EA02-025

TEXAS INSTRUMENTS, INC.'S

9/10/03

REQUEST NO. 7

BOX 10

PART A – I

PART E

DEPOSITION EXHIBIT 1

CAUSE NO. C-4178-98-F

[redacted] * IN THE DISTRICT COURT

VS. * OF HIDALGO COUNTY, TEXAS

VAN BURKLEO MOTORS, INC.; FORD MOTOR COMPANY; and UNITED TECHNOLOGIES AUTOMOTIVE, INC. * 332nd JUDICIAL DISTRICT

[redacted]

COMES NOW, FORD MOTOR COMPANY, a Defendant in the above-entitled and numbered cause, and files this Cross-Claim Against Texas Instruments, Inc., and in support thereof would respectfully show unto the Court as follows:

I.

JURISDICTION, PARTIES AND VENUE

1.01. This Court has jurisdiction over the parties and the subject matter of the underlying suit and of this Cross-Claim; the amount in controversy exceeds the minimum jurisdictional requirements of this Court, and all conditions precedent to the filing of this suit have been satisfied.

1.02 Defendant/Cross-Plaintiff Ford Motor Company ("Ford") sues herein Cross-Defendant Texas Instruments, Inc. ("Texas Instruments"), a Delaware Corporation doing business in Texas. Texas Instruments, having already appeared and answered herein, may be served by service upon its counsel of record in this cause: Mr. Johnny Carter and Mr. Eric Mayer, Susman & Godfrey, 1000 Louisiana, Suite 5100, Houston, Texas 77002; and Michaela Alvarez , Hole & Alvarez, L.L.P., 612 West Nolana, McAllen, Texas 78504. By copy of this Cross-claim, service is being accomplished on Texas Instruments at this time.

1.03 Venue of this Cross-claim will follow venue over the primary action.

II.
FACTUAL BACKGROUND

2.01. Plaintiffs [redacted] filed this action on or about August 6, 1998, and filed an Amended Petition adding Texas Instruments as a party on or about May 20, 1999. In this suit, they allege that they purchased a 1993 Lincoln Town Car manufactured by Ford, which they allege caught fire on or about December 28, 1997, allegedly causing extensive property damage to Plaintiffs' home and personal property. In their most recent amended Petition, Plaintiffs specifically contend that the vehicle's speed control deactivation switch was the ignition source for the fire and the cause of Plaintiffs' alleged injuries and damages.

2.02. While Ford does not agree and expressly disputes Plaintiffs' claim that the speed control deactivation switch (or any other alleged defect in the vehicle) caused the fire at issue, to the extent that the trier of fact may determine such to be the cause of the fire, such a cause would be the responsibility of Texas Instruments as the manufacturer of the speed control deactivation switch, for the reasons set out below.

2.03. [redacted] to the extent that the trier of fact may determine the switch to be the cause of the fire, then, Ford alleges [redacted] were caused by such a manufacturing defect and/or such negligence by Texas Instruments rather than by any act, omission, or product for which Ford is responsible.

2.04 Ford purchased the speed control deactivation switch at issue from Texas Instruments relying upon express warranties and the Uniform Commercial Code's implied

warranties of merchantability and of fitness for a particular purpose. With regard to the warranty of fitness for a particular purpose, Texas Instruments had reason to know that Ford was purchasing the switch specifically for use as a speed control deactivation switch in a 1992 Ford vehicle which would need to perform as such during all of the functions performed by a passenger vehicle purchased by a United States consumer/driver of such a vehicle. Ford relied upon Texas Instruments' skill and judgment as a manufacturer of electrical switches for automotive applications to select and furnish a suitable switch for this purpose.

2.05 To the extent that the trier of fact may find that the fire at issue was caused by the speed control deactivation switch, [redacted] Ford relied upon these warranties and would not have purchased the switch without them. Ford would also show that injuries and damages such as those claimed by Plaintiffs are foreseeable consequential damages of the breaches of the above warranties committed by Texas Instruments.

2.06 In addition, Ford purchased the speed control deactivation switch from Texas Instruments pursuant to a written purchase order, which constituted a written contract and which contained language by which Texas Instruments agreed to indemnify Ford for damages caused by claims such as that of Plaintiffs herein.

2.07 Ford has requested that Texas Instruments fulfill its responsibilities to indemnify Ford in this matter; however, to date, Texas Instruments has failed and refused to do so, requiring Ford to bring this Cross-Claim against Texas Instruments in order to protect its rights in this matter.

III.
FIRST CAUSE OF ACTION
COMMON-LAW CONTRIBUTION AND/OR INDEMNIFICATION

3.01 While Ford does not agree and expressly disputes Plaintiffs' claim that the speed control deactivation switch (or any other alleged defect in the vehicle) caused the

fire at issue, to the extent that the trier of fact may determine such to be the cause of the fire, Ford relies upon its rights in such a case under Tex. Civ. Prac. & Rem. Code §32.001, et seq. In such case, Ford asks that the trier of fact be asked to determine the percentage of causation attributable as between Ford and Texas Instruments, and alleges that [redacted]

3.02 Ford thus sues for common law contribution and/or indemnity herein.

IV.
SECOND CAUSE OF ACTION
BREACH OF WARRANTIES

4.01 Ford purchased the speed control deactivation switches from Texas Instruments relying upon express warranties and the Uniform Commercial Code's implied warranties of merchant ability and of fitness for a particular purpose, found in Michigan law at M.C.L.A. 440.2313, 440.2314 & 440.2315 and alternatively in Texas law at Tex. Busi & Com. Code § 2.313, 2.314 and 2.315. To the extent that the trier of fact may determine the switch to be the cause of the fire at issue, Ford alleges that the above warranties were breached and that foreseeable consequential damages of such breaches are the damages caused to Ford by the claims of Plaintiffs herein, including any expenses incurred by Ford in investigating, defending itself from and/or resolving such claims.

4.02 All conditions precedent to the bringing of this cause of action have occurred or are waived.

4.03 Ford thus sues for its damages, as stated above, in excess of the minimum jurisdictional limits of this Court, for these breaches of warranties.

V.
THIRD CAUSE OF ACTION
BREACH OF CONTRACT OF INDEMNIFICATION

5.01 Ford purchased the speed control deactivation switch at issue pursuant to a purchase order which constituted a written contract, which included a provision by which Texas Instruments agreed to indemnify Ford for any claims of the type brought by Plaintiffs herein. Ford has requested that Texas Instruments fulfill its responsibilities to indemnify Ford in this matter; however, to date, Texas Instruments has failed and refused to do so. Ford thus alleges that Texas Instruments has breached its written contractual agreement to indemnify Ford in this matter and that foreseeable consequential damages of such breach are the damages caused to Ford by the claims of Plaintiffs herein, including any expenses incurred by Ford in investigating, defending itself from and/or resolving such claims.

5.02 All conditions precedent to the bringing of this cause of action have occurred or are waived.

5.03 Ford thus sues for its damages, as stated above, in excess of the minimum jurisdictional limits of this Court, for this breach of the indemnification agreement in the purchase order.

VI.
FOURTH CAUSE OF ACTION
RECOVERY OF ATTORNEYS' FEES

6.01 Ford has made written demand upon Texas Instruments that it fulfill its obligations under the purchase order/contract for the speed control deactivation switch at issue. As stated herein, then, Ford has a claim for breach of a written contract, and thus for its attorneys' fees herein pursuant to Tex. Civ. Prac. & Rem. Code §38.001 (8).

6.02 All conditions precedent to the bringing of this cause of action have occurred or are waived.

6.03 Ford thus sues for its attorneys' fees incurred in bringing this Third Party Complaint.

VII.
PRAYER

WHEREFORE, PREMISES CONSIDERED, Defendant/Cross-Plaintiff Ford Motor Company prays that it be afforded the following relief:

(1) Judgment for common law contribution and/or indemnity as determined by the findings as to percentages of responsibility made by the trier of fact herein;

(2) Judgment in its favor for damages caused by breaches of warranties and/or breach of contract in an amount to be determined by the trier of fact;

(3) Judgment in its favor for reasonable and necessary attorneys' fees;

(4) Costs of Court;

(5) Prejudgment and post judgment interest at the maximum legal rate; and,

(6) For any and all further relief, at law or in equity, to which Plaintiff may show themselves justly entitled to receive.

Respectfully submitted,

RODRIGUEZ, COLVIN & CHANEY, L.L.P.

By: _____
Jaime A. Saenz
State Bar No. 17614859
Alison B. Kennamer
State Bar No. 11289400
1201 East Van Buren
Post Office Box 2155
Brownsville, Texas 78522
(956) 542-7441
Fax (956) 541-2170

ATTORNEYS FOR DEFENDANT,
FORD MOTOR COMPANY

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing was served upon all counsel of record, to-wit:

Norman Jolly
1018 Preston, 4th Floor
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Houston, Texas 77002

by certified mail, return receipt requested, facsimile transmission, and/or hand delivery, pursuant to the Texas Rules of Civil Procedure, on this the 6th day of December, 1999.

Alison Kennamer

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*BOARD CERTIFIED IN PERSONAL INJURY TRIAL LAW TEXAS BOARD OF LEGAL SPECIALIZATION

†BOARD CERTIFIED IN LABOR AND EMPLOYMENT LAW TEXAS BOARD OF LEGAL SPECIALIZATION

December 6, 1999

Via Hand Delivery

[redacted]
Edinburg, Texas [redacted]

Re: Cause No. [redacted] vs. Van Burkleo Motors, Inc.; Ford Motor Company, and United Technologies Automotive, Inc.
Our File: 17,110

Dear [redacted]

Enclosed for filing in the above-referenced matter, please find the following original documents to be filed with the Court:

1. Ford Motor Company's Cross-Claim Against Texas Instruments, Inc.

By copy hereof, I am serving a copy of said documents on all counsel of record.

Please file stamp our copy for our records. Thank you for your courtesy.

Very truly yours,

RODRIGUEZ, COLVIN & CHANEY, L.L.P.

Alison Kennamer

ADK/pg
w/enclosures

cc: Mr. Norman Jolly
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Mr. Eric Mayer
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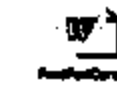
Houston, Texas 77002

Epstein, Sally

From:	McQuirk, Andy [a-mcquirk@email.mc.ti.com]
Sent:	Tuesday, June 01, 1999 9:38 AM
To:	Pechania, John; Dague, Bryan; Prola, Stephen; Watt, Jim
Cc:	Baumann, Russ
Subject:	FW: Ford Core team update




for your background info as we host Steve reimers weds

a

AUTOMOTIVE SENSORS AND CONTROLS QRA MANAGER
34 FOREST ST M/S 23-03
ATTLEBORO, MA 02703
TEL : (508) 236-3060
FAX : (508) 236-3745
MOBILE: (508) 208-6119
PAGER (800) 467-3700 PIN 604-2044

From: McQuirk, Andy
Sent: Friday, May 28, 1999 3:22 PM
To: 'Frederick J. Porter'
Cc: Baringhaus, Steven; Sharpe, Robert
Subject: Ford Core team update

Fred, per our discussions and Rob Sharpe's visit enclosed is our updates...

<<FredPortCore.doc>> <<synopsii.doc>> <<TESTLOG9.xls>>
<<77SSL2_1.xls>>

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May 26, 1999

Mr. Frederick J. Porter, Supervisor
E/E Systems Engineering
Building 5, Mail Drop 5011
20000 Rotunda Drive, Rm 3E004
Dearborn MI 48121-2053

Dear Fred:

I want to review our recent support of the Ford core team to assure we do not have any misunderstandings regarding our pressure switch performance, our continued contribution to the 'core' team, and our commitment to a quick conclusion.

For six months the Texas Instruments Automotive Sensors & Controls Team has been supporting the Ford Core Diagnostic Team with technical facts, data, and analysis regarding our brake pressure switch product applied in the Ford cruise control deactivation circuit.

A senior TI pressure switch engineer was in residence at Ford for three weeks to assist with switch related issues in the system-diagnostic process. Senior TI leadership participation has also been involved in virtually every Ford Core Team meeting delivering facts, data, and technical support year-to-date '99.

We also investigated switch capability, and using agreed upon accelerated simulation life testing techniques, demonstrated the ability of the model year '92 & '93, Town Car speed control deactivation switches to consistently exceed "cycle life specification" of 500,000 pressure cycles. TI Weibull reports of pressure switches tested in 1999 conservatively demonstrate 95% reliability to 1 million cycles (with confidence intervals greater than 50%).

Additionally "success testing records" of some 665 ES units that were tested during the 1991 - 1992 (11/91 - 12/92) showed zero leakage at 500,000 cycles.

Conclusion to date: 1992 period switches met specification. 1999 switch meets or exceeds specification

We have developed and delivered [redacted] circuit. Theories from the model suggest that fluids in the switch cavity in the presence of uninterrupted power could lead to a corrosion product formation which might create a plastic base ignition path.

TI-NHTSA 016891

Conclusion to date: Constant speed control power allows long term corrosion

In light of this laboratory model and the need for cruise system power only during vehicle operation, we suggest the system architecture of "key-on/off" based power be considered.

We have been open and forthright in our communications and delivery of information and we believe we have been instrumental in helping Ford address the underhood fire concern issue.

In this regard, we think it is appropriate at this point that our active participation in the diagnostic journey of the vintage 1992 product move towards a timely conclusion. Toward this end, we will continue to support the "core" team review of 1992 product history with targeted completion in July 1999.

We are preparing to fulfill your request for hosting a site visit, supporting campaign field return device analysis, and participating in robust system brainstorming sessions moving toward conclusion in July, as well as reviewing the optimization of our product line process controls.

Our prime focus at this time is in rapidly supplying Ford with 225,000 units in support of the field actions.

Regards,

Andrew C. McQuirk
QRA Manager
Texas Instruments

attachments: 1992 Testing History
TI 77PS Test synopsis
TI 77PS Investigation Flow Diagram

TI 77PS Test Synopsis

This document is a synopsis of tests conducted by Texas Instruments during the 77PS investigation. The intent of this document is to highlight test findings which drove the investigation to its current state. Throughout the investigation, several tests were conducted with the same objective. When each objective was met, efforts were refocused to obtain a new level of understanding and to establish a new set of objectives. As such, tests have been categorized into (5) levels, representing the level of knowledge obtained from the group of tests conducted. Each level is listed below with a short description of the objective:

Level 1: Create a laboratory switch ignition without any restrictions on methods.
Level 2: Create a laboratory switch ignition using only conditions found in the switch operating environment.
Level 3: Understand the laboratory ignition mechanism.
Level 4: Compare factors contributing to laboratory ignition.
Level 5: Evaluate recommendations.

Refer to Brake Pressure Switch Test Log.

Level 1 Objective: Determine if a switch ignition can be created in the laboratory.

- Test 1

Objective: Determine if switch ignition can occur under the following laboratory conditions:

Switch contact cavity flooded with brake fluid mixed with varying amounts of % H_20.
14 volts applied to one terminal, second terminal electrically floating. (No electrical load across switch terminals).
Switch housing electrically grounded.

Results: (8) samples were tested total:
(2) with 4% H_20 in brake fluid.
(2) with 6% H_20 in brake fluid.
(2) with 10% H_20 in brake fluid.
(2) with 75% H_20 in brake fluid.

No ignition occurred. No significant temperature rise observed in all samples. Current draw ranged from 0.5 mAmps to 5 mAmps over a period greater than (250) hours.

- Test 2

Objective: Determine if switch ignition can occur under the following laboratory conditions:

Switch contact flooded with brake fluid.
14 volts applied to one terminal, second terminal connected to a 14 Ω resistor which is tied to ground. (1 Amp load across switch terminals).
Switch hexport electrically grounded.

Results: (2) samples were tested. No ignition occurred. No significant temperature rise observed for a period over (250) hours.

Conclusion: A (1) Amp load through switch terminals did not ignite brake fluid in the contact cavity of switches.

- Test 6

Objective: Determine if switch ignition can occur under the following laboratory conditions:

Heater element installed in contact cavity of the switch.
Power applied to the heater element until plastic base melts.
Spark generated in contact cavity of switch.
Brake fluid present in the contact cavity (wet device) and absent in the contact cavity (dry device).

Results: (2) dry devices were tested and (1) wet device was tested. Ignition occurred in all devices.
Wet device: The internal temperature of a wet device reached 660°F. A hole burned through the base of the switch (close to the heating element). The applied spark ignited the fumes in the contact cavity of the switch and engulfed the base material of the switch.
Dry device: The internal temperature of a dry switch reached over 1000°F. The switch base flopped over. The applied spark ignited the fumes in the contact cavity of the switch and engulfed the base material of the switch.

Conclusion: A switch ignition can occur under the following laboratory conditions:

Heater element installed in the switch contact cavity.
5 watts of power dissipated in heating element.
Spark generated in the contact cavity of the switch.

Brake fluid did not contribute to the ignition process.

Level 2: Objective: Determine if a laboratory ignition can occur using only switch components and elements found in the switch environment.

- Test 6a

Objective: Determine if corrosive degradation of switch electrical components can cause an increase in electrical resistance (and thus a source of heat) in the switch, which may lead to an ignition.

Results: (1) out of (15) samples tested increased resistance to 5 Ωs. A solution of 5 wt. % NaCl in H_20 can corrode the electrical components of the switch and cause an increase in electrical resistance. Repeated injections of the solution of 5 wt. % NaCl in H_20 into the contact cavity of a switch, with the switch continuously powered at 14 Volts, can cause an ignition.

Conclusion: A switch ignition can occur under the following laboratory conditions:

A solution of 5% NaCl in H_20 is injected into contact cavity of a switch.
Continuous 14 Volt power applied to the switch.
Hotport is grounded.
Current is limited at 15 Amps.

- Test 6c

Objective: Determine if brake fluid with metal shavings is conductive enough to create an ignition.

Results: (3) devices with various size metal particles were tested. No significant current increase detected.

Conclusion: Metal shavings did not significantly increase conductivity brake fluid. Current levels measured were well below levels necessary to create an ignition.

- Test 7

Objective: Determine if switch meets cycle life specification.

Results: Tests conducted during the first quarter of 1999 show that switches exceed cycle life specification.
In the first quarter of 1999, a total of (42) 77PSL2-1 snap switches were impulse tested to over 1,000,000 cycles with only (1) leak below 1,000,000 cycles, which

occurred at 728,000 cycles. A Weibull analysis showed 99.9% reliability at 500,000 cycles at 95% confidence level.

Conclusions: Switches meet cycle life specification. First quarter, 1999 tests confirm impulse test findings made during the period between 1991 and 1992. During that period, (6) impulse tests on 144 devices of 57PS and 77PS construction, had no leaks when tested to 500,000 cycles. A Weibull analysis of first quarter, 1999 tests, showed 99.9% reliability at 500,000 cycles at 95% confidence level.

- Test 15a

Objective: Determine the long term corrosive effects of brake fluid on the electrical components of switches which are continuously powered at 14 Volts.

Results: Test was suspended after 550 hours of testing. (6) samples were tested with continuous 14 Volts power. The contact cavity of (4) switches contained new brake fluid and (2) switches contained old brake fluid. Switches with old brake fluid drew very little hexport current and showed a decrease in hexport current over time to less than 1/10 mAmp. Samples with new brake fluid showed an increase in hexport current to over 20 mAmps toward the end of the 550 hours of testing. Analyses of (1) sample with new brake fluid and (1) sample with old brake fluid revealed electrolytic corrosion of the contact arm of both switches. There was a much lower level of corrosion in the sample with used brake fluid than the sample with new brake fluid.

Conclusion: Brake fluid in the contact cavity of switches, which are at 14 Volts continuous power for over 500 hours, can cause electrolytic corrosion of the switch contact arm and an increase in hexport current.

- Test 17

Objective: Quantify the long term corrosive effects of new brake fluid on the electrical components of switches under the following laboratory conditions:

Contact cavity of switch flooded with new brake fluid.
Switches at continuous 14 Volts power.
Switches subjected to vibration for (1) hour per day.
Switches subjected to 100°C for (1) hour per day.

Results: Test suspended after (312) hours. (50) samples tested. The average hexport current drew after (312) hours is 1.9 mAmps with a standard deviation of 1.8 mAmps. These results are consistent with results previously found in Test 15a at the 300 hour point.

Conclusion: New brake fluid in the contact cavity of switches, has not caused an increase in hexport current after (312) hours at continuous 14 Volts power.

Level 3: Objective: Understand the laboratory ignition process, determine the current path and establish a repeatable ignition method.

- Test 6b

Objective: Understand the ignition process, determine the current path and establish a repeatable ignition method.

Results: Multiple attempts at laboratory ignition, via injection of a solution of 5 wt. % NaCl in H_20 into the contact cavity of switches, has resulted in a repeatability rate of approximately 50%. Plots of hexport current verses time show an increase in current until the point of ignition.

Conclusion: A repeatable laboratory method for switch ignition was established. Based on hexport current measurements, the current path is from switch terminals to hexport body.
When a solution of 5 wt. % NaCl in H_20 is repeatedly injected into the contact cavity of powered switches, electrolytic corrosion of the switch terminal results in an increase in terminal resistance. When sufficient power is drawn through the corrosive resistance, switch elements heat up and begin to glow red hot. A hole burns through the switch base and ignition occurs. There is arcing visible throughout the corrosion process which may provide the spark necessary for ignition.

Level 4: Objective: Compare and contrast variables influencing ignition using the established laboratory ignition method.

- Test 13a

Objective: Compare various fluids in the established ignition method.

Results: The following fluids were tested.
(1) NaCl in H_20.
(1) tap water
(1) rain water
(1) used brake fluid
(1) used brake fluid with 5 wt. % H_20
(1) new brake fluid
(1) new brake fluid with 5 wt. % H_20
The switch filled with 5 wt. % NaCl in H_20 resulted in an ignition when average hexport current exceeded 2.5 Amps. Switches that were filled with tap water and rain water drew less than 10 mAmps over a (3) hour test and showed little signs of

corrosion. Switches filled with a matrix of new and used brake fluids, with water and without water, all drew less than 3 mAmps hexport current draw and showed no signs of corrosion over the (24) hour test.

Conclusion: Brake fluid is not conductive enough to cause the electrolytic corrosion and necessary current draw to create an ignition within a 3 hour lab test. Because of its' significantly higher conductivity, an ionic rich fluid such as NaCl in H_20 can cause an ignition in a 3 hour lab test exposure.

- Test 15

Objective: Compare the ignition characteristics of various plastics as switch base material.

Results: When 5 wt. % NaCl in H_20 was injected into switches with different base materials, the following results were obtained: Cellarex 4300 ignited 3 out of 5 attempts. Noryl ignited 2 out of 5 attempts. Zytel ignited 1 out of 5 attempts.

Conclusions: All plastics tested can ignite using the established laboratory ignition method.

- Test 15b

Objective: Determine if switch ignition can occur in the vertical position and 45° orientation. Determine if switch ignition can occur and at different rotational angles in the 45° orientation.

Results: Switch ignitions can occur in both the vertical and 45° orientation using the established laboratory ignition method.

Conclusion: Switch ignition does not appear to be sensitive to vertical orientation verses 45° orientation nor to rotational angle in the 45° orientation.

Level 5 Objective:

Test 16

- Objective: Test proposed relay circuit.

Results: (1) switch was injected with a solution of 5 wt. % NaCl in H_20 and placed in the proposed current limiting circuit for (48) hours. The current draw remained constant at 180 mAmps throughout the test. There was no activity observed and the contact arm remained mostly intact.
(1) switch was brought to an impending burn condition using the established burn method. An impending burn is a condition where a corrosive resistance has built

up in the switch and an ignition is imminent. The switch was then placed in the proposed relay circuit for(18) hours where it drew 160 mAmps, showed no visible activity and did not result in an ignition.
Because the proposed relay circuit acts as a resistor which limits current to the switch, the maximum power to the switch is limited to .75 Watts. A resistive wire was wrapped around the base of (1) switch and 0.75 Watts of power was dissipated in the wire. The wire became warm to the touch but had no effect on the switch.

Conclusion: 0.75 Watts, the maximum power in the proposed circuit design, is insufficient to cause substantial electrolytic corrosion or significant switch terminal heating, which is necessary to create an ignition. In previous tests, using a resistor as the heating element (see Test 6), approximately 5 Watts of power was necessary to create an ignition.

Brake Pressure Switch Test Log, Updated 8/22/99

Category	Test	Location	Test Parameters	Results Update
Lab Simulation	1	TI	Vary water concentrations in new Brake Fluid	250+ hours, Current draw in the 0.5mA to 5mA range
of Potential Ignition			14Vdc to one terminal, Import grounded	Fluid has discolored.
in Switch			Water Cncn: 4%, 6%, 14%, 79%	No Significant Temperature Rise. Test Suspended.
				Interval Analysis suspended.
	2	TI	New Brake Fluid	250+ hours. Constant temperature.
			1 Amp through switch terminals	No significant temperature rise with time
			14Vdc to one terminal, Import grounded	Test Suspended.
	3	AVT	new Brake Fluid in Switch, 24 VDC to one	> 300 hours into test, max current 7mA
			terminal, Import Grounded	No significant change with time. Test suspended
	4	AVT	new Brake Fluid in Switch, 24 VDC to one	48 hours into test max current 5mA
			terminal, Import Grounded, Ambient at 100 C	No significant temperature rise with time. Test suspended.
	5	AVT	new Brake Fluid in Switch, 16 Amps	Temperature rise of 25 C above room temp
			Through switch terminals	Delta T reached steady state at 25 C. Test suspended.
	5a	AVT	new Brake Fluid in Switch approx. 50 Amps	Temperature rose to approx. 270 F. No smoke. No ignition
			through Switch Terminals	Test suspended.
	6	TI	Shield heater elements into Switch.	3 tests, Smoke observed, ignition observed on port adhesive
			Heat 48 hours, include cycling.	One attachment
			Fill w/ solution of Brake Fluid and 6 wt. % H2O	Test complete
				Brake fluid in cavity slows down heat build-up
				Smoke observed at 675 F, Base melts and falls off at 800 F
	6a	TI	Create heater by corroding spring iron.	One coil of 16 develops increased resistance to 5 ohms.
			Salt water solution, 14V between spring	Others either very low resistance or open/clean.
			and thingolt.	It took about 100 hours to match the 5 ohm stage.
				The 5 ohm device ignited under conditions similar to test 6.
	6b	TI	Re-run ignition test to understand	Switch ignition with repeated 5% water solution into switch
			repeatability and current path.	Current path is through hexport.
				One plate and visible.
				Additional test Indicate tap water, old BF, new BF and other
	6c	TI	Pure new/ brake fluid with metal shavings	Metal shavings do not contribute significantly to brake fluid

TI-NHTSA 018800

				conductivity
Life Cycle Reliability	7	TI	0-1400 psig pressure pulses at 135C	First leak observed at 728,000 cycles.
of Pressure Switch			per ES	Test Completed. See attached Weibull Chart.
Diaphragm Wear	8	TI	0-1400 psig pressure pulses at 135C.	Parts withdrawn every 200k cycles, characterized for wear
Field vs Lab Correlation	9	Central Labs	Field returns, from dealer lots, junkyards	Parts in Central Labs, see Ford spreadsheet
Design Of Experiments (1)	10	TI	Vary water concentrations in Year Brake Fluid	Test Report being written investigation continues.
Evaluating Factors			12 snap + 12 quiet switches w/ 0 % water in BF	Suspended at 1.3 million cycles with no leaks observed.
Effecting Diaphragm Wear			12 snap + 12 quiet switches w/ 5 % water in BF	Snap samples suspended at 1.3 million cycles with 2 leaks
Impulse test				observed at 1.3M. Quiet samples suspended at 500k cycles to
				assess failure anomalies.
On-Vehicle Characterization	11	AVT	Monitor Pressure and Temperature	Test at AVT.....see Ford charts...>500k in car?
of Pressure & Temperature			at Switch Location for ABS and non-ABS	
Profile in Town Car			braking events.	
Brake fluid analysis	11a	TI	Analyze used brake fluid at the master cylinder	Test complete.
Used fluid at master cylinder.			(UMC), used brake fluid at the caliper (UCA)	UMC: Cu = 415 (ug/ml), Fe = 5.6 (ug/ml), Cr = 0.05 (ug/ml), 1.1 %H20.
			and new brake fluid (NEW) for metal and water	UCA: Cu = 592 (ug/ml), Fe = 8.5 (ug/ml), Cr = 1.9 (ug/ml), 1.1 %H20.
			content.	NEW: Cu = <0.01 (ug/ml), Fe = 0.07 (ug/ml), Cr = <.01 (ug/ml), 0.3 %H20.
Spark /Arc Study	12	Central Labs	Determine if arc/spark forms in switch	Equipment set-up in progress at Central Labs.
			using cloth leads and high speed video.	TI Experimented with no 'significant' sparks observed
			Use dry switches as well as switches with	
			various brake fluid water mixes.	
Characterization of	13	Central Labs	Characterize electrical, mechanical	Data log and analysis procedure set up complete.
switches retrieved from field			and chemical aspects of returned switches	Analysis of switches in progress.
junkyards & other sources				
Fluid Ingress Tests	13a	TI	Repeat ignition simulation with different fluids.	Test complete.
			(3) hour tests:	5% NaCl sample resulted in an ignition.
			5% NaCl in tap water	All brake fluid samples drew less than 3 mAmps. No corrosion
			rain water	visible on brake fluid samples.
			(24) hour tests:	Rain water and tap water samples drew <10 mAmps and showed
			tap water	some signs of corrosion.

Brake Pressure Switch Test Log, Updated 6/22/99

			used brake fluid	Chemical analysis in process.
			used brake fluid w/ 5% H_2O	
			new brake fluid	
			new brake fluid w/ 5% H_2O	
Design Of Experiments (2)	13b	TI	Vary water concentrations in 'new' Brake Fluid	Test suspended. Analysis in process to assess test fixturing.
Repeat of test 10			10 snap + 25 quiet switches w/ 5 % water in BF	
			25 snap + 25 quiet switches w/ 5 % water in BF	
Compatibility of Kapton	14	Dupont	Characterize change in properties of Kapton	Test in progress ([illegible] hours completed. Oxalic acid [illegible]
with Oxalic Acid			with various % oxalic acid in brake fluid.	[illegible] effects that water has on Kapton properties.
Evaluation of Plastic	15	TI	Assess properties and moldability of different	Test suspended.
Materials with Improved			grades of plastic resin with additives	[illegible] tested 30 and 25 [illegible]
Parameters			to improve plastic part performance	[illegible] samples tested [illegible]
Long duration brake fluid	16a	TI	(4) samples with new brake fluid	Test suspended ([illegible]) hours completed.
ingress test			(2) samples with used brake fluid	Used brake fluid current dropped off to <1/10 mAmp.
				New BF [illegible] current [illegible] of time under cont. power.
Evaluation of Switch	16b	TI	Assess ignition sensitivity to switch orientation.	Test [illegible]. [illegible] in [illegible] switch orientation.
Orientation			Test vertical versus 45 degree.	[illegible] ignition can occur in vertical or 45 degree angle.
			Test [illegible] sensitivity to 45 deg. orientation.	[illegible] to switch rotational alignment.
Relay Circuit	18	TI	[illegible] relay circuit [illegible]	Test [illegible]. [illegible] reduced.
Test			[illegible] switch to [illegible] ignition in [illegible] Amp	[illegible] power in circuit to create or move toward ignition in lab.
			circuit then place in relay circuit for ([illegible]) hrs.	Heater element was [illegible] in the bench.
			[illegible] heater on switch.	
Long duration brake fluid	17	TI	([illegible]) samples [illegible]	[illegible] hours completed.
ingress test number 2			(1) hour of vibration per day	Average [illegible] current is 1.9 mAmp (std deviation = 1.8 mAmps)
			(1) hour soak at 1[illegible] deg C per day	

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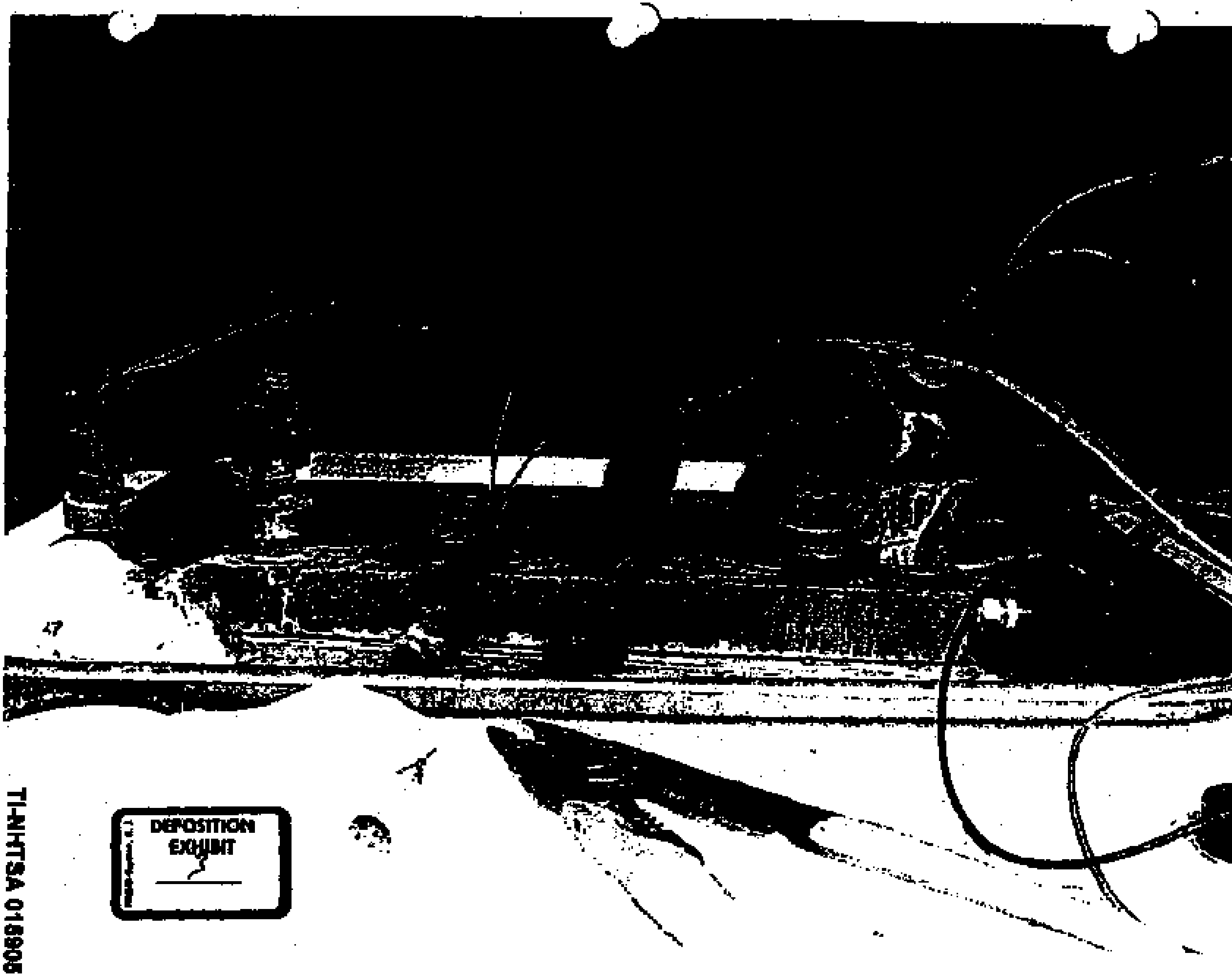
preliminary draft summary of TI record search findings of May 14-17 1999

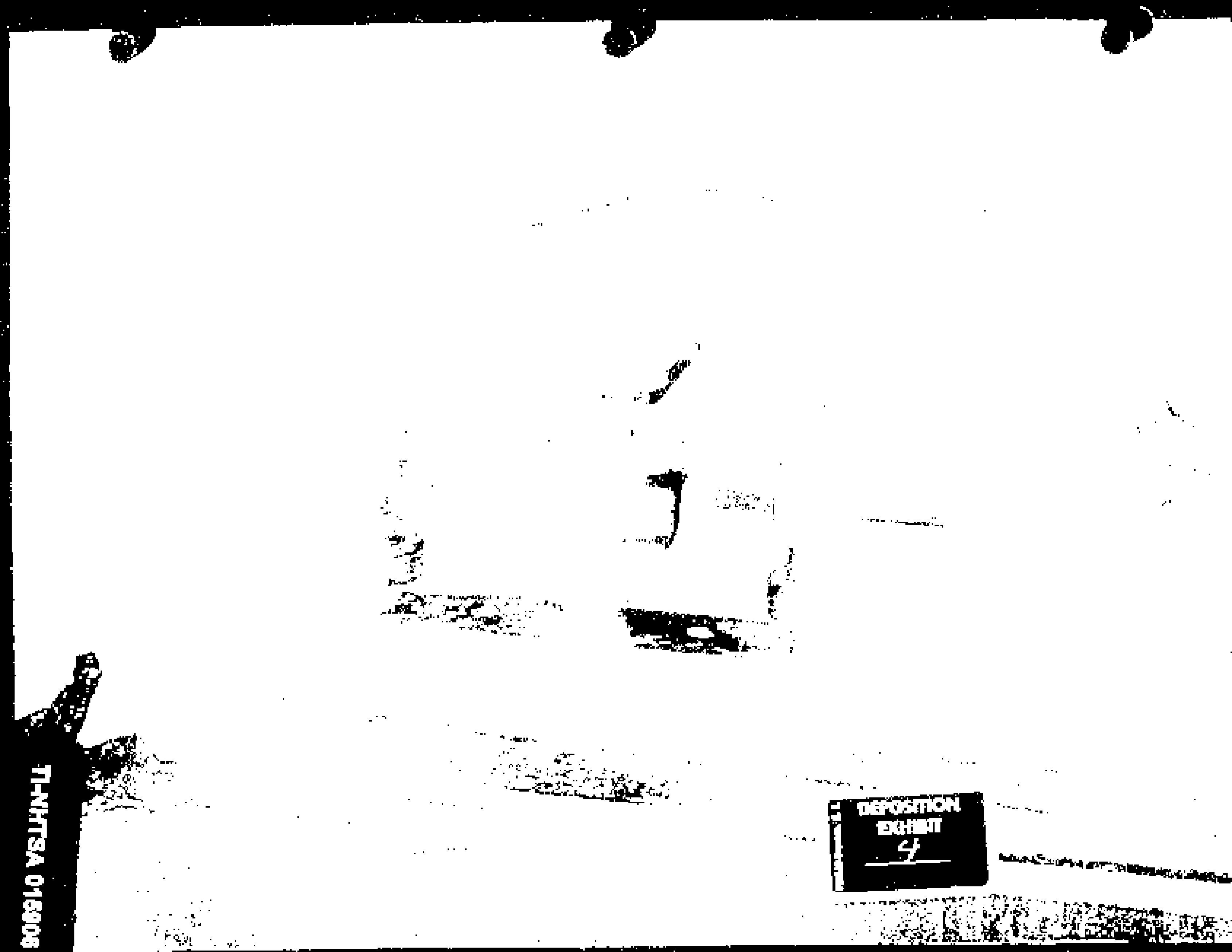
summary by Steve Beringhause & Andy McGuirk May 19th 1999
TI P/N: 77PSL2-1
Ford P/N: F2VC-9F924-AB
Tested at 'room temp' per manufacturing ES requirements

Date	Lot Size	Qty Impulse Tested	Qty Leaks
25-Nov-91	4,000	10	-
26-Nov-91	4,000	10	-
5-Dec-91	4,000	10	-
5-Dec-91	4,000	10	-
9-Dec-91	4,000	10	-
9-Dec-91	2,000	5	-
11-Dec-91	4,000	10	-
11-Dec-91	4,000	10	-
13-Dec-91	4,000	10	-
14-Dec-91	4,000	10	-
16-Dec-91	4,000	10	-
16-Dec-91	4,000	10	-
2-Jan-92	4,000	10	-
6-Jan-92	4,000	10	-
7-Jan-92	2,000	5	-
8-Jan-92	4,000	10	-
8-Jan-92	4,000	10	-
14-Jan-92	4,000	10	-
14-Jan-92	4,000	10	-
15-Jan-92	4,000	10	-
28-Jan-92	2,000	5	-
31-Jan-92	4,000	10	-
2-Feb-92	1,850	5	-
4-Feb-92	4,000	10	-
5-Feb-92	4,000	10	-
6-Feb-92	4,000	10	-
10-Feb-92	4,000	10	-
11-Feb-92	4,000	10	-
12-Feb-92	4,000	10	-
13-Feb-92	4,000	10	-
14-Feb-92	4,000	10	-
14-Feb-92	4,000	10	-
14-Feb-92	4,000	10	-
15-Feb-92	4,000	10	-
24-Feb-92	4,000	10	-
25-Feb-92	4,000	10	-
26-Feb-92	4,000	10	-
28-Feb-92	4,000	10	-
28-Feb-92	4,000	10	-
28-Feb-92	4,000	10	-
6-Mar-92	4,000	10	-
10-Mar-92	4,000	10	-
11-Mar-92	4,000	10	-
12-Mar-92	4,000	10	-

18-Mar-92	4,000	10	-
23-Apr-92	2,000	5	-
2-May-92	2,000	5	-
5-May-92	2,000	5	-
6-May-92	2,000	5	-
14-Sep-92	2,000	5	-
22-Sep-92	4,000	10	-
30-Sep-92	4,000	10	-
7-Oct-92	4,000	10	-
7-Oct-92	4,000	10	-
16-Oct-92	4,000	10	-
21-Oct-92	2,000	5	-
20-Oct-92	4,000	10	-
29-Oct-92	4,000	10	-
29-Oct-92	4,000	10	-
30-Oct-92	4,000	10	-
4-Nov-92	4,000	10	-
10-Nov-92	4,000	10	-
10-Nov-92	4,000	10	-
11-Nov-92	4,000	10	-
17-Nov-92	2,000	5	-
20-Nov-92	4,000	10	-
4-Dec-92	2,000	5	-
9-Dec-92	2,000	5	-
14-Dec-92	2,000	5	-
15-Dec-92	4,000	10	-
16-Dec-92	4,000	10	-
16-Dec-92	4,000	10	-
21-Dec-92	2,000	5	-
21-Dec-92	4,000	10	-
Totals units	**265,690**	**665**	**-**



DEPOSITION EXHIBIT 2



DEPOSITION EXHIBIT 5

.001" teflon

500 FN 131

.003" polyimide

.005" thick Teflon coated Kapton

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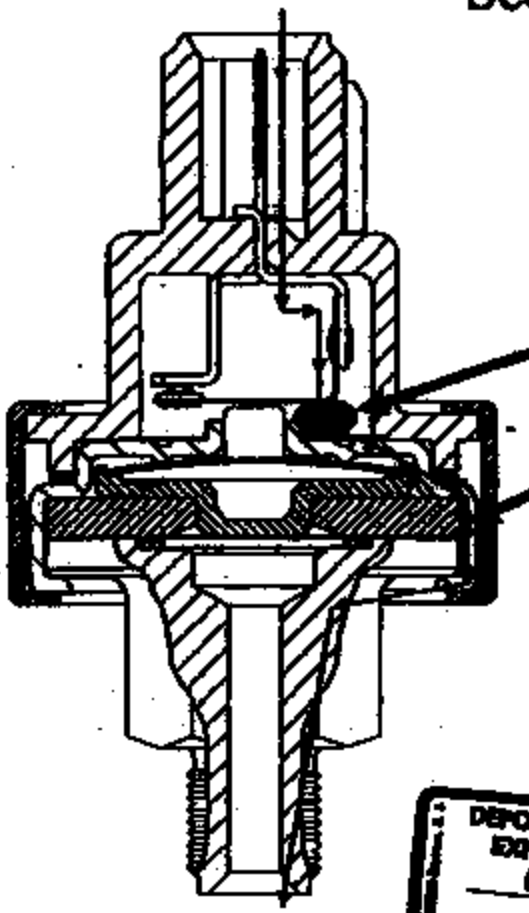
Scenario



1. Contamination enters switch cavity through perforated kapton seal or connector seal.
2. Switch components and cup corrode with aid of electric field and contamination.
3. Current path forms between battery and ground.
4. Current increases as material builds until heat is generated to melt plastic.
5. When plastic melts enough to open the switch cavity to external air, the plastic ignites consuming the switch housing and connector.

mead

DEPOSITION EXHIBIT Z

NEAT SHEETS

80 SHEETS

11 x 8½ in / 27.9 x 21.5 cm

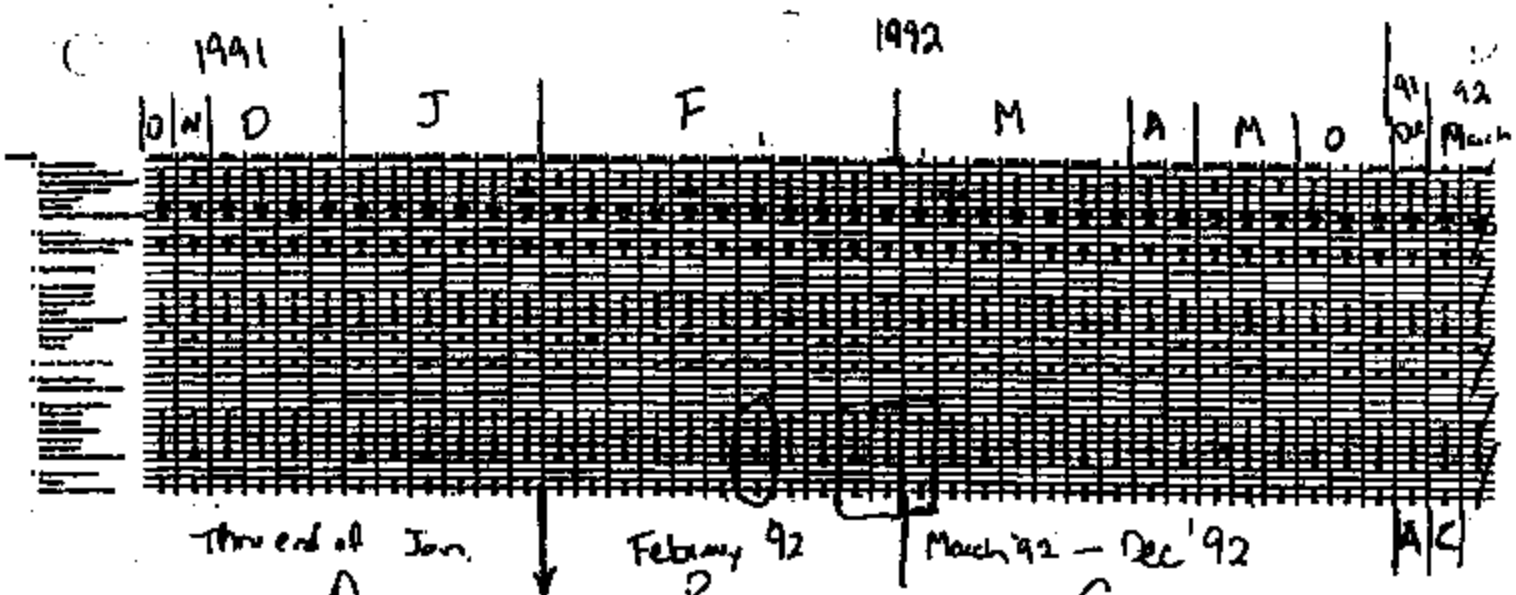
1 SUBJECT

NEATBOOK® NOTEBOOK

TI-NHTSA 016909

Steve Kimes

313-390-3286



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TI-NHTSA 015911