March 2, 1995

To: See Distribution List.

From: J. B. Estes, Jeep Safety Development, x3-2519 514-15-58

RE: 1996 ZJ Post Impact Review Meeting from 2-2-95.

A meeting was held on March 2, 1995 to review the 1996 ZJ Impact Program. The overall program status and direction were also reviewed. The impact data was presented by Jud Estes with discussion by the attendees as follows :

1996 ZJ-8905 (EVO #6ZJ-103)

Test No.: VC5344

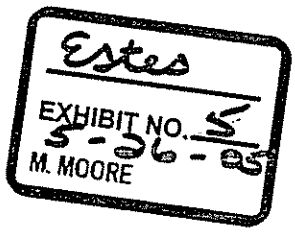
Test Date: Feb 6, 1994

Test Purpose: **Primary**, 1996 MVSS 208 Development.
Observe Dummy Kinematics &
Determine Injury Criteria.

Secondary, 1996 MVSS 301 Development.
Monitor Fuel System Performance.

Direction: 30 mph Flat Frontal Impact.

Vehicle: 5.2 l (V8) engine, 4-speed auto trans, 4x4
power steering, air conditioning and antilock brakes.
Modified transmission crossmember - (1) open and
(1) closed ended slot on right front side.
Corporate Column - Tilt and reduced mesh
. Steel lower bearing retainer.
. New pivot pin.
. S/C upper mounting bracket w/rolled edge.
. Intermediate shaft is 3/4 'DD' (Torrington).
Bucket seats(cloth) on manual tracks, full console.
Drivers' side foot rest.
Driver Side Airbag:
. 26-ucc-2t-2-std-420-kpa.
. Uncoated 315d/420d cushion.
. 2 sq. in. discrete vents.
. 2 tethers and standard fold.
. S/N cre97539006.



Steering Column Capsule began to stroke at : Left Capsule @ 83.0 ms.
Right Capsule @ 40.0 ms.

FMVSS 301 Fuel System Integrity

There was no fuel system leakage at impact. At the post test pressure check the system held pressure. No rollover test was conducted. The prototype fuel rails did not leak. The mounting bolt and plastic fuel rail flange contacted the plenum during the event. The modifications to the crossover pipe did not allow contact between the crossover pipe and the plenum as we had seen previously. This carryover program for vehicle improvement will be pursued for the 1997 ZJ. A addition to the 1997 ZJ Impact Plan is being made to accommodate the necessary testing. A need for additional vehicles was identified. A possible 3 new vehicles, 1996 production ZJ's, could be added to the plan.

General Observations and Discussions

The loss of the injury numbers reduced the value of this test enormously. The injury criteria were to have confirmed our position to use the Hybrid II dummies in Compliance testing. The next test ZJ-8905 will again attempt to confirm the previous Injury Criteria.

The vehicle broke the rear differential housing and the axle by rearward movement of the engine-transmission assembly.

The 6 o'clock spoke on the steering wheel broke. This is being addressed on the next vehicle. This is a due care issue and not strictly regulatory.

The rear impact test of ZJ8602 was discussed. The complete electronic data package was lost at the proving grounds. This again greatly compromised the value of the test. The test vehicle exceeded the standard for fuel leakage. The vehicle crush pattern was observed to quite different from previous vehicles. No impact pulse data is available for comparision. Improvements to the tank are being implemented. A further rear impact test must be scheduled. This will happen as soon as we identify another available vehicle.

The NHTSA compliance test on a 1995 ZJ was also discussed. This vehicle meet all the applied standards when tested by the Federal government at TRC of Ohio.

Future Program Direction :

There is one more scheduled frontal impact test in the program. ZJ-8905 A 4.0L (I6) 4x4 is scheduled for a 30 mph frontal impact test as soon as the Steering Wheel is available. This part will be here at the end of March, 1995. The occupants will be Hybrid II dummies.

This will be the last vehicle test prior to beginning our compliance series of vehicles. This series will begin in early April and will consist of six (6) vehicles. The test matrix will be 3 frontal, two angular and an NCAP test.

Vehicle : Passenger Side Airbag:
. CES inflator w/32g Arcite.
. zy-03 bag/ sigma fold.
. 41.5 x 41.5/ @ 4.5 cu. ft - 63 OD.
. F1 level top pad full.
Passenger kneeblocker:
. F1 level eggcrate liner and polypro bin with slotted bezel.
Airbag Sensor system:
ASDM P/N 56009021, S/N TMC1874Z0006.
P225/75R15 Tires on steel wheels
Full size spare.
Aluminum Rear Differential housing.
Prototype Plastic Rails with repositioned crossover pipe and matching fuel line bundle

Test Weight (lbs) 4163 total, 2311 front, 1852 rear.

Test Speed: 30.4 (Trap Timer)

Vehicle Crush: 24.1 inches at 78.3 ms.

MVSS 208 - Occupant Protection

FMVSS 208 - INJURY CRITERIA

Injury Category	Driver	Passenger	FMVSS Limit
HIC	266	N/A	1000
Head G's Peak Resultant	N/A	N/A	
Chest G's (3 ms) G's (Peak) Deflection	 N/A N/A N/A	 N/A N/A 0.70 in. @ 79.1 ms.	 60 g's 3.0 in.
Femurs Left Right	 N/A N/A	 2010.7 @ 71.4 ms. 2201.4 @ 63.0 ms.	 2250 lbs

The Data was lost due to a malfunction in the Proving Grounds data collection system.

1996 ZJ Grand Cherokee
Impact Development
Test Summary

Fleet EVO #	VC#	Test Date	Engine	Veh Line	Test Mode	Test Weight	Test Speed	1000 HIC		60'G (3 MS)		FEMUR LOAD 2250 LBS				CHEST DEFL 3.0 (ins.)		
								HIC		Chest g's (3ms)		Femur Loads (lbs.)				Chest Defl. (in.)		
								Driver	Passenger	Driver	Passenger	Driver Left	Driver Right	Passenger Left	Passenger Right	Driver	Passenger	Crush
FEDERAL MVSS LIMITS								1000		60'G								
DEVELOPMENT (Mule/F1)																		
ZJ-6077	4648	1992-09-01	5.2LV8	J	UANGLE	4680	30.3	80.0	88.0	28.1	17.8	731.4	746.2	991.3	889.2	1.3	0.9	N/A
ZJ-6188	4702	1993-03-10	4.0L I6	J	FRT	4072	30.3	290.0	406.0	40.3	40.4	1293.0	1300.0	1047.0	1567.0	1.6	0.8	24.6
ZJ-6138	4864	1993-07-12	5.2L V8	J	R/ANGLE	4648	30.2	78.0	92.0	44.9	30.2	1519.8	1391.8	1348.0	1436.0	1.5	0.9	N/A
ZJ-6139	4865	1993-06-08	5.2L V8	J	FRT	4855	30.3	175.0	178.0	58.3	59.0	1151.4	2011.6	1868.6	2156.8	1.1	1.0	22.7
ZJ-6070	4893	1993-07-29	4.0L I6	J	UANGLE	4669	30.3	91.0	69.0	29.9	26.3	916.3	1250.5	1265.4	1147.8	1.1	0.8	N/A
ZJ-6069	4911	1993-08-17	4.0L I6	J	FRT	4632	30.3	182.0	178.0	59.6	44.3	1179.0	2034.1	1760.5	1673.6	1.0	1.4	N/A
ZJ-6068	4934	1993-09-10	4.0L I6	J	FRT	4637	30.3	294.0	158.0	52.6	44.7	1523.9	1810.6	1748.0	1732.5	1.0	1.0	23
ZJ-6485	4990	1993-11-22	5.2L V8	J	FRT	4954	30.5	251.0	535.0	45.8	49.9	1200.1	1175.1	625.1	781.4	1.3	1.9	23
ZJ-6484	4993	1994-02-09	4.0L I6	T	FRT	4374	30.4	231.0	222.0	49.3	42.6	1617.4	1559.7	1743.7	2000.5	1.0	0.9	21.6
ZJ-6761	5044	1994-01-22	5.2L V8	J	FRT	4369	30.2	603.0	790.0	56.6	50.1	512.3	601.6	405.6	153.4	1.7	1.5	20.6
ZJ-6486	5065	1994-03-05	5.2L V8	J	FRT	4846	30.4	175.0	273.0	58.5	47.6	1951.4	1564.7	1649.3	2359.5	1.3	1.1	23.5
ZJ-6488	5099	1994-03-17	5.2L V8	J	FRT	4959	30.4	156.0	467.0	50.3	53.7	1436.0	1490.0	771.0	901.0	1.6	1.6	23
ZJ-6487	5131	1994-04-20	4.0L I6	J	LO/THRES	4003	6.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.1
ZJ-6487r	5132	1994-05-03	4.0L I6	J	FRT	4652	30.3	266	227	48.3	45.3	1695.6	1421.1	1416.2	1638	1	0.9	22
ZJ-6315	5163	1994-05-26	5.2L V8	J	FRT	4653	30.4	150	242	45.1	53.2	1359.5	1329.1	1906	2334	1.9	1.1	23.3
6ZJ-321r	5199	1994-07-21	5.2L V8	J	REAR	4655	30.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23.1
6ZJ-061	5209	1994-08-12	5.2L V8	J	FRT	4825	30.1	192	273	78.1	57.3	1403	1821	1634	2021	2.1	1.2	22.9
VALIDATION (F2)																		
ZJ-6771	5208	1994-07-26	4.0L I6	J	REAR	4849	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.9
ZJ-6469	5210	1994-07-29	4.0L I6	T	REAR	4843	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16.9
ZJ-6301	5243	1994-09-21	4.0L I6	J	REAR	4850	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21.2
5ZJ8990	5230	1994-08-29	5.2L V8	J	FRT	4842	30.3	202.6	.....	44.4	.....	1335.1	1375.9	.....	.....	1.7	.....	24.9
6ZJ-069	5224	1994-08-29	4.0L I6	J	FRT	4857	30.3	191.3	255.2	51.1	55.6	1492.6	1710.1	1745.5	1942.9	1.4	1.3	22.3
6ZJ-066	5276	1994-10-15	4.0L I6	T	R/ANGLE	4350	30.3	98.8	1571.3	33.6	52.9	1515.1	913.2	1523.6	1530.7	1.06	0.60	N/A
6ZJ-095	5290	1994-12-22	4.0L I6	T	R/ANGLE	4360	30.2	44.5	328.7	30.3	26.6	1371.7	1539.7	1417.4	1228.9	1.23	0.57	N/A
6ZJ-096	5285	1994-10-20	5.2L V8	J	FRT	4799	30.3	166.3	298.2	59.1	56.2	1742.4	1812.5	1931.6	1919.5	1.02	0.82	23.45
6ZJ-102	5314	1994-12-16	5.2L V8	J	FRT	4794	30.4	224.4	283.1	43.7	41.6	1620.6	1791.6	1937.6	2156.4	.....	.....	23.2
ZJ-6768	5339	1995-01-06	5.2L V8	J	REAR	4805	30.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22.2
ZJ-6602	5360	1995-02-15	5.2L V8	J	REAR	4810	30.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6ZJ-103	5344	1995-02-06	5.2L V8	J	FRT	4795	30.4	265.9	.....	.....	.....	.....	.....	2010.7	2201.4	.....	0.7	24.1
ZJ-6944	5396	1995-04-01	4.0L I6	J	FRT													
COMPLIANCE (C1)																		
ZJ-6496		1995-04-13	4.0L I6	J	FRT													
ZJ-6497		1995-04-11	4.0L I6	T	FRT													
ZJ-6498		1995-04-11	5.2L V8	J	FRT													
ZJ-6499		1995-04-10	5.2L V8	J	UANGLE													
ZJ-6500		1995-04-11	4.0L I6	J	R/ANGLE													
ZJ-6501		1995-04-12	5.2L V8	J	NCAP													

204 No Occupants
208, 301 w/belts
208, 301 w/o belts
208, 301 w/o belts
208, 301 w/o belts
Belts and Bags

03/03/95 07:53 AM J B Estes

ZJSUM96.WK3

DC 05032

There is one additional test in the 1996 ZJ series. A Dynamic Side Impact (DSI) will be conducted using the passenger car standard. The test is primarily for use by Marketing. This vehicle will be taken from the development fleet and is not yet individually identified from the pool of potential vehicles. Completion of testing and the condition of the vehicle will determine the exact vehicle used in the DSI. We intend on using a 1996 C1 pilot vehicle. An additional meeting will be called in late March. 1995 to collect the requirements of the engineering community for this vehicle.

ZJ Impact Review
Mailing List

Body Exterior

Structures

G. Hemingway	514-18-77	S. A. Meidanis	514-17-47	T. Schroeder	514-18-77
		M. Gaduski	514-18-77	D. Potter	514-17-47

B-I-W

R. A. Payne	514-18-77	L. J. Osenkowski	514-18-77	J. Jyawook	514-18-60

Bumpers/lamps/Ornamentation

R M. Harden	514-18-60	M. J. Marlow	514-18-77		

Body Interior

I/P, Climate Control/Steering Controll/Airbags

T. C. Hamilton	514-18-15	G. Zamplas	514-18-15	D. Cooney	514-18-60
B. Bos	514-18-15	S. L. Williams	514-18-15		
T. Quinlan	514-18-15	J. Rauch	514-18-15		

Seats/Belts/Interior Trim

L. K. Tilly	514-18-15	D. Eisle	514-18-15	H. D. Bowers	514-18-15
D. Silsbe	514-18-15	R. Cox	514-18-15		

Electrical

Interior Systems

P. M. Marks	514-16-15	E. G. Aziz	514-16-15	R. Samoy	514-16-15

Program Management

G. W. Crockatt	514-17-07	P. D. Benedict	514-17-07		

Vehicle Development

L. J. Achram	514-17-22	J. B. Estes	514-15-58	E. A. Zylik	514-15-58
D. F. Buser	514-17-22				

Chassis

Structures/Mounts

M. H. Heppler	514-17-41	R. D. Blankenship	514-17-53	S. Knight	514-17-53

Cooling

S. D. Johnston	514-17-53	D. M. Hale	514-17-53		

Fuel Systems

S. Dudzinski	514-17-41	J. Rocca	514-17-41		

Exhaust Systems

B. C. Lazarus	514-17-43	C. J. Andary	514-17-43		

Brakes/Controls

D. E. Falkowski	514-17-41	M. W. Liddane	514-17-53	M. L. Allender	514-17-53

Steering/Suspension

W. A. Demattia	514-17-53	B. J. Pecheniuk	514-17-53		

Powertrain

Engine Engineering

G. L. Pirog	514-18-39	D. M. Weiss	514-18-39	W. R. Krieger	514-18-39
S. R. Brueckner	514-18-39	B. Crothers	514-18-39		

Transmission/Drivetrain

J. M. Klobuchar	514-18-29	R. D. Blough	514-17-43	M. Conlon	417-34-25
P. M. Bober	514-17-43	M. E. Dober	514-17-43		
D. C. Knott	514-17-15				

Impact Analysis (CTC)

A. J. Regan	481-01-39	M. A. Khalifa	481-01-39		