the voltage is sent

through the wire and the voltage changes over time, and that information is recorded and interpreted in the RCM; is that correct?

A It's continuously recorded.

Q Okay. And, now, the RCM that was in this car, was it capable of multiple sensors? I think it was, what; two -- two multiple satellite sensors?

A No. No. I think you -- the side bags you actually would have had three sensors. You have to have three remote sensors. So this only had the one remote sensor.

Q I'm not talking about in the car. The RCM, was it designed that it could carry more remote sensors than just one?

A For this vehicle, no. This was a six loop.

Q Okay. If it had been an eight-loop system --

A Then you would have had the side system.

Q The side -- okay. Now, in any of the Ford -- any of the Ford vehicles, are there more than one satellite sensor in the front of the vehicle?

MR. BIBB: What model year are we talking about?

MR. WELLS: 2000 Ford.

THE WITNESS: I don't know.

BY MR. WELLS, CONTINUING:

Q Do you know of any that have more?

A That have more?

Q Yeah, more than one satellite sensor.

A I'm not aware of any.
Q Do you know --
A You mean for frontals?
Q Yes, sir. Do you know of any that have just one satellite sensor other than the Ford Taurus?
A Well, there were other vehicles that started getting phased in after this. Are you talking about the 2000 model year?
Q Well, let me ask that, and I didn't ask that. I skipped it.
In the 2000 model year do you know what Ford vehicles carried the SMART system airbag systems?
A I believe it was only the Taurus and Sable in 2000.
Q What about 2001?
A I'd have to go back and check some other documents. I don't recall. I know we started phasing in other products. My recollection is we started putting it in the Windstar in 2001, but there could have been other products. I don't recall when we put it into some of the other ones.
Q Well, the ones that you do know about, were they all with the RCM somewhere behind the engine and one satellite sensor that was in front of the vehicle?
A Usually that was the design.
Q Do you sitting here know of any that had more than one satellite in the front?
A I do not.
Q Okay. Let me show you --

A See, the problem is with your questions, you're not asking -- see, we have European products, and I'm not sure what they were doing on some of the Volvos and Jaguars and things like that, and you haven't restricted your question. We sell all those products, and I haven't studied all those different products, so --
Q Is Volvo you guys?
A Yeah, we own Volvo.
Q I didn't know that.
A Nonast [phonetic] and Martin, Mazda -- not outright but --
Q I'm looking at buying a Volvo. I may corner you and ask you a few questions during a break.
A But that's why it's tough to answer your questions, because there are a wide variety of products being sold in this market that's for, you know, some that Ford didn't design that I don't know what they did in 2000 or 2001 unless I looked at a lot of documents.
Q Then let me ask you this and restrict it somewhat and see if I can help you.
For the vehicles that carry the Ford name where you go and you buy it in the Ford lot with the Ford name on it, not buried somewhere in the little fine print that says Ford owns it; Ford vehicles, Windstar, Taurus, those, do you know of any that carried the SMART system that had more than one satellite sensor for the airbags on the driver and passenger

side?

A Not that I am aware of.

Q Now, let me show you what's marked AABC 7315, and it has a line that has on it the D186 Taurus, Sable. And it goes across and it's got the crash sensor and a number of things, and one of which is the external sensor. It has FSS, paren, 1 or 2, closed paren. Let me see if you can read that there.

A I may have to borrow somebody's glasses.

MR. BIBB: Mine won't help. Mine are for long distances.

THE WITNESS: I think you need a secret decoder sheet to figure out some of this stuff. I don't see where there's a reference what that means.

BY MR. WELLS, CONTINUING:

Q You don't know what the one or two means?

A It's not clear to me.

Q Okay. Can you state today one way or the other that the RCM would accommodate more than one satellite sensor?

A Yes. Because we had -- in 2000 Taurus side bags, right and left, we had satellite sensors on different products.

Q Let me ask you this. Can you state today whether or not the RCM would or would not accommodate more than one satellite sensor in the front of the car?

A Our design did not have that, but if somebody thought it was necessary, I suppose you could do it, because we had the eight-loop system with the side bags which had satellite sensors.

Q Now, with the eight-loop system with the -- for the side bags, that's one. But what was the other; a six-loop system?

A This -- well, when you start looking at these documents, you'll see four-loop system, six loops, and each loop fired something, so if you look at the 2000 Taurus involved in this case, it was the six loop. You had two buckle pretensioners. That's two loops. Then you had the driver's bag that was dual stage and a passenger bag that was dual stage, so that's the other four. That gets you the six. If you had side bags, then you had two more loops; one for the right and one for the left.

Q Okay. But with that -- my question is whether or not with a six-loop system; the two pretensioners and the two airbags with two stages, is that right?

A Right.

Q With a six-loop system could you have this RCM three sensors?

A No.

Q Why?

A You don't have enough firing loops.

Q Was there a 12-loop system?

A In 2000?

Q Yes, sir.

A I see no evidence of that.

Q Would a 12-loop system have allowed two satellite sensors in the front of the car and a safing sensor in the RCM?
A If there was a 12-loop system, then you'd have other firing circuits, but I'm not aware of anything like that.
Q Would it take a 12-loop system to be a -- with no side impact airbags -- would it take a 12-loop system in order to have two satellite sensors in the front of the car and one safing sensor?
A I don't know. I think you'd have to talk to somebody that has studied the logic, and I think that's a question for Visteon, because I think you're talking about something that doesn't exist, No. 1, and I'm not sure whether it was doable. To just be able to talk about loops and so forth, I don't know whether technology was available to do that.
Q All right. You don't know whether anybody in the market anywhere had two satellite sensors in the front of the car or not?
A I do not know that.
Q Okay. And you don't know whether people had considered it technically feasible or technically not feasible; is that correct?
A That's correct. I think that's a question that you should direct to Visteon.
Q Now, this -- this design with only one sensor in the front of the car, I want to ask you a couple other questions about it.

The system had some sort of battery back up, didn't it, the 2000 airbag system?

A I thought it did, but, you know, there's a lot of documents that talk about different things, and in the past we used to always have some kind of capacitor that would have a backup power supply in the system. And I think it does, but I would have to check some documents to see if it did.

Q Okay. And sitting here today do you know whether it did or did not?

A Not without checking documents.

Q Okay. Is it your expectation that it did have one?

A We identified that as an issue, and we incorporated backup power supplies. And it shows that on that other chart that you had, I believe, starting in about '92 with the backup power supply, which was like a -- generally it was a capacitor within the diagnostic module, that if you lost a battery during the course of a collision, you still had power to fire it for some period of time before the capacitor would die.

Q Okay. And then there was also in the system a system for determining whether there was some fault with the system; is that right?

A Right. That was part of the recorded information. If there was some -- for example, a short in the wire or something was disconnected, it would give a -- a blinking to the readiness indicator to warn the operator to seek some service, and these were coded to provide different information which you could interpret by the shop manual.

Q Okay. And it also had -- if the light didn't work, it had a buzzer as a back up?

A Well, I think it was a tone generator, wasn't it?

Q A tone generator, yes, sir.

A Tone generators are more user friendly than a buzzer.

Q Yes, sir. Well, in either event, if the RCM detected there was some fault in the system, there was either a light that would tell you that there was a problem --

A Or an audible tone.

Q -- or an audible tone or both if it wanted to?

A I guess I don't recall whether -- it being both. The audible tone --

Q Let me --

A Now, combined with that there are warning things that tell you to put your belt on, but I'm not sure if there was a fault -- that you had both.

Q Okay. Well, let's go back to it. The RCM was set up that a light -- at least a light would go on if there was certain faults to the system?

A That's correct.

Q And if the light was not working, the audible tone would alert you to a problem that it detected with the system?

A That's correct.
Q Okay. Let me show you a document that's AAHC 8243. Are you familiar with that document?
A I've seen various copies of this.
Q What is that?
A It's an engineering specification generally.
Q Is that the engineering specification for the airbag system on the 2000 Taurus?
A I wouldn't know that unless I seen a drawing, because the drawings always tell you what specification that you have to manufacture for it.
Q The drawing for the airbag system?
A Well, this is -- well, this is for the -- the RCM.
Q Okay. So the drawing for the RCM you'd have to see?
A If you had a drawing of the RCM, it would show you on the drawing what specifications it had to meet and whether this is this particular one or not, because there are different dates on the bottom. It says updated, Revision A and so forth.
Q Okay.
A Usually on a drawing you have to see what level for the release drawing for the part matches that.
Q And look at page 52 using the Bates number.
A Page 52?
Q Yes, sir.

A The one that has highlights on it?

Q Yes, sir. Let me see it a second.

There is a -- Paragraph 3.4, battery -- I'm sorry -- backup power supply, BPS, requirements, loss of vehicle power. It says the system must provide crash discrimination and be able to supply sufficient power to deploy dual-stage frontal airbags and pretentioners, if applicable, for a minimum of 150 milliseconds after loss of total vehicle power. Do you know whether that paragraph was complied with in the 2000 Taurus for RCM?

A If this is the appropriate specification that's listed on the drawing, it would have been, yes.

MR. WELLS: Do you have a drawing for the RCM?

MR. KILPATRICK: Not with me.

BY MR. WELLS, CONTINUING:

Q Do you know any reason why the RCM for the 2000 Taurus would not have this sort of backup power?

A I do not know -- if that was the specification, it would have had it.

Q Since there is -- this engineering document that we just looked at, you as an engineer at Ford Motor Company, would you expect the RCM in the 2000 Ford Taurus to have some backup power?

A Yes. And that was an issue that -- if you go back and look at your other chart, we identified that as a problem on some of the earlier vehicles, and we incorporated that into the diagnostic module, which was sort of like an RCM on the more primitive ones.

Q Okay. But all the 2000 -- was that before 2000?

A Yes.

Q Okay.

A At one time, if you look at those charts, it was a separate capacitor. It was a separate part. And then it became integrated with the diagnostic monitor.

Q Now, there's a term I keep seeing called crash mode. What is that?

A Crash mode?

Q Yes.

A I guess I'm not sure what context it's being used in.

Q I've just seen it in places. There's some things they describe for a crash, some -- they use it by miles per hour or times or that sort of thing that says when the airbag should go off.

A I think you're talking about that long explanation of how the system worked, whether it was -- I think they talked in terms of low, mid and high; is that -- is that what you're talking about?

Q It may be.

A There was a long answer in one of the interrogatory responses that said the conditions where you would get Stage 1 or a

Stage 2 or --

Q Here's what I want to know. I want to know under what conditions should the airbags go off, not Stage 1 or Stage 2, any airbags in the 2000 Ford Taurus, driver and the passenger?

A Well, it depends upon the conditions, and I have not committed all the conditions to memory, so I would tend to refer you to that interrogatory response because it talks about 40 percent offsets, it talks about belted conditions, and speeds and so forth. Some are at 14, some are at 20, 25, and so forth. So there are different conditions, and rather than to get confused and try to give you a long story that doesn't match the official response, I refer you back to the interrogatory response.

Q Let's go back to it again. I'm going to try to box with it; one reason I don't have it here, and, two, I don't remember what it says, but bear with me a second.

When you refer to an offset, you're referring to offset of --

A Barrier.

Q Straight forward, a dissection of the middle of the car? What would you call it? What would your --

A I said the -- you talk about the center line of the vehicle.

Q Center line, yes, sir.

A Yeah.

Q So when you're referring to an offset, you're talking about angles -- collision angles off the center line of the vehicle; is that correct?

A No. An offset barrier -- maybe it's not clear to you. If you have a perpendicular barrier, it's a 35-ton wall-to-wall barrier that goes from one side to the other; okay? An offset barrier is when you have -- you're hitting the edge of it and you only have 40 percent overlap to whatever side of the car you're impacting.

Q Okay. I'm with you there. Okay. Let me ask you this.

If a car under the conditions that have been set by Ford 2000 Taurus runs directly into a barrier straight on, the whole car hits --

A When you say barrier, you're talking about the SAE 35-ton barrier that's described in the Federal Motor Vehicle Safety Standards and so forth?

Q Let's hit one of those. That's good enough.

A Okay. Because, I mean, when you say barrier, I don't know what you're talking about.

Q I agree with you. Let's use your barrier. Basically a flat unmovable barrier.

A Right.

Q Do you agree with that?

A Okay.

Q A 2000 Taurus runs directly straight on into that, at what speed at the point of impact should the airbags deploy?

A I think -- I haven't committed all those different scenarios back to memory, but I think I would refer you back to the interrogatory response so that -- it's different levels depending on belted conditions and seat position.

Q There you go. With a --

A Driver's seat position in this vehicle.

Q With a 50 percentile or larger male, belted, what should it go off at, about? Wait. I have the answer. I might be able to just save you some trouble. Bear with me a second. They're in the Request for Production.

MR. BIBB: The supplemental Response to No. 13 and 14 or 14 and 15.

THE WITNESS: According to page 3, it says 25 miles an hour.

BY MR. WELLS, CONTINUING:

Q Okay.

A Well, it depends -- that's not -- I mean, that's for the high output. Yeah. Because this is dual-stage inflator. The logic -- I mean, let me go backwards here and tell you, I think you get Stage 1 at a lower speed. Right. Continuing on page 3 it says for the belted occupant the low output airbag supplemental restraint system in the 2000 model Taurus is designed to deploy when the sensors predict a crash velocity of 20 miles per hour. So the low output goes into

20; the high output comes into 25 miles per hour.

Q Okay. So let me go back to my question.

For a 2000 Ford Taurus driving head on into the barriers you described, the big heavy flat thing that doesn't move, the airbags for an unbelted occupant should deploy somewhere in the range of about 14 miles an hour?

A Right.

Q For a belted occupant the first stage of the airbag should deploy at about 20 miles an hour?

A That's correct.

Q And the second stage should deploy at about 25 miles an hour?

A That's correct.

Q Now, let me ask you this. If the same car went head on -- this is a 2000 Taurus -- into the flat heavy unmovable barrier as you've described that they run tests with, should the airbags always deploy in a head-on collision at 40 miles an hour?

A I don't know.

Q Why?

A Because that's a condition that we never tested to because it's a very, very severe collision.

Q Okay. Tell me, Ford has never run a 40-mile-an-hour head-on collision for a car?

A I believe we have run some at 40 at some point in time. If you go back and you look at what was being done in the early

'70s, we -- the ESV project was supposed to be a 50 mile per hour, and that was beyond the realm of survivability. And there were other projects that I was trying to recall what they were called, but I don't know whether the RSV was at 40 or 35, but there were some crash testing that was done at 40.

And that was still considered, back in those days, out of the realm of survivability, so basically from the early '70 time frame most people felt that 30 was the limit until improvements were made and the NCAP, which is not a requirement but that gives you star ratings, that can be handled if you are belted and you're doing things right. It doesn't say that it's a survivable collision, but the risk of fatality has been reduced somewhat. Because there are many factors that you have to consider about age, special conditions, you know, whether people are using the system properly and so forth.

Q But those tests that were over 40 miles per hour were in the '80s and before?

A I believe most of those were probably before the '80s. I don't recall. If we were running any 40 into a barrier after the '70s, I don't recall them.

Q Okay. As far as your knowledge is, Ford Motor Company has not run any barrier tests on any of its vehicles over what speed since 1980?

A There is always a plus or minus factor in these things, so 35 sometimes -- 36, 37 miles an hour. So I don't recall any, but -- I mean, you'd have to check the databases to see if there were tests, because sometimes tests are conducted just for research information. I do not recall any, so I would have to go back to honestly answer your question to say that -- you know, maybe there are one or two, but the practice of running those tests was dropped because of the lack of technology to make it a survivable impact.

Q I guess my question is, so I can understand the numbers, is it the policy and practice of Ford Motor Company since at least 1980 that in its crash tests it does not run crash tests on its vehicles over 35, 36 miles per hour?

A Into a barrier?

Q Yes, sir.

A Yes.

Q Does it run crash tests over 35, 36 miles an hour in any other crash tests?

A We use 50 mile per hour car-to-car crash tests.

Q Okay. And has it done that with the Ford Taurus?

A I believe there are crash tests that are 50 miles per hour car-to-car.

Q Has it done it with the Ford Taurus with the SMART airbag system in it?

A Again, I'd have to check. There's been an awful lot of data that's been produced, so -- you're asking me a question about

25 boxes of material. I'd have to refer you back to what was produced to see whether they did or didn't. I believe they did, but I don't recall any, you know, crash tests specifically.

Q The car-to-car tests, why are those different than the barrier tests?

A Because there's mutual crush between the two.

Q And that decreases the acceleration?

A Well, the barrier equivalent. If you run two vehicles 50 miles per hour nose to nose, that's like a 50-mile-an-hour collision. But some of these modes that they're crashing for, fuel systems and other things, so --

Q Okay. Has Ford Motor Company since 1980 run over a 35, 36-mile-an-hour collision into a pole in doing its test of any sort?

A I wouldn't be able to answer that question unless I looked at all the data that's available, but most pole tests are low 20s, high teen numbers, because we're looking at threshold kind of testing to make sure that you do get airbags from poles that may be a large penetration before you pick up hard objects. Poles are special cases, and you have to study each structure to try to determine where you would get pole penetration, where you may need an airbag. So it goes back to trying to figure out what is the relationship between a -- say, a 14-mile-per-hour barrier equivalent and what is a pole equivalent, and usually it comes out being, like, 19 to 21 miles per hour, something like that -- in that range. I don't recall any pole tests that were in high ranges unless it was a special test.

Q Okay. Let me ask my question. You're sitting here today as the corporate representative testifying for Ford Motor Company. Since 1980 until today do you know of any crash tests that Ford Motor Company has run or had run for it where it ran a car of any sort, any model, into either a barrier or a pole in excess of 35, 36 miles an hour?

A I'm not aware of any testing like that. You'd have to go check the database to -- you know, there could be thousands of tests in that database.

Q But, I mean, you -- you're one -- you're their expert in this case. You're knowledgeable in their development of their airbags, of their safety systems. You've worked in lots of their litigation in the past ten years or so. You're the person they picked to talk here today. Do you know of any?

A I do -- I told you I wasn't aware of any. But when you ask that question, it could have been -- a test of that nature could have been done for litigation purposes, which is not the normal development kind of testing that you would do in order to determine the performance of an airbag system. Because pole tests, as I indicated, are normally conducted to make sure that you have airbag under threshold conditions.

And you're talking about something way over threshold. It wouldn't be a normal airbag design and development kind of test. It would be something that probably was a special case test for litigation or some other purpose.

Q What do you mean for threshold purposes? You used that word just then. Just to see if at the low speed it will actually go off?

A That's correct.

Q Here's what I'm trying to figure out. With those of us who buy Ford cars in the market we see all these videos on television of airbags going off and all these tests and all the dummies. Are you telling me those are all collisions that are lower than 40 miles an hour?

A Yes, generally.

Q What general range of speed are they?

A Well, the FMVS is 30-mile-per-hour barrier. NCAP is 35. Now, again, there's plus or minuses, so we usually bias a little bit higher.

Q So you would expect them to be in the 30 to 35-mile-an-hour range or 36?

A It could be lower too depending on what -- I don't know what you're referring to, but sometimes marketing people take tests like offset frontals, they may use pole tests -- and I don't know what you're talking about, so if you had a number, we could go back and check and determine what it was, but

generally the testing would be the 30, 35 range.
Q And why doesn't Ford test for higher speeds than 30, 35 range when it does these barrier and pole tests? Tell me that.
A I think it's generally agreed once you get up to 40 miles per hour it's in a nonsurvivable range. We don't allow to get the injury criteria where the probability of death is going to occur in most people.
Q Well --
A That's the problem.
Q But we're talking about probability of death and most people. There's still a lot of people that will survive a 40-mile-an-hour collision with airbags and seat belts; isn't that true?
A I don't know what you mean by a lot, but some -- some have survived under very severe collisions. I mean, it's not a certainty that just because somebody has a high-speed collision that you're going to die or be terribly injured. Sometimes things happen and they're very difficult to explain.
Q When Ford Motor Company puts in the marketplace automobiles with airbags and seat belts and pretentioners and all that, how does it know that its airbags are going to work in a car, in a new system, at 50, 40, 45 miles per hour if it hasn't tested them at that speed?
A I don't know what you mean by work. If it's something to

just go off, that's one matter. But if it's something that provides data that you have survivable injuries and they're treatable and so forth, that's another matter.

Q Let me ask it differently. I understand.

A We know that based on our previous testing back from ESVs and RSVs when we were running these tests that that's generally agreed that that's a nonsurvivable type of collision, because whether you get bags or no bags or whether you get good crush characteristics, you're talking about an unsurvivable human factors kind of situation.

Q Let me back up again. When a car from Ford Motor Company goes into the marketplace with a new airbag system, how is it that Ford Motor Company knows that their airbag system will deploy the airbags in a frontal collision at 40, 45, 50 miles an hour, 60 even, if it doesn't run tests on those -- crash tests?

A We don't know whether they're going to deploy or whether the system is going to function within the performance criteria because you're outside the design intent. Because it's generally agreed that it doesn't make any difference, most people are going to be fatally injured when you start getting into these high-energy collisions.

Q What about the people that aren't the most people, the other people leftover? There are some that are going to survive that need that airbag, isn't that true?

A I suppose there are some that might have that benefit, but when you start looking at human tolerance limits, you're not -- in a number of accidents that happen in that range, it's very difficult to design for those kinds of accidents. So whether you get an airbag at 50 miles per hour really doesn't matter too much.

Q But the airbag is intended to lessen the risk of death, isn't it?

A That's -- within the range it's designed for. It's designed to reduce the risk of injury and fatality in accidents less than 30 miles an hour. When you start -- even when you start talking about 35 or -- I've seen cases where you have threshold impacts, and I'm sure you've seen that too, where because you have children, you have elderly people, you have medical conditions, you have all kind of other issues involved, that survivability is not possible even under the conditions that you design the system for.

Q Okay. Is it then -- based on your statement -- that the airbags are not designed to save people's lives, so to speak, above 35 miles an hour because your experience is people are going to die anyway over that?

A That's essentially correct. You cannot design a system when you're talking about the human tolerance levels that you would experience at that level.

Q Okay. Now, with these airbags -- Ford Motor Company has not

designed these airbags to do any good over 35 miles an hour
because Ford Motor Company has determined that people will
die anyway over 35 miles an hour; is that right? Is that
what I understand you to say?

A I think maybe you want to read that question back, because I
think you switched from 30 to 35, either that or I missed
something.

Q I'll go to 40 just to get our tolerance --

A Okay.

Q What I understand you to say, and correct me if I'm wrong, is
that Ford Motor Company has not designed its airbags to save
people's lives in collisions from front collisions at
40 miles an hour or more because Ford Motor Company is of the
opinion that people will die anyway at collisions over
40 miles an hour and that's the reason Ford Motor Company has
not tested its airbags over 40 miles an hour?

A That's correct. There's a very high probability that
regardless what you do when you get to that energy level that
you're going to have a fatal collision.

Q But the airbags are still designed to deploy at 40 miles an
hour and over; correct?

A That's certainly not part of any specification.

Q Well, are they supposed to deploy at 40 miles an hour in a
head-on collision into a barrier or a pole?

A I think you'd expect most of the time that you would see an airbag, but it's -- since you're talking about out of the design range and we talked about out of the testing and performance, it's -- basically you don't know whether they're going to deploy when you get into these high-speed, high-energy collisions.

Q Why not?

A Because it's out of the design range and it hasn't been tested to.

Q Okay.

A And the survivability -- just what I explained to you.

Q Okay. The design range then is from what speed to what speed?

A Well, depending upon the conditions --

Q Head-on collision for the vehicle, barrier or pole.

A It's exactly what's described in this -- what's the number of this?

Q Request for Production No. 14.

A Right.

Q Tell me what that is. The design -- what's the level at which you're above the design range in miles per hour?

A It depends upon the conditions, and it's outlined in this document; whether you're belted, whether you're unbelted --

Q Okay. What I want to know is, if I run my Ford Taurus 2000 directly into a barrier or a pole, at what speed have I passed the design range of that entire airbag system in the

opinion of Ford Motor Company?
A You're going to have to quantify what you're talking about, because I think you've made that so broad that it's impossible to answer that question.
Q Well, at 40 miles an hour I'm outside the design range of the airbag system; is that right?
A That's correct.
Q Okay. And --
A Wait. When you -- let's step backwards. You're using -- see, the problem is you're using 40 miles an hour. I don't know whether that's car to car. I don't know whether you're talking about perpendicular and rigid barrier or exactly what we're talking about.
Q Straight head-on, perpendicular -- straight head-on collision into a barrier or to a pole.
A 40 miles per hour, it's not survivable, crash into a perpendicular --
Q In most cases?
A That's right.
Q In all cases?
A I guess I'd defer to somebody that's collected that kind of data, but I think the percentage of survivability has been reduced. You know, I don't know whether 10 percent survive or 1 percent at that speed, but people have collected that information.

Q Okay. Now, when you were at Ford Motor Company, was that the general philosophy that you've described among the engineers and the safety people and those that work there, that because the opinion was that most people don't survive a 40-mile-an-hour or more collision into a barrier or a pole that the airbags won't matter and we won't test those airbags at that speed or higher?
A The technology is not available to do that. That's the problem. I mean, if you had technology that you thought you could reduce the risk of injury at 40 miles per hour, and maybe someday there will be that technology, then you would test to that level, but the technology is not available. The limit to the technology that's available is up to 35 miles an hour belted.
Q My question is -- what you have just stated now, was that the philosophy of just you or was that the general philosophy of the engineers at Ford?
A I think it's the general philosophy of engineers that are familiar with automotive safety. I don't think it's just -- I think it's Ford, not only that, but the industry.
Q Okay.
A Because if somebody had the technology, I think they'd be trying to sell it.
Q Miss Schaeffer survived this accident, didn't she?
A That's my understanding, yes.

Q Okay. In all your years at Ford Motor Company, did anybody ever say words to the affect regardless of whether people will survivor let's see how fast we can make the car go before -- just to see if the airbags will go off?

A Some of that work was done, like I indicated, back in the ESV and RSV time frame when we were trying to figure out what the limits of technology was.

Q The 1970s -- let's say since 1980, did anybody at Ford Motor Company ever say let's run a faster than 35-mile-an-hour collision in these tests, pole test or barrier test, just to make sure the airbags will go off at 40, 50 or 60, just three tests?

A Not that I recall.

Q Did anyone ever discuss it? Say it? Mention it? Philosophy or just guess?

A Not -- I'm not aware of it. I mean, sometimes people talk about these things, but they have no solutions.

Q What does the government require the test to be at, what speed?

A 30 miles per hour.

Q Okay. And did anybody ever say let's run faster than the government requires -- 10 miles an hour more than the government requires?

A Well, 35 is NCAP. It was being proposed at one time, but it's never been a regulation. Most manufacturers try to meet

that because it's marketing that you have the different stars for different types of collisions.
Q But, I mean, did anybody ever say, hey, let's just run a 40-mile-an-hour collision just for giggles or fun or curiosity?
A You're talking about some pretty costly propositions when you pretty much know what's going to happen when you run it at 40 or 50, so when you're talking about running a hundred, 150,000-dollar test, if you're using prototype or whatever, I mean, these tests are very expensive.
Q Well, I mean, you're putting out, you know, hundreds of millions of dollars in cars. Did anyone ever say just one time let's take any car, Ford, Taurus, Windstar, Volvo, any car, Jaguar, and let's just run one with an airbag system in it -- just one -- at 40 or 50 miles an hour and let's just see if the airbags go off then?
A We went through that exercise earlier.
Q Other than in the 1970s. I mean, with the SMART system in it even or the one with the ball and the tubes since 1980.
A I'm certainly not aware of anything like that, because I think it was generally agreed back in the earlier time frame that those collisions were so severe that they were beyond survivable limits with the technology that's available. And maybe people are thinking about 40 again, but -- you know, there may be documents talking about 40, because sometimes

when you get to 35, people talk about 40. But I think it's not the kind of test that you would run because you're beyond the survivable limits.

Q Okay. Now, who is it that has recorded that this is beyond the survivable limits, 40 miles an hour?

A Human factors people. There's lots and lots of documents in the past. Human factors people look at injury criteria and they look at accidents. These are very rare accidents when you look at the database of what's available in these. Catastrophic collisions are very rare events and usually they're unsurvivable.

Q Okay. Have you ever seen the statistics on that?

A I have seen those kind of numbers that other people have pulled together. You have to go into your mass databases to look at those kinds of numbers to see what is going on in the world.

Q Let me ask you this. In all your years at Ford or among all the other engineers, you're testifying as a corporate designee, did anybody ever discuss the possibility that a center pole collision right where the satellite sensor is where the satellite sensor would be right in the crash zone might disable the satellite sensor before it can send its signal back to the RCM if the speed of the car is fast enough?

A Certainly people when they're designing things think about those things, and then all the testing that we conducted we had not seen anything like that.

Q Okay. Prior to the 2000 Taurus going on the market, did anybody ever run a center pole collision on that vehicle to see at what speed the pole -- center pole collision would destroy the remote sensor before it could send its signal to the RCM? Does that make sense?

A To actually run a test?

Q Yes, sir.

A I don't -- there's no evidence that anybody ran a test to try to determine when you destroy the system.

Q Well, I mean, from a logic standpoint, if you've got the remote sensor right under the hood ornament and you hit a pole that is just perfect, and I realize we're talking about perfect here, right there at the sensor, that pole could disable the sensor somewhere in the crash; is that right?

A I don't know.

Q Okay. Has anybody ever done any studies, any tests, any computer modelling, any doodling, I don't care what they did, to determine whether or not the pole that you hit on a center pole collision could destroy the satellite sensor before it sent its signal to the RCM?

A I'm not aware of anything like that, and I didn't see any work like that that was done in the documents that I reviewed.

Q Was it ever discussed as a possibility at Ford?
A Sometime -- you know, I'd have to speculate and I'd have to go back and look at documents, and I shouldn't do that. But usually when people go through failure mode and affects or faulty analysis, those kinds of things, they look at those issues and speculate. And after they've thought about that and maybe they've done some other work on it, they've come to the conclusion that it's certainly not a high-probability event.
Q That what?
A Well, when you're doing paper studies for failure mode and affects or faulty analysis, you try to put probabilities -- especially faulty analysis -- you're trying to put a probability, an event, and whether it's very common or very unusual -- I mean, you have to solve the most common problems. And when you start looking at some of these unusual events, they're very difficult to solve. Nobody knows how to solve them.
Q I mean, just from the logic standpoint, the fact that cars are going to hit poles, they're going to hit -- they're going to hit light poles, they're going to hit other type poles, they are going to hit things that look like poles, like a bridge abutment, they're going to hit those things, and occasionally they're going to hit them right dead on center, aren't they?

A It's certainly a possibility when you look at all the different infinite possibilities.

Q Yes, sir. Did anybody look at the fact that with the Ford Taurus -- did anybody look at the Ford Taurus to see whether or not a front pole collision would harm the sensor if it was a pole that hit right at the sensor and to see whether or not it would affect whether the sensor would send its signal to the RCM?

A We ran pole tests. We ran offset barrier tests. We ran 30-mile-per-hour barriers. We ran 35-mile-per-hour barriers. We ran many, many different tests, and we never seen something like this that would occur in the ranges we were testing.

Q But did you ever run a frontal pole test?

A Yes.

Q Did you ever run one to see at what speed the pole would destroy the sensor?

A I don't recall seeing any kind of test of that nature. If you ran a vehicle into a pole at, say, 50 miles per hour, there's no evidence that they ran any testing like that.

Q Do you know the fastest they ran a car into a pole -- frontal pole -- at Ford Motor Company since 1980, any car?

A Into a pole?

Q Yes, sir.

A I -- I don't know the answer to that without checking all the crash tests.

Q You don't know of any over 35 miles an hour sitting here, do you?

A It would not be a usual kind of development test, if it was conducted. And I answered your question. I don't know of any.

Q Do you know of any pole tests -- frontal pole collision tests that Ford Motor Company has ever run that the airbags did not fire?

MR. BIBB: At any speed?

BY MR. WELLS, CONTINUING:

Q Go ahead. I'm sorry. Let me ask the question again.

Do you know in the history of Ford Motor Company since 1980 whether Ford has ever run a test in which it crashed a car into a pole head-on and the airbags did not go off? Of course, I'm assuming we're over 15 miles an hour or so, and I'm talking center pole.

A I really can't answer that question unless I looked at everything in the database. I mean, we're talking about thousands of crash tests.

Q You don't know of any sitting here today?

A No, I don't.

Q Do you know of any offset poles where it didn't go off?

A I don't know of any, but I could see where people -- when people run development tests it could have been a possibility

if they ran the test at something that was below the threshold that caused -- because, like I said, depending upon the structure of the vehicle, the threshold for -- that was equivalent to a 14-mile-per-hour barrier sometimes got up to 17 to 21 range.
Q Okay.
A If you ran a -- if you ran a vehicle that -- if you ran a pole into it at 19 and it was one of those where the threshold was up at 21, then you would not have bags because you wouldn't get sensor closure.
Q Now, is it the position of Ford Motor Company that for its SMART system airbags if the Ford Taurus 2000, 2001, 2002 even, is run 40 miles an hour straight into a pole -- center pole collision -- that the airbags are supposed to go off?
A I don't think you know what's going to happen, because it's out of the range of the design and development of the system.
Q Ford Motor Company doesn't have a position either way at that speed?
A At 40 miles per hour into a pole?
Q Yes, sir.
A You didn't quantify what kind of pole it was.
Q It's a big, hard, round pole that's not going to move, just like you run in your crash test.
A Oh, well, we usually run an eight-inch steel pole.
Q How about and eight-inch steel pole?

A I don't know what happens because it's a catastrophic collision.

Q What about a telephone pole?

A Sometimes those are different because they sheer off. There are different soil conditions.

Q What if the telephone pole doesn't break?

A It depends upon soil conditions.

Q What about straight into the corner of a bridge?

A Again, what kind of bridge? See, most bridges along the highways have protective devices on them.

Q Let's talk about one that doesn't, that is rigid, that is pointed, and you run just into it just like it's a pole that doesn't move.

A I don't know whether the bag will deploy or not.

Q Okay. Now, with the standard tests that you run, the 8-inch steel pole that doesn't move, is it the position of Ford Motor Company that its 2000 Taurus airbags should deploy at 40 miles an hour into that pole?

A Again, I don't know whether it should or shouldn't. It's out of the design range of this system.

Q Anywhere in the -- can you tell me anywhere in the owner's manual, the documents given to the public, the advertisements, or anywhere else, that Ford Motor Company tells the public that the airbags are not designed for above the limits you've told me, which I believe were about 35, 36 miles an hour?

A I don't recall where in any owner's manual it tells you what the upper limits are, but we do tell the customer that we meet the NCAP. And I'm not sure how much information that we provide what the NCAP and the five-star information is about and whether they really know all the details of that, but there usually is advertising information that talks about a 35-mile-per-hour barrier and so forth. There is some details through the advertising, and I'd have to go back and look at the owner's manual and this book to see whether it talks about whether this meets the 35 NCAP.

Q Well --

A In order to sell it, you have to put your -- you don't have to test it, but part of meeting FMVSS 208 you have to meet the injury criteria with the dummy under the conditions of 208.

Q I'm thinking of my own experience listening to Ford advertisements over the years and also thinking about the other car companies it owns, Jaguar, Volvo, that sort of thing, and I can't think of any advertisement or any written documents I've ever seen where they have discussed their safety features, where there's been any mention that the airbags are not designed for over 35 miles an hour. Do you know of any?

A I don't.

Q There is a designation I saw somewhere that is D186 airbag.
What is that?
A That's this vehicle.
Q Okay. I'm sorry. Airbag for a D186?
A Right, 2000 Taurus.
Q I apologize.
The Ford Taurus that was in the United States had the RCM and the satellite sensor, correct? I know that to be --
A This vehicle has.
Q The same vehicle that was shipped that was either -- that was in the European market, what did it have?
A I'd have to determine the export information to see what we were exporting to that market and whether we ever sold the Taurus in Europe.
Q Let me show you AADE 5765, which is the model year 2000 DW 186 European export for the U.K. in Germany. It's a document produced by Ford in this case. Does that help you answer that question?
A It sounds like a similar system. There's one item on here -- you didn't ask the question, but it says seat belt buckle pretentioners. It says TBD, and -- I don't know. It could have been some early stage. I don't see a date on this document.
Q Okay. But the document that you have in your hand, does that show a sensor -- the sensors for the seat belt -- not the

seat belt -- but for the airbags?

A Yes.

Q Okay. Where are those sensors for the airbags?

A Well, it does not show -- you know, the diagram does not show a satellite sensor. It says uses front crash single-point sensor. I think at this stage from whenever this document was produced or put together it probably was a proposal that they thought they could put a true single-point system in. Because it says buckle pretensioners to be determined, and it does say uses front crash single-point sensor.

There was a point in time where we thought we could put a single-point sensor in because this program was being developed from '93 to, you know, when it finally went into production in 1999.

Q Now, that's what I was going to get to. Do you know whether or not the European model was a single-point sensor?

A This is an export version. This was still built in the same plants, and I don't know whether this was -- this was actually exported without checking the records. Usually we exported vehicles of that type to other parts of the world that wanted them, like the Gulf nations or other places like that. Because we had other products that were similar to the Taurus that were already being produced in Europe.

Q Yes. But my question is, do you know whether or not the European version, wherever it was created, shipped from,

et cetera, was a single-point sensor or a dual-point sensor?
A I don't know the answer to that unless I looked at the final program assumptions that would say what it was. I would think it would be very difficult to have two different systems on the same vehicle that was being produced in Chicago and Atlanta.
Q Can you find that out?
A Can I find that out?
Q Yes, sir. I think it's officially covered in the 30B6 as to know what the systems were that were being put into the 2000 Ford Taurus. It doesn't talk about European versus American.
MR. BIBB: I just now was going to say -- I was going to object to this whole line of questions because there's nothing in here about vehicles sold outside the United States. I'm not even sure the Taurus was sold outside the United States, or at least not in Europe.
MR. WELLS: Well, here's the reason I have an interest in it. He alluded to it, and I was going to go into in a minute. There was some problems with the single-point sensor. It's all through the documents. They were having all sorts of problems with single point, and I'm betting, much like he alluded to, that the document we're looking at was probably an early-stage document that went to Europe -- if I was a betting man -- that would probably say it was also

a two-point system, but I don't have a date on this document.

MR. BIBB: I'll take your bet, because I bet they never exported a Taurus to Europe.

MR. WELLS: So my question is, we have 40 categories about 2000 Taurus and the design and the details and how they worked and didn't work. It's from the same plant. I think that's sufficiently covered with a 30B6. It's a simple matter of can I ask you guys to let me know whether or not the one shipped to -- if there was one shipped to Europe whether it was a single point or a dual point?

MR. BIBB: I will be glad to -- I'll find that out. That's not a very difficult question to answer. We do not -- the witness was not prepared to discuss foreign sold vehicles.

MR. WELLS: And that's reasonable. Just let me know.

MR. BIBB: I will.

MR. WELLS: Okay.

MR. BIBB: We have a bet though. We have a little wager on whether it was actually sold in Europe, because I feel real confident about my answer on that.

MR. WELLS: I thought we were betting on the single versus the dual?

MR. BIBB: No.

MR. WELLS: Okay. Thank you.

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MR. BIBB: No.

MR. WELLS: Okay. Thank you.

BY MR. WELLS, CONTINUING:

Q Now, you mentioned something, and I guess I'll kind of skip ahead to it. In the early stages of the development of the SMART system for the airbag system for the 2000 Taurus there was an effort originally to have a single-point sensor?

A That's correct.

Q And the sensor would just be in the RCM?

A That is correct.

Q And then there was some problems that caused you to go -- you at Ford to go to a remote sensor -- satellite sensor in addition to the one in the RCM; is that right?

A That's right.

Q Tell me what the problems were.

A It didn't work.

Q Why not?

A You couldn't -- you couldn't get the right timing on the system, and you had issues that other manufacturers were having in that time frame with single points, that if you had -- if you would hit a rock or raccoon or something on the road, you thump the floor pan and you trick the system. So the fact is that you have two different positioned sensors that gets rid of what's called the inadvertent actuations where you don't want those.

There's lots and lots of conditions in the world that would produce a bag when you don't want it. And those are much more frequently occurring events than something that's way out in the, you know, 40, 50-mile-per-hour barrier.

Q Are there any other reasons?

A I'm sure there are, but that's -- that is one of the primary things that when you have a single point you've got a go-no-go kind of situation, where you don't have a check on it.

Q Okay. And from the perspective of determining acceleration, they both work the same? Or they both give you the same sorts of things; one is not better than the other in terms of determining accelerations?

A Well, it could be, because the location and timing is certainly important. So if you're going to make a decision early on and you have to make a decision very early on in the crash sequence, you want to be able to get the data as soon as possible so that the RCM is looking at that data and saying what should I do; should I just fire the pretensioner if the belts are on or should I do a Stage 1, is this a small person that the seat's forward. It has to look at all that information very, very early on and make a prediction as to whether this is the kind of crash that would require one-stage, two-stage pretensioners, whatever.

Q But the reason you guys put in two sensors, one in the RCM and one in the satellite, is so they can check each other?

A That's right.

Q And what the computer wanted to do to avoid just the inadvertent situation where the airbags would go off where you, like you said, hit a rock or hit a raccoon is it requires both of the sensors to say yes, go?

A That's right.

Q Now, the single-point system, was it also very risky due to pole impact performance?

A That's -- depending on the structure of the vehicle, you can -- a pole can hit a soft point in a vehicle and you can get a lot of penetration before you hit a hard object. Say you're between some kind of structure and the pole would penetrate and then all of a sudden it would get into the engine or some other hard point in the front end, so you have to watch those kind of conditions because it tends to trick systems if you don't have one system checking on the other to make sure this is an event where you would have a bag required.

Q Okay. You lost me there. Why would that be a problem with a pole for a single point?

A If you located a single point, you might not have enough time to get the bag up because you're getting a lot of penetration, and then you have something being rigidly impacted and then you don't have enough time to get the bag up and provide the protection that you need.

Q What do you mean get the bag up?

A Well, there's inflation time. Once you make the decision, you have to get the bag fully deployed before the head and neck of the occupant moves very far.
Q Okay.
A And if you have -- where it's a soft collision where not much is happening and then all of a sudden late in the sequence you get a spike in the curve, you're not going to be able to deploy the bag where it's going to provide the protection you'd like to have.
Q Because the person would already be against the steering wheel?
A That's correct.
Q Okay. Let me tell you what I'm mentally thinking as you're saying that. The slow collision may be throwing the person forward, the slow part of the collision, the soft part -- the soft part of the collision may be throwing the person forward, the airbag doesn't have enough -- the tester doesn't have enough deceleration to say hit the airbag, and then it has the deceleration where the person is already up forward and bang, it goes off; is that right?
A That's probably one of the possibilities.
Q Okay. Let me read you something and see if I understand. This is a memo. Let's see who this is. It's to Dave. What is Dave's name? It's from Christopher Carrooso [phonetic] to U-S-F-M-C-X, somebody at IBM mail dot com something. It

says: Hi, Dave. And it talks about missing a conference. It says, No. 2, PN 96 -- does that mean anything?

A That's a truck.

Q Okay. The single-point approach is very risky due to pole impact performance. The pole impacts provide very little energy to the passenger compartment by the desired triggered time and, as a matter of fact, for the 19 and 21-mile-per-hour poles it is unlikely we would not be able to provide a robust deployment decision until about 85 milliseconds, which would miss your goal times; therefore, we're abandoning the single-point approach for PN 96 and focusing on the crush zone sensing. Does that all make any sense to you?

A It makes sense because you're talking about a truck product that's rigid, and one of the major issues with trucks is, like, in this part of the world you put snowplows on them and you don't want bags to be popping off when snowplows are pushing stuff around. And trucks are used for a lot of different purposes, so trucks tend to be a little bit more ridged, so that makes it more difficult to sort this information out.

Q Okay. It says the ESI, what is that? And its says, paren, crush zone sensing, closed paren.

A I'm not sure what ESI means.

Q Okay. Let me go to this. It says a general comment about

the ESI approach for DN 101. DN 101 is the Taurus?
A That's correct. That's the previous one to 2000.
Q Okay. Let's talk about pole tests. Is it -- there were observed many accelerometer failures in these test events. This indicated that the sensor locations are in a very volatile region of the structure. The lack of accelerometer data which is valid leads to two concerns; one, being able to set threshold reliability where there is -- where there is unknown beyond the accelerator failure point. It sounds like it's missing a word. Are you sure we did not set a threshold too high or too low? 2, the viability of the ESI itself is now vital. Do you know what that all means?
A I'm trying to figure out what they're talking about, ESI.
Q It says he had ESI --
MR. BIBB: Could the witness see the document?
MR. WELLS: Sure.
BY MR. WELLS, CONTINUING:
Q The ESI -- it says crush zone sensing. Let me show you what I'm looking at right here.
(Discussion held off the record)
(Recess taken)
BY MR. WELLS, CONTINUING:
Q Okay. I've got this AAGQ 1102, and there was the discussion on 1104 about certain things, one of which was a general comment about the ESI approach for DN 101, the Taurus, is

that there were observed many accelerometer failures in these tests. I believe they were talking about the pole tests, but you've read it. This indicated the sensor locations are in a very volatile region of the structure.
A That's what it says.
Q What does that mean?
A I guess they're concerned about the location at that particular time of where the sensors were located. This is a 1997 document. It appears that this is some kind of sales pitch that was from Delco, if you look at the E -mail address. So it must have been some kind of Delco proposal to Ford because we were looking at anybody that had the information. So it's unclear whether those are Delco systems on those products or what they are.
Q Okay. It says here the survivability of the ESI itself is now vital. It appears there may be a high probability of ESI contact in crash events and, thus, the ability to transmit the vital information before a wire gets cut or the sensor gets destroyed may become critical. Is this E-mail talking about the fact that if you put the sensor in certain areas of the structure it's possible that the sensor may be destroyed or one of its wires cut before it actually goes off?
A That's what that document says, but we don't know what design that is or what that's all about. It's -- certainly with all the E-mails it's clearly from Delco Electric in Cocoma,

Indiana.

Q Okay. But before the 2000 Taurus came out there were concerns about single-point systems and there were some concerns about how to deal with pole crashes, weren't there?

A Yes.

Q Okay. And the concerns about the single-point system resulted in a dual-point system -- dual-sensor system?

A That's correct.

Q And the concerns about pole tests wiping out the sensors, was that something that was discussed and resulted in a change in any design?

A Again, I don't know the answer to that without, you know, rereading all those 25 boxes of documents to see whether there was something in some of those documents that addressed that.

Q We will discuss that when we come back for the continuing deposition.

A Okay.

Q Would you look for that? But sitting here today -- can you look for that?

A It would take me a long time to read 25 boxes.

Q Well, let me put it this way. You are the Ford representative, and I have asked about design and all kinds of things in the notes. My question to you is, as the representative of Ford, whether or not the concerns about --

the expressed concerns at Ford when the 2000 Taurus went into
production that a collision with a pole may cause the sensor
to be destroyed, did that concern result in any design
changes?
A I don't know.
Q Okay. And did that concern with the pole destroying the
sensor result in any warnings, actions, studies, discussions,
or anything that you know of?
A I'm not aware of anything like that other than the design was
tested with poles and it was tested with barriers, it was
tested with offset, car-to-car, all those tests we talked
about previously, and we didn't see anything like that.
Q But those were at lower than 35 -- 35 miles and hour or
lower?
A That is correct.
Q As an engineer sitting here thinking about this system, with
the sensor sitting -- the satellite sensor sitting -- it's
basically directly under where the hood ornament would be,
isn't it?
A It's in that area.
Q With the sensor in that location, with a center pole
collision do you think it is possible that the sensor could
be cut or destroyed in a center pole collision before it
sends a signal to the RCM?
A Under any conditions?

Q Yes, sir.
A I think that's a possibility if you're talking about the severe high-speed collision, yes.
Q Do you have any ranges that you think of as severe high speed?
A I could not give you a number without, you know, running a whole series of development tests to determine that.
Q And then your development test would involve some simulations of some sort, wouldn't it?
A Well, you could do simulations. Sometimes, you know, since -- if you're talking about computer-aided modelling and so forth, if you have your models correct and so forth, then you might be able to get some ballpark to determine what range you may want to run some actual tests that prove out your computer modelling.
Q Would you sitting here be able to venture any range that you would expect that to start being a problem?
A I don't know. I mean, you wouldn't -- you wouldn't be able to answer that question without doing a big research project.
Q Could you answer that question simply by running one of the cars into a pole at -- pick a speed -- 60 miles an hour and then it didn't -- if the airbags didn't go off you could just back the speed down and run a few more tests, couldn't you?
A Well, that's certainly one way of doing it, but you may or may not get reliable results from doing something like that.

Q Okay. The thing is you could run some computer simulations, you could run a variety of other things and try to figure that out, couldn't you?

A That's correct. If you actually were able to model everything properly, you may have some useful information.

Q Has anybody done that at Ford for the 2000 Taurus or any other car that's using the SMART airbag system?

A I'm not sure what your question is. There certainly was computer modelling done, because that's -- that's part of the process today. What I mean, today, probably the last five years or so, computer modelling has been able to do some fine tuning to be part of a development program where you actually can run tests and simulations. I mean, computer modelling has certainly been around for 20 years or more, but the supercomputers that we have and the techniques that have been developed, there certainly is computer modelling as far as crash testing that's been done to give preliminary information.

Q Has that computer modelling and computer modelling for the crash tests been done to determine at what speed a center pole frontal collision the car would have to be going before it destroyed the sensor before it would send a signal to the RCM?

A I'm certainly not aware of anything like that. It's usually -- the computer modelling is done to determine occupant kinematics and system performance under the test conditions that you're trying to meet, such as FMVSS 208 or 35-mile-per-hour NCAP.

Q You agree it's possible that there's a speed at which a center pole collision would destroy a front sensor -- the satellite sensor before it sends the signal to the RCM; is that right?

A I think that's a possibility.

Q Okay. Would a second sensor in the car -- second satellite sensor in the car remedy that problem if it's not at the same place as the center pole collision?

A I don't know. It depends really on the type of collision you're talking about.

Q Well, let's just say it's a center pole collision into your testing for what Ford uses as the eight inch, real hard nonmovable pole, and the collision is straight into the pole right at the hood ornament. Let's assume whatever speed it is sufficient to wipe out, destroy the sensor before it sends the information to the RCM. If we have a second satellite sensor somewhere in the front of the car, even that it would pick up a front collision, would that remedy the problem -- assuming it's not hitting the pole -- would that remedy the problem of the first satellite sensor being destroyed?

A I -- that would only be speculation. I don't know whether you could answer that question. You don't have to have a direct impact on something like this. You could have induced damage to it; in other words, if it's closed, it may cause it to fail as well. I mean, if you're talking about a 60-mile-per-hour collision or something like that -- I'm not sure what you're talking about, but you don't have to have a direct impact. You could have sensors on the front of the vehicle and maybe hit one with the pole, if that's what you wanted to do, and the other one may still be destroyed by induced damage.

Q But it would lessen the likelihood of a problem by having two sensors, wouldn't it?

A I don't know.

Q Okay. Now, why is the remote sensor for the 2000 Taurus all the way up under the hood ornament as opposed to somewhere else in the car?

A I think you asked a question that you'd have to ask the people that have done the calibration, the Visteon people. The timing is so critical in determining whether you get a fire of a bag or pretensioner in the very, very beginning milliseconds, and when you start looking at when these systems are actually being -- from T zero -- from the start of a collision in a 30-mile-per-hour collision, you're talking about pretensioners have to -- the decision has to be made within about 10 milliseconds. Stage 1 for a 30, 35-mile-per-hour collision has to be made 17 milliseconds or so. Stage 2 has to be made within about 22 milliseconds in order to get the bag up within the 80-millisecond requirement.

Because you're talking about ranges -- a lot of these things vary a little bit, but probably if you add 50 milliseconds on top of that, that's the time it takes to burn the propellant to inflate the bag so that you can provide the protection. So these decisions have to be made very early on and have to be made with some degree of confidence that the system is going to provide the protection to the occupant that you intended it to do.

Q Okay. The decision to fire the pretensioner is made first?

A Yes.

Q Okay. And then the decision to fire the first stage and second stage are made after it?

A That's correct.

Q Okay. Do the same sensors decide to fire the pretensioners? Is it both the RCM and the satellite sensor that determine that the pretensioners should be fired?

A Yes.

Q Okay.

A It's taking information and -- and looking at what the characteristics of this data is to determine whether you need it. I mean, No. 1, to fire the pretensioner it has to say is the belt on --

Q Okay.

A -- so you have to check the buckle switches to see whether the belt is on, because if the belt isn't on, then the pretensioners won't fire.

Q Okay. So going back to -- what documents do we have that say what the sequence is of making decisions and what's required for that decision? Are they in the documents, the 22 boxes?

A Yes, they are in that collection.

Q Okay. Can you identify those documents?

A I can't identify them by number, no. But they are in the collection. I've seen them.

Q Okay. Would you do me a favor and make a note of what they are for our next meeting? I think your attorney -- could you do that for us? Do you need a reminder?

A To go back through and read 25 boxes of documents, I think we're talking about 40, 50 hours maybe to do that again, and --

Q Ford can afford it.

MR. BIBB: Well, there is that summary in the interrogatory response.

BY MR. WELLS, CONTINUING:

Q Let me go back then.

The computer receives information from the two sensors and then makes decisions and then sends out its commands; correct?

A That's correct.

Q Does it send out the command to fire the pretensioner before it sends out the command to burn the airbag?

A Before the different stages are kicking, yes.

Q Yes. So that's what I'm getting to. The actual signal is sent to the pretensioner before a signal is sent to the airbags; is that correct?

A Right.

Q Okay. Then that is a sequence that it is trying to fire the various mechanisms; correct?

A Well, the more input data, you have a great -- when you look at the beginning of a time zero, you have very limited data early on. As time goes by, even though you're talking about, you know, 15, 17, 20 milliseconds, the longer you can put off the decision-making process, you're going to have a more reliable prediction.

Q Okay.

A Because you got to be careful about looking at data too early on because it's very hard to distinguish between a fire and no-fire characteristic early on. The longer you can look at it, then you can have a higher degree of confidence that you need the bag, you need Stage 1, you need Stage 2.

Q I got you. Let me see if I can do this, and I'm being a little sloppy and I'll consolidate this in a minute once I figure it out.

The decision whether to fire the pretensioners is made earlier than the decision to fire the airbags?
A Right.
Q And the actual firing of the pretensioners fires before the airbags fire?
A That is correct.
Q And the airbags are fired later for -- one of the reasons is that it wants to receive more data to increase the reliability --
A Exactly.
Q -- before firing the airbag?
A That's correct.
Q So what happens is -- let me get to this.
Is one of the reasons that occurs is because an airbag firing is a big event and the pretensioner firing, well, it's not going to kill anybody -- hurt anybody, and it needs less data?
A Well, it's easier to determine because you're checking is the belt on, does this look like this is an event that requires it.
Q And then the airbags want to really know it's required?
A And do you need Stage 1; do you need stage 2.
Q Okay. So let me walk through it.
At time zero you start colliding with something, the car does -- and I realize how fast this occurs. You start

colliding with something. The sensors, one in the RCM, one in the satellite, start detecting something is going on and sends -- initially sends some limited data followed by more data and more data --

A That's correct.

Q -- as this is occurring?

The first data that comes in may be enough to order the pretensioners to fire but not enough to order the airbags to fire because you're waiting on more information to confirm this before the airbags fire?

A That's correct.

Q Okay. So as the data comes in from the two sensors, the decision can be made based on the limited data that we presently have that the pretensioners should fire?

A Right.

Q And they go off?

A That's correct.

Q And then the RCM waits to get more reliable data to make the decision?

A It's not exactly waiting. It's a continuous calculation of what's occurring.

Q Yes, sir.

A It's accumulating information.

Q It accumulates more information to make a more reliable decision to fire the airbags and fire at the appropriate stage?

A That's correct.

Q Now, with that is it possible that the information could be coming in as the wreck occurs, the automobile makes the -- the RCM makes the decision to fire the pretensioners, then the information is such that it's not reliable enough information to shoot off the airbags?

A That's certainly a possibility.

Q Okay. Is it also possible that in a center pole collision at sufficient speed that the information from the initial impact could be sufficient to fire the pretensioners but then before sufficient information is transmitted to fire the airbags the front satellite sensor is wiped out and can't send the available information for airbags?

A That's certainly a possibility too.

Q Okay. Now, this data that is sent that says, ah-ha, fire the pretensioners, is that recorded in the RCM?

A It should be, yes.

Q Okay. The data that is sent to the RCM before the front satellite sensor is destroyed, should that be stored in RCM?

A It should be, but this is a continuous process, so the system is continuing to acquire information, so it's -- it's like the first hundred milliseconds and then it's going back over it. So it writes on top of it.

Q That was going to be my question. How much data does it store?

A It depends. Generally I think the specification is -- you know, some of it says -- I think that document you just had say 150 milliseconds, but -- people have told me it's 117 milliseconds, but it's generally about a hundred milliseconds.

Q Okay. So every tenth of a second it writes information and then rewrites it?

A That's correct.

Q Okay. So if I wanted to know what was the last second recorded by the RCM, I can't have it; I can have the last tenth of a second, I can't have more than that?

A That's correct.

Q Okay.

A And that's also -- that previous document talked about some of the problems with the storage and how much you could really put in there.

Q Okay. Now, in this case the RCM was taken out of the vehicle and there was an attempt to read it?

A Right.

Q What did the information say?

A It said that it didn't -- the information that was available really didn't provide anything that made any sense.

Q What information -- what was the information that it should have provided? I mean, like deceleration? It's underwater.

not underwater. I don't know what it is.

A Once you retrieve the data -- the raw data, you can use the software that's available that we have, and I think we provided it to some of the investigative people now, that you can actually get a deceleration versus time characteristic which would show what's happening plus any stored fault codes and some other information that's in there that's described in the documents.

Q Okay. Did the RCM in this case show any fault codes that occurred?

A I don't know the answer to that because I think it was -- Visteon was trying to interpret some of that information.

Q What was told to you that they determined from the RCM?

A I never heard whether there were fault codes in it or not.

Q Did the RCM record anything other than deceleration over time and the fault codes? Are those the only two things that it records?

A That was some of the information. I'm not sure what else was recorded in there.

Q Those were the two that you looked for to determine whether the airbags should go off?

A We were looking for the deceleration versus time curve.

Q Okay. And in this case when the RCM was read, was there any information regarding deceleration over time?

A There was some information, but it was certainly not meaningful.

Q What do you mean there was some information not meaningful?

A I don't remember what the curve looked like, but it certainly was not what we would expect. It was basically data that didn't make any sense.

Q Did you get some report of that data?

A I seen a printout of that data at one time.

Q Okay. Did you see an interpretation of that data?

A Yes, we had interpretation of the raw data.

Q Can we get that?

MR. BIBB: I'm working on that.

MR. KILPATRICK: You're trying?

MR. BIBB: I'm working on that.

BY MR. WELLS, CONTINUING:

Q But you have seen that in written form?

A It was plotted.

Q Okay. It was given to you?

A I don't know whether I ever had a copy of it or not. Once I seen it was meaningless data, I wasn't really interested in it.

Q What did it look like?

A I don't recall. I know it was just nonsensical information.

Q This is just one of the crash tests. Well, this would have been -- would it have just been something that was a graph of deceleration versus time?

A Right.

Q A two-dimensional graph?

A That's correct.

Q It would have deceleration on the right -- it says probably -- time on the -- probably the X axis -- my guess?

A I believe that's what -- eventually once you take the raw data and run it through the software, that's what you get.

Q And you would expect some sort of curve that would be as the result of the data; right?

A That would be correct.

Q Okay. Did you have any curve?

A There was something, but it was just not -- it didn't have any meaning. It was -- certainly indicated that whatever was in there might have been something that occurred way at the end of the event because of the continuous monitoring of the system.

Q Did it look like it had erased everything?

A It was overwriting stuff I think, because it seemed to me they only had a small portion of some kind of curve that didn't seem to make any -- like a -- you know, less than 20 milliseconds.

Q This machine that only reads for a hundred milliseconds and then writes over it again, when you have a wreck, you're wanting that information to determine what happened, aren't you? Don't you?

Let me ask that question. What is the purpose for it retaining any information?

A You would like to see what happens during the part of the event where you have the system sensing the collision and firing the bags or the pretensioners.

Q Yes.

A You want that information.

Q Yes, sir. But what in the system says, ah-ha, quit recording, don't write over yourself?

A I think that's a question you have to ask Visteon.

Q But it is in there?

A I believe so, because I've seen it where you can get that curve from the collision.

Q Okay. Something happens, maybe the airbags fire, and it says don't record anymore and preserve that information?

A That may be what occurs.

Q Okay. But in this case did Visteon give any explanation as to the reason why the RCM did not have good information?

A I'm not aware of what Visteon said about that.

Q Okay. Have you seen any report from Visteon as to why their little gizmo didn't do its thing?

A No, sir.

Q Who runs the crash tests for Ford? Do they do that in-house?

A We usually do them in-house. We have contracted other people. We have a barrier -- in fact, there's two barrier

facilities. If you want names, you have to look at organizational charts or look at the crash test reports.
Q When they do a crash test, they run some sort of a report that they put into a crash test package of some sort; it's got photographs, graphs --
A That's correct.
Q Where are those kept?
A I'm not sure where they're kept.
Q Okay. Do you know who is --
A They may be kept at the barrier crash test facility. Maybe it's -- a lot of this stuff is put onto the computer system, so the barrier test facility would have the information for the test.
Q You mentioned something about to look at the crash test you'd have to go to the database. What's the database?
A There's a database that -- all crash tests you can get from that, and in recent years -- it used to be there was no database that you could access directly, so if you want the photographs, if you want the information that's in those reports, you can call it up out of the databases, and I'm not sure what the acronym for that database is.
Q Okay. Is that just a Ford database or is that something you share among all the car companies?
A No, that's a Ford database.
Q Who chose the location of the satellite monitor for it to be

where it was in the 2000 Taurus, under the hood, did Ford or Visteon?

A I think it was a collaborative effort, because it always has to be -- the suppliers certainly make suggestions, and since Ford Motor Company had the ultimate responsibility for the performance of this system, you would have to look at the system and see whether it was the kind of thing that you could manufacture and put together and service and those other characteristics.

Q But it is a location that was approved at least or concurred in by Ford?

A Yes. It's a collaborative effort.

Q Okay. Were there any alternative locations considered for the location of the satellite sensor?

A Sure. I think when you look through the documents there were all kind of different proposals made. You showed one from Delco to me that you didn't mark as an exhibit, so --

Q Well, we didn't need to because of the numbering. That serves our purpose. Let's see which one you're talking about.

MR. BIBB: It's the hi, Dave, memo.

BY MR. WELLS, CONTINUING:

Q In the hi, Dave, memo, we know that Dave -- in the hi, Dave, memo, where did he suggest it be placed?

A Well, it's not exactly clear other than being up front, but I would suspect that there were drawings. There were proposals as to exactly where it was. It's not clear where it is from the document other than it says it's in the crush zone.

Q When I refer to the SMART system airbag system for the 2000 Taurus, is there a number that I should call that? I know there's a number for the RCM. I know there's a number for the sensor, but is there something that –

A You mean a part number?

Q Well, like we've got the DN 101 or the D 186 for the car. Is there something about this system that would identify it?

A Sure. There's a part number.

Q For the airbag system itself?

A No. It's not the airbag system. Each component has a part number.

Q Okay. Now, you mentioned that there were some costs analysis done as to how much this system in the 2000 Taurus cost, the SMART system versus the system that was the electromechanical ball in a tube system. Do you recall what the difference in cost was to the company?

A It looked to me like it was about a 17- to 20-some-dollar penalty.

Q To go to the SMART system?

A That's correct.

Q How much did the SMART system cost versus the electromechanical?

A I didn't see anything like that in the documents. Usually what people are interested in is is it going to cost more or is it going to cost less, exactly what's happening here to the difference.

Somebody in the system would know exactly what -- if you took component by component -- what it cost to pay Visteon or whoever for those pieces when they were ordered by Ford, but that's -- that's usually a purchasing document that if you can backtrack from a part number you can understand what it is.

Q Do you recall what the RCM cost?

A I don't know.

MR. WELLS: Do you have that list?

MR. KILPATRICK: I'm looking.

THE WITNESS: I don't recall ever seeing in any of the documents exactly what the cost was. It showed what the incremental cost was.

BY MR. WELLS, CONTINUING:

Q What is that?

A The difference between what the system was before; in other words, they would compare the '99 system against the 2000.

Q All right. Now, the -- was the -- the effort over the years to develop this electronic accelerometer, meaning the RCM and the SMART system that was in the Ford Taurus and other cars, was that a project that had a name at Ford Motor Company?

A I think it was generally called the SMART airbag, but, again, there are documents that talk about the intelligent airbag Phase 1, 2 and 3, so it's one or the other. I think generally people were talking about the SMART bag --
Q Okay. With that --
A -- or the advanced airbag, I mean, depending on which document you look at. I think people were putting names on it, but the SMART bag was supposed to give you all this feedback information, so that's why I think they talked about the intelligent airbag, Phase 1, 2 and 3, because they couldn't get things invented in time.
Q Yeah. Is this Phase 1?
A I believe it is.
Q What happens in Phase 2?
A I think that's where they were trying to get the weight sensors in.
Q In the seat for how large a person?
A Right.
Q What's Phase 3?
A I think they were talking about -- which hasn't come about yet -- they were looking at proposals to try to understand proximity kind of locations for child restraints to determine whether -- whether there was a child restraint and what position it was in and so forth.
Q Okay. Now, with these systems, the SMART airbag system and

the intelligent airbag system, were those mandated by the
federal government?
A I think there's a phase-in Mandate 208 that covers some of
these issues up in -- it's something that's being phased in,
and whether they're still sticking with that -- sometimes
they issue rules and then they backtrack on them too. So I
think my recollection was that there was a phase-in
requirement that you had to have some of these advanced
airbag restraint systems being phased in up to 2010 or
something like that, 2008.
Q Okay. But this SMART airbag system that was in the 2000
Taurus was something that the feds were mandating at some
point in time?
A Well, it certainly wasn't mandated for 2000.
Q But it was coming in the next several years?
A That's what it appeared, yes.
Q So this was one of the early stages to phase it into your
line because it was a requirement of the federal government
that a system of this nature start going into the cars in the
United States?
A I think you would probably say it was a potential
requirement, because sometimes when the government says you
must have it in 2004, 2006, whatever, sometimes when you get
closer to the date, then they change their rules again. So I
think it was a potential requirement.

Q But as of the year 2000 model year, Ford Motor Company was aware that the existing requirements required to get these type of SMART systems to go in cars, and absent a change in the rules, they had to get these systems implemented; is that right?
A Well, the -- you probably read the rules. The rules aren't exactly that way. They talk about injury criteria usually and they talk about different-sized dummies, and the only way you can meet that criteria is to put a system like this in, where you have feedback and controls where you can cut it off if you have the child restraint or, you know, the 50th percentile, the female being too close to it. So it's a rule-making proposition that talks about the performance criteria. So this is certainly one way of doing that.
Other manufacturers may choose other ways to do it. They usually don't mandate a way of designing a vehicle or a system, but rather they tell you what the performance for the injury criteria is for different dummies.
Q Let me back up. And I recognize your difference. I was being somewhat sloppy.
Is it correct to say that the SMART system -- SMART airbag system that Ford Motor Company put into the 2000 Taurus was placed in the 2000 Taurus in order to meet the then stated requirements of the federal government for airbags and certain safety systems that were in affect and

were going to be requiring these systems in the next several years? Not that it required that particular airbag or that particular result, but the requirements of the federal government were being met by putting in this sort of system.

A Essentially that's correct. I would say it's more like advancing the technology to meet those requirements.

Q Okay. Now, the -- let me show you what we've marked AABC -- actually, your attorney or somebody marked it -- AABC 7588. There is an -- it's called ECS module variable cost targets. What does that mean?

A What was your question?

Q What does that mean?

A I'm not sure what ECS means other than I think it's electronic control. That's my guess. I think we're talking about the -- what was called the RSM.

Q Okay. It has a place that says the mechanics and then it has certain model years and it has a cost. And it says accelerometer 2000 model year, $4.23. What is the accelerometer?

A It's a part of the system.

Q Is that the remote sensor, the satellite sensor, the thing that's under the hood?

A Well, it may or may not be, because you've got a document dated here '94, and they were still looking at the single-point system, so the way this is worded I think it's one system that had everything in it rather than the satellite. So I think this is talking about a single-point system just because of the data, so it's an accelerometer that would have been in the single-point system.

Q Okay. Well, let me ask you this then. Category No. 8 is, the cost of the airbag and restraint system implemented in the 2000 Ford Taurus. What was that?

A Repeat the question please.

Q Category No. 8 here, it says, the cost of the airbag and restraint system implemented in the 2000 Ford Taurus -- how much did the airbag and restraint system cost in the 2000 Ford Taurus?

A I did not see any numbers like that in the documents, but that's something that probably could be determined from purchasing. I mean, these are variable costs, and you have to be careful about looking at fixed and variable costs. Sometimes it's -- it's meaningless in reality. I mean, you have to understand what the basis of these costs are. I mean, it's certainly important for making an analysis internally, but just because something says $32 does not mean that you're buying it for $32, because on top of variable costs you always have to look at your fixed costs.

Q Like what?

A Manufacturing.

Q The cost to get it into the car?

A Well, that's part of it. I mean --
Q What do you mean by variable and fixed? I know a little economics, but I'm trying to figure out how you're using them.
A My understanding of variable costs is what the actual pieces costs.
Q Okay.
A Now, to put it together to buy the equipment and machinery and so forth you have to add fixed costs on it. Any manufacturer, whether it's Visteon, whether it's Delco, they would look at the components and see what it costs and then they would also add numbers in for brick or mortar or whatever it would take to manufacture it.
Q Let me ask you this. If I went to Visteon and I said sell me an RCM and I got the same price you guys got for that RCM put together, would that be the variable cost and then you guys have to add from a cost analysis what it costs to have somebody take it out of the box, go over to a car, put it in the car, the building that covers me, the pension benefits and all that kind of stuff? I'm just trying to get to this variable-fixed cost understanding.
A The cost that you pay is not the variable cost because you're buying a service part I would suspect.
Q Assume I got it at the same price you guys do. You guys have a deal. You can get RCMs at --

A It certainly wouldn't be this number.
Q Okay. Why wouldn't it be that number?
A It's some number -- I don't know whether it's doubled or tripled or whatever, but you have to go back and look for purchasing documents on the final-end item that was purchased, and that's -- that's not that difficult to find out. You go back and say, what was purchasing paying Visteon for an RSM that was put into this vehicle based on that part number. I don't know what that is.
Q But you don't know the cost of the airbag and restraint system in the 2000 Ford Taurus?
A I have not seen that number.
Q That would be an accumulation of the various parts, the cost of the parts; is that right?
A That would be correct.
Q And continuing on No. 8, and the cost of the airbag and the restraint system in the '99 Taurus, you can't tell me that. That would also be a collection of the various parts and what they cost?
A That would be correct.
Q All you can tell me is the difference of the two costs which is, what did you say, 17, $20?
A Depending on what estimate they were making at what level and what time frame. There's lots of those documents that reflect those kinds of numbers, and I was giving the

estimate, kind of the numbers that I seen in some of the documents.

MR. WELLS: Okay. Randy, can you -- Category No. 8, what I'm wanting to know is what the cost is on an RCM and the cost is of the satellite sensor.

MR. BIBB: Then we will attempt to do the cost analysis that Mr. Wagner described, which is just a part cost which is not necessarily an accurate number. Costs are a real -- they're real variable based on what you mean by costs. Like if you went and bought one at your neighborhood Ford store, that's the cost of the part.

MR. WELLS: I want to know what Ford paid for a --

MR. BIBB: Just for the RSM --

MR. WELLS: Yes.

MR. BIBB: -- or the satellite sensor?

MR. WELLS: I want the satellite sensor.

MR. BIBB: And for the wiring and for the wiring harness and for all those components?

MR. WELLS: In order to -- according to him, in order to get the cost of the airbag and restraint system in the 2000 Taurus you would have to give me the parts in that system and the cost of all the individual parts. If you give me that, then there's no confusion between us.

MR. BIBB: But that would only cover the part cost --

MR. WELLS: I'm okay with that.

MR. BIBB: -- as opposed to the labor cost or the fixed cost.

MR. WELLS: Yeah, there's all kinds of costs to get it into the car.

MR. BIBB: Right.

MR. WELLS: I understand that. Right. I understand that when somebody --

MR. BIBB: We will endeavor to get you a number.

MR. WELLS: Okay. I understand that when the food arrives at the restaurant, it's not on the plate.

MR. BIBB: That's true.

BY MR. WELLS, CONTINUING:

Q Okay. That's what we're talking, fixed and variable; is that correct?

A Yes.

Q And the cost accounting people, what they have to do is figure out what to charge -- what the cost is of that car in the end, and it's just not the sum of the parts sitting on the shelf?

A That's correct.

MR. BIBB: That's correct.

MR. WELLS: But you'll get me the cost of what they paid for the parts -- for all the parts in the 2000 airbag and restraint system?

MR. BIBB: I will endeavor to get that information.

BY MR. WELLS, CONTINUING:

Q Okay. Now, let's see. Now this fixed cost, does anybody calculate that somewhere?

A It has to be calculated otherwise you don't know how to price the vehicle.

Q Has anybody calculated what it would cost to put another remote sensor on the 2000 Taurus as a backup safing sensor?

A I haven't seen anything like that.

Q Okay. When the single-point system was thought about doing, you guys thought about a single-point system as opposed to a remote, was there a team that was actually working on the single-point, testing it to see if it worked and that sort of thing?

A Sure. You can see it in the documents, if people were working on it. And it wasn't necessarily the Taurus. It was looking at other programs too.

Q What was the name of the team?

A I don't think they had an official name. I think it was different people; restraints engineering, automotive safety office. Suppliers that we had talked about were participating in the design and development of these systems, from, you know, Siemens to Bosch to Delco, Visteon, if -- they were looking at all different sources of designs and components to try to understand which was the appropriate one for the vehicle.

Q Okay. As I look at the documents today, and I've been messing with them, I don't find a study that says -- both you guys may correct me -- the reason we're putting the satellite sensor under the hood ornament as opposed to other locations is 1, 2, 3, 4. Is there such a document that you've seen?

A Usually there's not a document that clearly says that. When you go through the development process and you look at designs, there -- at some point in time when you're talking about sensor development, people are looking at different locations. And whether it's a computer simulation or whether it's an actual crash test, they look at locations of sensors and structure and so forth that you may see some tests -- I know when you look at old mechanical sensors, they used to put some threshold test where they would put, you know, 20 sensors in the engine compartment at different locations to try and record data. Sometimes it's just simply accelerometers.

(Interruption on the record)

BY MR. WELLS, CONTINUING:

Q Now, the sensors, are they -- these teams that are doing it -- are they just working on one car or are they kind of working on all the cars? Do I have one great big Taurus-Sable group and I've got a Ford Expedition group?

A There's different teams of people because the characteristics -- if you're looking at an F-series truck, you've got different criteria than you would for a Taurus, for example. You've seen some of that. Trucks are different than cars and big cars are different than small cars, so you've got different groups of people. But there certainly can be some cross-over people that are working on all products because of what their expertise is.

Q. Does the Ford Expedition have a SMART system in it?

A Today?

Q Yeah.

A I don't know the answer to that. I would suspect it does, but I don't know.

Q Okay. Are sensor development tests run after the car gets on the market?

A No. That is done well -- well -- long before the vehicle is ever manufactured because you have to sort out different alternatives. With computer-aided design you -- you do some fine tuning with the computer-aided modelling and design so that you have an idea, and then you run development tests and then you would run certification in some cases. You run verification tests to see if you're still meeting certification requirements.

Q I'm just curious. I've got document No. CRTS 0012068 that is a test report, and it's a whole bunch of pages. It goes through 1, 2 --

MR. KILPATRICK: They're all numbered.

MR. BIBB: That's a crash test number.

MR. WELLS: It's a crash test number, oh.

CRTS, does that mean crash test?

MR. BIBB: I bet it does, CRTS.

MR. WELLS: I bet it does.

MR. BIBB: Yeah, there's generally a number up here.

THE WITNESS: Right here.

MR. BIBB: There's 12068, and that's what it corresponds to.

BY MR. WELLS, CONTINUING:

Q It says objective to obtain development data relative to airbag sensor systems for the 2000 Taurus run at the end of 2000; do you know why that test would be run?

A This appears to be a document where they had a number of different sensors on it, but they were looking at different locations and different types of sensors for some future development, I would say, because this is a production vehicle. It says it's a production vehicle in here. That's run after the start of 2000 production.

This does not mean that this is a 2000 production vehicle. This is a modified 2000 vehicle with sensors that -- if you go to the second to last page, it shows locations of where the different sensors were placed, and some of them are Visteon sensors. And I don't know what RCM 1, 2, 3, 4, 5, 6, 7, 8 -- it says some triaxial

accelerometers were placed in different locations. And there's a map here that says sensor map of where these are located. So this has to be development for some future program. Maybe this is for, you know, the next generation –
Q Let me see it a second.
A – Taurus.
Q Is this a – is this a test other than the airbag SMART system that was in the 2000 Taurus vehicle in this case?
A Yes. This is an evaluation of a different -- an array of sensors of different types, which I can't tell you what they are, but it's described on that second to last page, the locations and what they are.
Q Okay. This one – let's look at the end to last page. Is this showing where the sensors were located in this car during this test?
A Yes.
Q Okay. There was a -- Sensor No. 1 is LC, front radiator support; what does that mean? What does that LC mean? Located? No, that couldn't be.
A It almost sounds like --
Q Left?
A – left center, but I don't know where – if there's a mark on this diagram that shows where number one is, maybe that would help us. I can't tell whether that shows a one in there or not, but these other ones are blocks.

MR. BIBB: Yeah, that is.

THE WITNESS: It looks like the number one is located near the hood latch. That looks like --

MR. KILPATRICK: Oh, yeah, I see it.

THE WITNESS: -- like a number one here. These other ones are blocks. I see two and three and so forth over here.

MR. BIBB: One is boxed too.

MR. WELLS: Yeah.

MR. BIBB: It's hard to pick up on that copy.

BY MR. WELLS, CONTINUING:

Q I gotcha. So No. 1 would be at the radiator support?

A Obviously near the center line.

Q Okay. So then No. 2 -- No. 1 would be an accelerometer. Does that mean it's a satellite sensor?

A Yes.

Q Okay. No. 2 would be at the dash, which would be an accelerometer?

A That's correct.

Q Number --

A But also there's different types. It says output longitudinal and the other one is triaxial, which means X, Y, Z.

Q Okay. Then you would have a variety of Visteon RCMs in this car?

A Whatever that means.

Q Okay. Then you would have on the No. 5 at the left -- at the floor pan, wherever that is, at No. 2?
A I think it means left front floor pan.
Q There was an accelerometer?
A Triaxial.
Q Which would be X, Y, Z?
A That's correct.
Q Okay. And then you had an accelerometer in the floor pan, dash, and then one behind the front seats?
A That's correct.
Q Now, what is the difference between the -- well, in the 2000 Ford Taurus the accelerometer -- or the satellite sensor in the front of the car, was it a longitudinal or a triaxial?
A I think that's a question you have to ask Visteon. I've never seen a document to say what it was. There may be in the collection of 25 boxes defining what it is, but I don't recall what it was.
Q Can you tell me whether it was of the type that's on this second to last page of 12068 crash test?
A I couldn't with this information.
Q Okay.
A I think maybe somebody at Visteon may be able to answer that.
Q Well, the problem is I've got a Ford test. I would hope that they would know.
I'm going to go through a couple of these graphs to see

if I understand what they are. Can you tell me what that graph is graphing? I know it's inches and time, but is that how much crush and time?
A This says the right shoulder of the passenger with respect to the right rocker at the B pillar longitudinal displacement; in other words, there's targets that they track on a computer to say how much movement there would have been versus time. And there's a plot that goes from zero up to approximately -- it goes beyond 80 milliseconds, and it shows that that displacement is about 12 inches.
Q That's on a dummy?
A Right.
Q Okay. I'm looking for the graphs of the accelerometers.
Well, when you look at this one, the second one -- is this where you were looking to tell what this second one is?
A Yeah. Sometimes you have to look at them and try to interpret -- well, it's -- it looks like it says center line tunnel behind front seat SM No. 9. I don't know whether that corresponds to one of those other graphs, but this is a deceleration versus time graph.
Q Okay. I'm not going to go through these because we're being squeezed for time. Let me ask you what this one is.
A It says left center front radiator support, SM No. 1, longitudinal. I think that, from what I recall, may be that first accelerometer trace.

Q Okay. But that was left center?
A Well, left, slash --
Q That didn't seem to fit.
A -- center front.
Q Is this crash test we're looking at something you're just not familiar with and can't testify as to it?
A As to what?
Q As to what happened in this crash; why they did it, where the sensors were, that sort of thing.
A Well, it's a develop crash test.
Q Can you testify whether the sensors in this case are the same sensors that were in the 2000 Ford Taurus?
A I cannot without doing some additional work.
Q Okay. Can you testify whether or not this crash test has anything to do with our case? Do you know why it was run?
A You'd have to look at the test request, which you don't have, and sometimes that doesn't tell you.
Q All right.
(Discussion held off the record)
BY MR. WELLS, CONTINUING:
Q Mr. Wagner, this test that we're looking at -- this crash test 12068, you don't know as you sit here today whether the monitors -- sensors in this car were the same or different from the ones that were in the 2000 Ford Taurus involved in this case?

A That is correct.
Q Okay. You don't know why this test was actually run as you sit here today?
A It's not obvious by looking at that other than it is a development test. It was -- people were looking at something into the future.
Q And you don't know whether this test was using placements that were -- placements of sensors that were the same or different than the ones that were in the Ford Taurus that were in the wreck we're discussing today?
A Some may have been the same, but clearly there was a lot more sensors on this testing than there were on the 2000 production Taurus.
Q Okay. And in the accelerometer -- I'm sorry -- not the accelerometer. In the RCM there has got to be a manual or something that goes with it for the purpose or doing something at your place. Let me back up. That's a bad question.
Is there a manual that goes with the RCM?
A A manual?
Q Yes, sir.
A Not to my knowledge.
Q Okay. Are there specifications that are made for the RCM that you send to Visteon that says this thing has got to do the following?

A Exactly. You have to -- to make any component you have to have a drawing and you have to have a specification.
Q Are those drawing specifications in the 22 boxes?
A I did not see those.
Q Now, the --
A There may be some other documents out there that have been produced that I haven't seen, but I have not found those documents in those boxes.
Q Now, the RCM specifications, would those specifications detail under what circumstances the RCM should send a signal to the airbags to fire?
A I guess I don't know without looking at the actual specification. I know in the old systems there was always clearly-defined threshold requirements because you had to have the supplier certify that the system met certain requirements. So it was carefully outlined. And I would suspect that the same kind of information was in this, because these components have to be certified and there has to be some kind of test at whatever temperatures and conditions to show that they meet the threshold performance of fire, no-fire conditions.
Q Okay. So then in sitting here talking about the design of the airbag system, in this case you cannot tell me what the specifications were for the RCM; is that right? You'd have to go back and look at the specification?

A The specification you had here earlier could very well have been that specification, but you have to look at the drawing and say what specification that release drawing that was put into production requires. I don't know whether it was that one or not without looking at the drawings.

Q That one being the one that was here for the – for the what?

A Earlier you had a specification for the module, and it said Revision A.

MR. BIBB: It was about 20 pages long.

MR. WELLS: This thing?

MR. BIBB: No. I don't think that was it.

THE WITNESS: Well, that doesn't look like the same cover sheet, but it does look similar. I mean, this is another one, but –

BY MR. WELLS, CONTINUING:

Q We have a couple of copies of this thing.

A But, see, each one of these -- some of them say draft copy. This doesn't say draft copy, but this is a marked up one, and this is not a final copy when somebody has it marked up like this.

Q We've got here --

MR. BIBB: It's AAHC 8243 I believe.

BY MR. WELLS, CONTINUING:

Q And here is the 8243 that you looked at. AAHC 8243, are these the specifications for the RCM that would have been

given to Visteon for the manufacture of the RCM?
A I told you a couple two or three, maybe half a dozen times, I don't know unless I looked at a drawing. The drawing would say that this specification number, the changed level and so forth, would be what was the requirement for that.
Q This may be an interim draft of some sort?
A It could be, but it could be the final. I don't know.
Q Is this kind of the form -- the sort of the look of the document that you would expect it to be?
A Yes.
Q You just want to know if it's the final one?
A That's correct.
Q Have you seen the final one in the 23 boxes?
A I don't know.
MR. WELLS: Randy, can you check to see if you all produced this final?
MR. BIBB: I'll be glad to. I mean, what you have to do is just check the drawing.
THE WITNESS: Yeah. If it's on the drawing -- if you have the drawing, you can find the spec number on it.
MR. WELLS: Well, I don't have the drawing. Could you guys produce to us the drawing?
MR. KILPATRICK: I may have the drawing.
MR. BIBB: I would expect there are hundreds of drawings in the boxes that we've produced.

MR. KILPATRICK: Can we go off the record a second?

MR. BIBB: Sure.

(Discussion held off the record)

MR. BIBB: We'll look through the production log and see where the -- where the drawing should be and identify what revision level specification goes with the drawing and identify that and may be able, though I'm not promising, to give you an alphanumeric bates number for it.

MR. WELLS: Okay. And if we can't find it in the boxes, we'll let you know and you can then produce us the final?

MR. BIBB: When the documents were produced -- and, again, as I have mentioned while we were off the record -- I didn't have anything to do with these document productions. It was done by our Jackson office. But those documents are generally organized when originally produced by request number that they go with, so that if you went back and looked at -- if you asked for, for instance, the specifications, you should be able to go and find that.

MR. WELLS: We're going to ask Bradley where it is.

MR. BIBB: Don't do that.

MR. KILPATRICK: I got no numbers. I got a big box of a mess.

MR. WELLS: Do you want to keep going? It's 5:26.

MR. BIBB: Are you at a stopping point?

MR. WELLS: Yeah, because I was about to get into the documents over here, and I got -- if you miss your plane, we finish.

MR. BIBB: Well, we won't do that.

MR. WELLS: You tell me what to do. We hit 5:30.

MR. BIBB: I can go -- I think, you know, we can go for another 15 to 30 minutes.

MR. WELLS: Okay.

(Discussion held off the record)

MR. BIBB: We were just discussing -- plaintiff's counsel has reached a logical break in the deposition. He's got a number of documents that he wants to inquire Mr. Wagner about. So at 5:30ish on the afternoon of July 17th the deposition will be adjourned to be reconvened at a time, place, and date to be determined, but it will probably be the same day that Mr. Wagner will offer his expert witness deposition.

MR. WELLS: Consistent with our discussions earlier?

MR. BIBB: Consistent with our discussion several hours ago.

MR. WELLS: Okay. That sounds good, and I will see you at the next one and we'll talk about getting it organized.

(Deposition adjourned at 5:31 p.m.)

* * *

. VERIFICATION OF DEPONENT

I, ROGER C. WAGNER, do hereby certify that I have read the foregoing deposition taken on July 17, 2002 and that, to the best of my knowledge, said deposition is true and accurate (with the exception of the changes/corrections as attached hereto, if any).

____

ROGER C. WAGNER

Subscribed and Sworn before me this ________

day of ______________________, 2002

____

Dora L. Doletzky, Notary Public

County, Michigan

My Commission expires:

September 17, 2005

0218

CERTIFICATE OF NOTARY PUBLIC

STATE OF MICHIGAN)

) SS.

COUNTY OF WASHTENAW)

I, Dora L. Doletzky, Certified Shorthand Reporter and Notary Public in and for the State of Michigan, do hereby certify that the witness whose attached deposition was taken before me in the above cause was first duly sworn or affirmed to testify to the truth, the whole truth, and nothing but the truth; that the testimony contained herein was by me reduced to writing in the presence of the witness by means of Stenography; afterwards transcribed by means of computer-aided transcription; and that the deposition is a true and complete transcript of the testimony given by the witness to the best of my ability.

I further certify I am not connected by blood or marriage with any of the parties, their attorneys or agents; -that I am not an employee of either of them; and that I am not interested, directly, indirectly or financially, in the matter of controversy.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal this ________ day of

____________________, _____.

____

Dora L. Doletzky, CSR-6110

Notary Public, Washtenaw County, Michigan

My Commission Expires: 9-17-2005

E883-918 0813

ER03-018 0827

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI
JACKSON DIVISION

[redacted] PLAINTIFFS

VS. CAUSE NO. 3:01CV403BN

FORD MOTOR COMPANY, BUDGET RENT-A-CAR SYSTEMS, INC., and TEAM FLEET SERVICE FINANCING CORPORATION DEFENDANTS

PLAINTIFF'S RE-NOTICE OF RULE 30(b)(6) DEPOSITION

TO: Ford Motor Company

By and Through Counsel of Record:

Bradley W. Smith, Esq.
Baker, Donelson, Bearman & Caldwell
4268 I-55 North
Meadowbrook Office Park
Jackson, Mississippi 39211

PURSUANT TO Rule 30(b)(6) of the Federal Rules of Civil Procedure, you are ordered to produce the appropriate representative to appear at a deposition to be taken on July 17, 2002 at 9:00 a.m. and to continue day to day until completed, at a location to be mutually agreed upon by counsel, to give testimony in the above captioned cause.

Examination shall be continued on matters listed on Exhibit "A" attached.

Dated, this the 17th day of June, 2002.

[redacted]

By: Jay M. Kilpatrick

Wagner
EXHIBIT NO. 1
7/17/02 BLD

EA03-010 0839

ROBERT L. WELLS (MSB #7102)
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CERTIFICATE OF SERVICE

I, Jay M. Kilpatrick, hereby certify that I forwarded via United States Mail, postage prepaid, a copy of the above mentioned documents to the following:

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P. O. Box 1084
Jackson, MS 39215-1084

Dated, this the 17th day of June, 2002.

Jay M. Kilpatrick

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI
JACKSON DIVISION

[redacted] PLAINTIFFS

VS. CAUSE NO. 3:01CV403BN

FORD MOTOR COMPANY, BUDGET RENT-A-CAR SYSTEMS, INC., and TEAM FLEET SERVICE FINANCING CORPORATION DEFENDANTS

EXHIBIT "A"

1. The design, analysis, testing, and other development of the airbag and restraint system implemented in the 2000 Ford Taurus.

2. The relationship between Ford and all manufacturers and/or suppliers of the crash sensors, diagnostic systems, airbag modules, and individual airbag module compartments, including but not limited to Visteon Corporation, TRW, Inc., and/or AutoLiv.

3. All tasks performed by Visteon Corporation, TRW, Inc. and/or AutoLiv.

4. The decision making process involved in determining the mounting locations of the driver and passenger side airbag modules, airbags, inflators, and sensors.

5. All reports, analyses, tests, and/or other studies concerning the development of the airbag crash sensor system implemented in the 2000 Ford Taurus.

6. Performance of the airbag system, including the airbag crash sensor, in all impact tests performed with the 2000 Ford Taurus.

7. All crash testing performed in the development of the airbag and restraint system implemented in the 2000 Ford Taurus.

8. The cost of the airbag and restraint system implemented in the 2000 Ford Taurus and the cost of the airbag and restraint system implemented in the 1999 Taurus.

9. The location of all correspondence, comments, or petitions between Ford and NHTSA, Visteon Corporation, TRW, and/or AutoLiv pertaining to the airbag and restraint system at issue.

10. The barrier speed and/or other various thresholds and conditions at which both First and Second stage airbag deployment as well as pre-tensioner actuation is expected with the system at issue.

11. The knowledge and skill required to decipher the information stored on the Restraint Control Module used in the system at issue.

12. Failure Mode and Effects Analysis (FMEA) for all sensors, restraints control module, and/or other diagnostic modules used in the airbag and restraint system at issue.

13. The method and criteria by which the crash data is processed, analyzed and the determination to deploy the airbags or activate the seatbelt pre-tensioner is made.

14. The net worth of Ford Motor Company and/or all monies set aside by Ford Motor Company for payment of products liability claims associated with its vehicles.

15. All marketing pertaining to the airbag and restraint system at issue.

16. Any and all designs, prototypes, and/or variations of the airbag system at issue as well as any tests of said alternate designs.

17. The dummy injury assessment reference values or injury measurement criteria for all dummies or dummy components used in the design and development of the airbag and restraint system at issue.

18. The specifics of all crash performance tests of the subject vehicle including dummy characteristics, seat position, speed of the vehicle, whether the manual three point belt was fastened, occupant location, and the characteristics of the types of barriers used in the tests.

19. All work orders, job tickets, service reports, safety directives, service letters, service bulletins, letter, memoranda, instruction of engineering change, advisories, or other information relating to any change or modification of airbag and restraint system implemented into the 2000 Ford Taurus.

20. Other legal causes of action brought against Ford Motor Company wherein passengers were severely injured or killed by the failure of airbags to deploy.

21. The document retention policy of Ford Motor Company pertaining to documents dealing with restraint (both primary and supplemental) development and testing. This includes, but is not limited to, what information is retained, the form of the information retained, and where the information is physically located.

22. Ford Motor Company's policy on the printing of e-mail correspondence including the location of all printed e-mail correspondence.

23. The reason why the information produced to the Plaintiffs in this case is not numbered sequentially, including an identity of the documents left out which would fill the gaps, the custodian of these records, and a list or index of the missing documents.

24. The efforts taken by Ford Motor Company to stay informed on the issues of airbag restraint design and airbag restraint performance.

25. The details of any studies performed by or for Ford Motor Company to compile statistics or gather information pertaining to the performance of Ford airbag restraint systems in real world accidents.

26. The physical characteristics of all barriers (including poles) used in the various crash tests at Ford applicable to the system installed in the 2000 Ford Taurus.

27. Whether or not the vehicle at issue was in the same condition as it was when it left Ford's factory in Chicago, Ill. when it was sold to Fleet Service Financing Corp.

28. All statistics pertaining to the survivability of crashes in a 1999 Ford Taurus when the vehicle is travelling 40 m.p.h. or less including whether the statistics are derived from crash tests or real world accidents.

29. All statistics pertaining to the survivability of crashes in a 2000 Ford Taurus when the vehicle is travelling 40 m.p.h. or less including whether the statistics are derived from crash tests or real world accidents.

30. All differences and reasons therefore in the airbag system in the 1999 Ford Taurus and the 2000 Ford Taurus.

31. The percentage of non-deployments of airbags in the 1999 model year Taurus where the speed of the vehicle exceeded 25 m.p.h. which were known to Ford at the time the decision was made to alter the system for the 2000 model year.

32. The percentage of non-deployments of airbags in any Ford vehicle where the speed of the vehicle exceeded 25 m.p.h. and the car was equipped with a "smart" "dual-stage" airbag system like the one implemented in the 2000 Ford Taurus.

33. Why Ford believes one sensor located directly below the hood ornament of a vehicle is better than multiple sensors located in different locations in the vehicle.

34. Whether or not sensors from any entity other than Visteon were considered by Ford to be used with this airbag system, including all reasons why those sensors were not used.

35. The physical characteristics (including case strength and shield strength) of all other sensors considered by Ford.

36. The purposes of the Restraint Control Module used in the airbag restraint system.

37. An interpretation of the information retrieved by Ford from the Restraint Control Module of the subject vehicle.

38. Any and all reasons Ford believes more information was not recorded on the Restraint Control Module.

39. The identity of all engineers or engineer teams involved in the design of the restraint system in the 2000 model year Taurus, and their primary duties.

40. The identity of all persons plus their title, address, employer, and employment history with Ford who have knowledge of any of the above categories.