FSC-ESD-217-87-410

ON THE NATURE OF THE DISTORTION OF A GPHS FUELED CAPSULE
IMPACTED ON VARIOUS MEDIA AT VARIOUS VELOCITIES
AND UNDER VARIOUS BOUNDARY CONDITIONS

APPENDIX F

RESPONSE OF THE GPHS MODULE TO LH_2 - LO_2 OVERPRESSURE
IN VARIOUS SHIELDED AND UNSHIELDED GEOMETRIES

M. ECK

M. MUKUNDA

AUGUST 25, 1987

FAIRCHILD SPACE COMPANY
GERMANTOWN, MARYLAND 20874

APPENDIX F

RESPONSE OF THE GPHS MODULE TO $\text{LH}_2\text{-LO}_2$ OVERPRESSURE
IN VARIOUS SHIELDED AND UNSHIELDED GEOMETRIES

<u>DATA SET NAME</u>	<u>DESCRIPTION</u>
A. EULIR_600	
EULIR_800	
EULIR_1070	
EULIRT_1070	
EULIR_2K	
EULIR_2K	
EULIR_2KPY	
B. BSHLD_1070	
BSHLD_2K	
C. HSHLD_2K	
SHLD_HSG_GPHS	
SHIELD_HSG_2K	
D. GPHSE_JPL	
GPHS_429	
GPHSNEW 429	
GPHSNEW 429	
GPHS 600	
GPHSNEW 600	
GPHSC_EULIR 600	
GPHS_800	
GPHS800	
GPHSNEW 800	
GPHS1070PSI	
GPHSE_1070	
GPHS1070EI PSI	
GPHS1070EIT	

GPHS_2K 2000 PSI

GPHSE_2K

GPHS_2KEI 2000 PSI

E. PALPHA_GPHS_SRB

F. SRB IMPACTS SHIELD 100 M/S

EULIR_600 600 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2008

HI TIME 1.55 E-3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2003

EULIR_600 600 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2230

EULIR_600 600 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0

PROBLEM DIST UNI

CYCLE 2451

100 IN. 600 600 PSI

AT TIME 1.0 E13

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2230

EULIR_600 600 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2673

EULIR_600 600 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0

PROBLEM DIST UNIT:

CYCLE 2894

EULIRA_600 600 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 2895

EQI 11-4-500 600 PSI

AT TIME 1.75 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2895

EULIR_800 600 PSI

AT TIME 1.45 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2102

EDM. H. 2000 000 PSI

AT TIME 1.45 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2102

EULIA_800 800 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2323

EULIR_800 800 PSI

AT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS

EULIR_800 800 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2544

EULIA_800 800 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2769

EULIR_800 800 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3013

EULIA_800 800 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 3272

EULIAR_800 800 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3273

COLL: 1.000 000 PSI

HT TIME 1.7 E+3

ONE INCH =

0.5

PROBLEM DIST UNITS

CYCLE 3273

E IR_1070 1070PSI

AT TIME 1000.

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1265

EULIR_1070 1070PS1

AT TIME 1000.

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1265

EULIR_1070 1070PSI

AT TIME 1.05 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1502

EULIR_1070 1070PSI

AT TIME 1.1 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1726

EULIR_1070 1070PSI

AT TIME 1.15 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1951

EULIR_1070 1070PSI

AT TIME 1.2 E+3

NE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2175

EULIR_1070 1070PSI

AT TIME 1.25 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2400

EULIR_1070 1070PSI

AT TIME 1.3 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2624

EULIRT_1070 1070PSI

AT TIME 1.1 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1790

EULIRT_1070 1070PSI

AT TIME 1.15 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2036

EULIRT_1070 1070PSI

AT TIME 1.2 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2282

EULIRT_1070 1070PSI

AT TIME 1.25 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 2530

EULIRT_1070 1070PSI

AT TIME 1.3 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2779

EULIRT_1070 1070PSI

AT TIME 1.2 E+3

ONE INCH = 0.5
PROBLEM DIST UNITS

CYCLE 2282

EULIAT_1070 1070PS1
AT TIME 1.3 E+3

ONE INCH = 0.5
PROBLEM DIST UNITS

CYCLE 2779

EULIR_2K 2000PSI

AT TIME 8.001 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1173

EULIA_2K 2000PSI

AT TIME 8.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1173

EULIR_2K 2000PSI

AT TIME 8.502 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1395

UL1R_2K 2000PST

AT TIME 8.502 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1395

ULIR_2K 2000PSI

AT TIME 9.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1619

EULIR_2K 2000PSI

AT TIME 9.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1619

EULIR_2K 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

EULIR_2K 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

EULIR_2K 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

EULIR_2K 2000 PSI

CØLUMN 3 ROW 4 SUBGRID 5

EULIR_2K 2000 PSI

C0LUMN 1 R0W 41 SUBGRID 2

EULIR_2K 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

EULIR_2K 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

EULIR_2KPY 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

EULIR_2KPY 2000PSI

AT TIME 9.001 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1662

EULIR_2KPY 2000PSI

AT TIME 8.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1172

TOLIR_2KPT 2000PSI

AT TIME 8.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1172

EULIR_2KPY 2000PSI

AT TIME 8.501 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1402

EULIA_2KPY 2000PSI

AT TIME 8.501 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1402

EULIR_2KPT 2000P51

AT TIME9.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1662

EULIR_2KPY 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

APPEND TO
GPS-2KEEPY

EULIR_2KPY 2000 PSI
COLUMN 1 ROW 41 SUBGRID 2

EULIR_2KPY 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

EULIR_2KPY 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

EULIR_2KPY 2000 PSI

COLUMN 3 . ROW 4 SUBGRID 5

EULIR_2KPY 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

EULIR_2KPY 2000PSI

AT TIME 9.001 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1662

EULIR_2KPY 2000PSI

AT TIME 8.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1172

EULIR_2KPY 2000P51

AT TIME 8.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1172

EULIR_2KPY 2000PSI

AT TIME 8.501 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1402

EULIR_2KPY_2000PS1

RT TIME8.501 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1402

EULIR_2KPT 2000PSI

AT TIME 9.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1662

BSHLD_1070

COLUMN 1 ROW 41 SUBGRID 2

BSHLD_1070

COLUMN 2 ROW 7 SUBGRID 7

BSHLD_1070

COLUMN 2 ROW 7 SUBGRID 7

BSHLD_1070

COLUMN 3

ROW 4

SUBGRID 5

BSHLD_1070

COLUMN 3

ROW 4

SUBGRID 5

BSHLD_1070

COLUMN 3 ROW 4 SUBGRID 5

BSHLD_1070

COLUMN 1 ROW 7 SUBGRID 13

STRAINTT

TIME

BSHLD_1070

COLUMN 1 ROW 1 SUBGRID 13

BSHLD_1070

COLUMN 1 ROW 7 SUBGRID 14

B3HLD_2K

COLUMN 1

ROW 41

SUBGRID 2

BSHLD_2K

COLUMN 2

ROW 7

SUBGRID 7

BSHLD_2K

COLUMN 2

ROW 7

SUBGRID 7

BSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

BSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

BSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

BSHLD_2K

COLUMN 1

ROW 1

SUBGRID 13

PSH.D_2K

AT TIME = 2.01 E+3

ONE INCH = 1.0

PROBLEM DIST UNITS

CYCLE 4049

BSHLD_2K

AT TIME = 2.01 E+3

ONE INCH = 10.0

PROBLEM DIST UNITS

CYCLE 4049

HSULD_2K

COLUMN 1 ROW 41 SUBGRID 2

HSHLD_2K

COLUMN 2

ROW 7

SUBGRID 7

HSHLD_2K

COLUMN 2

ROW 7

SUBGRID 7

00225-

HSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

HSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

HSHLD_2K

COLUMN 3

ROW 4

SUBGRID 5

HSHLD_2K

COLUMN 1

ROW 1

SUBGRID 13

HSHLD_2K

COLUMN 1

ROW 7

SUBGRID 14

STRAINTT

1.0

0.5

0.0

-0.5

-1.0

1.5 E+3

2000.

TIME

HSHLD_2K

COLUMN 1

ROW 7

SUBGRID 13

STRAINTT

HSHLD_GPHS_2K
AT TIME = 2000.

ONE INCH = 10.0

PROBLEM DIST UNITS

CYCLE 3580

HSHLD_GPHS_2K
AT TIME = 2000.

ONE INCH = 1.0
PROBLEM DIST UNITS
CYCLE 3580

SHLD_HSG_GPHS 2000 PSI

COLUMN 2

ROW 7

SUBGRID 7

(AEROSHELL)

(~~TRAP~~)

SHLD_HSG_GPHS 2000 PSI
C0LUMN 2 ROW 7 SUBGRID 7

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI
COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2 (AERO SNEW)

SHLD_HSG_GPHS 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2

SHLD_HSG_GPHS 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7 (HOUSING)

SHLD_HSG_GPHS 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

SHLD_HSG_GPHSB 2000 PSI

AT TIME 1.85 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 3328

SHI D_HSG_GPHSB 2000 PSI

AT TIME 1.9 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 3550

SHLO_HSG_GPHSB 2000 PSI

AT TIME 1.95 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 3773

SHLD_HSG_GPHSB 2000 PSI

AT TIME 2000.

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 4001

SHLD_HSG_GPHS 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2

SHLD_HSG_GPHS 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

SHLD_HSG_GPHS 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7 (HOUSING)

SHLD_HSG_GPHS 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS
AT TIME = 1.511 E3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 1829

SHLD_HSG_GPHS
AT TIME = 1.647 E3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 2428

V426T5TA

V426SP

SHLD_HSG_GPHS
AT TIME = 1.8 E+3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 3107

Iv's gnd =

3243

SHLD_HSG_GPHSB
AT TIME = 2000.

ONE INCH = 10.0 PROBLEM DIST UNITS

CYCLE 4001

SHLD_HSG_GPHSB
AT TIME = 2.211 E3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 5828

SHLD_HSG_GPHSB 2000 PSI
AT TIME 1.85 E+3

CYCLE 3328

PROBLEM DIST UNITS
ONE INCH = 0.5

SHLD_HSG_GPHSB 2000 PSI
AT TIME 1.9 E+3

PROBLEM DIST UNITS CYCLE 3550
ONE INCH = 0.5

SHLD_HSG_GPHSB 2000 PSI
AT TIME 1.95 E+3

PROBLEM DIST UNITS CYCLE 3773
ONE INCH = 0.5

SHLD_HSG_GPHSB 2000 PSI
AT TIME 2000.

PROBLEM DIST. UNITS CYCLE 4001
ONE INCH = 0.5

SHLD_HSG_GPHS 2000 PSI

(AEROSHELL)

COLUMN 2

ROW 7

SUBGRID 7

(~~TEMP~~)

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

SHLD_HSG_GPHS 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2 (AERO SHELL)

SHIELD_006_2K 2000PSI

AT TIME 5.001 E+2

hydro shield

ONE INCH = 10.0

ONE INCH = 1.146

PROBLEM DIST UNIT

PROB VECTOR UNIT

CYCLE 31'

SHIE'D_HSC 2K 2000PST

QT TIME 1000.

1' view

JE INCH = 10.0
ONE INCH = 1.146

PROBLEM DIST UNITS
PROB VECTOR UNITS

CYCLE 1059

SHIELD_HSG_2K_2000PSI

AT TIME 1.5 E+3

0.1 INCH = 10.0
ONE INCH = 1.146

PROBLEM DIST UNITS
PROB VECTOR UNITS
CYCLE 1763

SHIELD_HSC_2K 20.0PSI

AT TIME 1.650 E+3

ONE INCH = 10.0

PROBLEM DIST UNITS

ONE INCH = 1.146

PROB VECTOR UNITS

CYCLE 1995

HSHLD_GPHS_2K
 AT TIME = 1.766 E3

ONE INCH = 10.0 PROBLEM DIST UNITS
 CYCLE 2495

GPHSEJPL

COLUMN 1 ROW 41 SUBGRID 2

GPHS EJPL

COLUMN 2

ROW 7

SUBGRID 7

GPHSEJPL

COLUMN 2

ROW 7

SUBGRID 7

GPHSEJPL

COLUMN 3

ROW 4

SUBGRID 5

GPHS JPL

COLUMN 3

ROW 4

SUBGRID 5

GPHS ~~E~~JPL

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_JPL

COLUMN 1

ROW 1

SUBGRID 13

GPHSE _JPL

$$\tau = 1899 \mu s$$

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 3252

GPHS_429

COLUMN 1 ROW 41 SUBGRID 2

GPHS_429

COLUMN 2 ROW 7 SUBGRID 7

GPHS_429

COLUMN 2 ROW 7 SUBGRID 7

CPHS_429
COLUMN 3 ROW 4 SUBGRID 5

GPHS_429

COLUMN 3

ROW 4

SUBGRID 5

GPHS_429

COLUMN 3 ROW 4 SUBGRID 5

GPHS_429

COLUMN 1

ROW 1

SUBGRID 13

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 3828

GPH5_429 429 PSI

AT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1143

GPHS_429 429 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1143

GPHS_429 429 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1364

GPHS_429 429 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1585

GPHS_429 429 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1806

GPHS_429 429 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2028

GPHS_429 429 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2253

SA

GPHS_429 429PSI

AT TIME 1.8 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2478

GPHS_429^{5A} 429PSI

AT TIME 1.8 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2478

GPHS_429 429PSI

AT TIME 1.85 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2704

GPHS_429 429PS1

AT TIME 1.85 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2704

GPHS_429 429PSI

AT TIME 1.9 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2930

SA
GPHS_429 429PSI

AT TIME 1.95 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 3156

GPHS_429S 429 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1143

G 4295 429 PSI

AT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1143

GPHS_429S 429 PSI

AT TIME 1.55 E+3

JNE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1364

GPHS_429S 429 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1585

GPHS_429S 429 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1806

GPHS_429S 429 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2028

GPHS_429S 429 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2253

PHS_429Y 429 PSI.

AT TIME 1.5 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1143

GPHS_429Y 429 PSI

AT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1143

GPHS_429Y 429 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1364

HS_429Y 429 PSI

AT TIME 1.55 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS

3PHS_429Y 429 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1585

GPHS_429Y 429 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1806

GPHS_429Y 429 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2027

GPHS_429Y 429 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 2248

PHS_429YA 429PSI

AT TIME 1.8 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2469

GPH5_429YA 429PS1

AT TIME 1.6 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2469

GPHS_429YA 429PSI

AT TIME 1.85 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2692

GPHS_429YA 429PSI

AT TIME 1.85 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2692

GPHS_429YA 429PSI

AT TIME 1.9 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2915

GPHS_429YA 429PSI

AT TIME 1.95 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 3139

GPHSNEW 429 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1166

GPHSNEW 429 PSI

AT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1166

PHSNEW 429 PS1

RT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1386

GPHSNEW 429 PSI

AT TIME 1.55 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS

GPHSNEW 429 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1607

GPHSNEW 429 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1828

GPHSNEW 429 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2050

GPHSNEW 429 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2274

EULIR_429 429 PSI

AT TIME 1.8 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2498

EULR_429 429 PSI

AT TIME 1.8 E+3

ONE INCH = 0.5 PROBLEM DIST. UNITS CYCLE 2498

EULIR_429 429 PSI

AT TIME 1.85 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2723

EULIR_429 429 PSI

AT TIME 1.9 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2947

EULIR_429 429 PSI

AT TIME 1.95 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3171

EULIR_429 429 PSI

AT TIME 2000.

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3395

EULIA_429 429 PS1

AT TIME 2.05 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3619.

EULIR_429 429 PSI

AT TIME 2.1 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 3843

GPHS

GPHS 600 PSI

AT TIME 1.35 E+9

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1057

GPHS 600 PSI

AT TIME 1.4 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1210

GPHS 600 PSI

AT TIME 1.45 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1364

GPHS 600 PSI

RT TIME 1.457 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1385

GPHS8

GPHS 600 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1518

GRASS: 600 FST

RT TIME 1.5 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1518

GPHS 600 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1673

GPDS 600 PSI

AT TIME 1.55 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1673

GP HSC

GP HS 600 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1828

CPHS 600 PSI

AT TIME 1.6 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1828

GPHS 600 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 199

GRHS 600 PSI

RT TIME 1.65 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1990

GPHS 600 PSI

AT TIME 1.7 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2176

GPHS 600 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 23

GPHSNEW 600 PSI

AT TIME 1.35 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1121

MEMPHIS 1000 P-21

AT TIME 1.95 E-3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1121

GPHSNEW 600 PSI

AT TIME 1.4 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1342

GRADIENT 600 PSI

AT TIME 1.4 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1342

GPHSNEW 600 PSI

AT TIME 1.45 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1563

GPHSNEW 600 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1784

GPHSNEW 600 PSI

AT TIME 1.514 E+3

ONE INCH = 5.0 PROBLEM DIST. UNITS CYCLE 1847

GPHSNEWA600 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2006

DISCREW 600 PSI

AT TIME 1.55 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2006

GPHSNEW 600 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2227

GRIPPER 600 PSI

R1 TIME 1.6 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2227

GPHSNEW 600 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2449

GPHSNEW 600 PSI

AT TIME 1.7 E+3

ONE INCH =

5.0

PROBLEM DIST UNITS

CYCLE 2670

GPHSNEW 600 PSI

AT TIME 1.75 E+3

ONE INCH =

5.0

PROBLEM DIST UNITS

CYCLE 2895

GPHSNEWB 600 PSI

AT TIME 1.75 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 2896

GFMSNEWB 800 PSI

AT TIME 1.75 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2896

GPHSC_EULIR 600 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1842

GPHSC_EULIR 600 PSI

RT TIME 1.6 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1842

GPHSC_EULIR 600 PSI

AT TIME 1.65 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2003

GPHSC_EULIA 600 PSI

AT TIME 1.65 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2003

GPHSC_EULIR 600 PSI

AT TIME 1.658 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2030

GPHSC_EULIA 600 PST

AT TIME 1.658 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 2030

GPHS_800 800 PSI
COLUMN 2 ROW 7 SUBGRID 7

GPHS_800 800 PSI
COLUMN 1 ROW 30 SUBGRID 2

GPHS_800 800 PSI

COLUMN 2 ROW 7 SUBGRID 7

GPHS800 PSI
AT TIME 1.72 E+3

ONE INCH = 1.0
PROBLEM DIST UNITS

CYCLE 3100

GPHS 800 PSI

AT TIME 1.2 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 941

GPHS 800 PSI

AT TIME 1.25 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1094

GPHS 800 PSI

AT TIME 1.3 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1247

GPHS 800 PSI

AT TIME 1.35 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1402

GPHS 800 PSI

AT TIME 1.4 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1557

GPHS 800 PSI

AT TIME 1.45 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1715

GPHS 800 PSI

AT TIME 1.5 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1901

GPHS 800 PSI

AT TIME 1.55 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2120

GPHS 800 PSI

AT TIME 1.6 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 2370

GPHSNEW 800 PSI

AT TIME 1.2 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 993

GPHSNEW 800 PSI

RT TIME 1.2 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 993

GPHSNEW 800 PSI

AT TIME 1.25 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1214

GPHSNEW 800 PSI

AT TIME 1.25 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1214

GPHSNEW 800 PSI

AT TIME 1.3 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1435

GPHSNEW 800 PSI

AT TIME 1.35 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1656

GPHSNEW 800 PSI

AT TIME 1.4 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS CYCLE 1877

GPHS_1070 1070 PSI

COLUMN 2 ROW 7 SUBGRID 7

COLUMN 3 ROW 4 SUBGRID 5

GPHS_1070 1070 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_1070 1070 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_1070 1070 PSI

COLUMN 1 ROW 41 SUBGRID 2

GPHS_1070 1070 PSI

COLUMN 2 ROW 7 SUBGRID 7

GPHS1070 PSI

AT TIME 9.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 823

GPHS1070 PSI

AT TIME 9.501 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1044

GPHS1070 PSI

AT TIME 1000.

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1265

GPHS1070 PSI

AT TIME 1.05 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 11188

GPHS1070 PSI

AT TIME 1.1 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1712

GPHS1070 PSI

AT TIME 1.15 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1935

GPHS1070 PSI

AT TIME 1.2 E+3

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 2160

GPHS1070 PSI

AT TIME 1.25 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 2423

GPHS1070 PSI

AT TIME 1.3 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS

CYCIF 2724

GPHSE_1070

COLUMN 1 ROW 41 SUBGRID 2

GPHSE_1070

COLUMN 2 ROW 7 SUBGRID 7

GPHSE_1070

COLUMN 2 ROW 7 SUBGRID 7

GPHSE_1070

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_1070

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_1070

COLUMN 3 ROW 4 SUBGRID 5

GPHSE_1070

COLUMN 1 ROW 1 SUBGRID 13

GPHSE_1070

COLUMN 1 ROW 41 SUBGRID 2

GPHSE_1070

COLUMN 2 ROW 7 SUBGRID 7

GPHSE_1070

COLUMN 2 ROW 7 SUBGRID 7

GPHSE_1070

COLUMN 3

ROW 4

SUBGRID 5

COLUMN 3 ROW 4 SUBGRID 5

GPHSE_1070

COLUMN 3 ROW 4 SUBGRID 5

GPHSE_1070

COLUMN 1 ROW 1 SUBGRID 13

GPHS1070EI PSI

AT TIME 9.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 823

GPHS1070EI PSI

AT TIME 9.501 E+2

NE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 1044

GPHS1070EI PSI

AT TIME 9.992 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1261

GPHS1070E1 PSI

AT TIME 9.992 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1261

G15

THERNEL - 4

GPHS1070EIT PSI

AT TIME 9.001 E+2

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 823

GPHS1070EIT PSI

AT TIME 9.501 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS
CYCLE 1044

GPHS1070EIT PSI

AT TIME 1000.

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 1282

GPHS1070E1T PSI

AT TIME 1000.

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1282

GPHS1070EIT PSI

AT TIME 1.05 E+3

ONE INCH = 5.0

PROBLEM DIST UNITS
CYCLE 1534

GPHS1070E1T PSI

AT TIME 1.05 E+3

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 1534

GPHS_2K 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

GPHS_2K 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_2K 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_2K 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2

GPHS_2K 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

GPHS_2K 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_2K 2000PSI

AT TIME 7.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 718

GPII5_2K 2000PSI

AT TIME 7.001 E+2

ONE INCH = 0.5 PROBLEM DIST UNITS CYCLE 718

GPHS_2K 2000PSI

AT TIME 7.501 E+2

NE INCH = 5.0

PROBLEM DIST UNITS

CYCLE 939

GPHS_2K 2000PSI

AT TIME 8.001 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

GPHS_2K 2000PSI

AT TIME 850.

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1382

GPHS_2K 2000PSI

AT TIME 9.002 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

SCALE 1606

GPHS_2K 2000PSI

AT TIME 9.502 E+2

ONE INCH = 5.0 PROBLEM DIST UNITS

CYCLE 1000

GPHS_2K 2000PSI

AT TIME 1000.

ONE INCH = 5.0 PROBLEM DIST UNITS

GPHSE_2K

COLUMN 1 ROW 41 SUBGRID 2

GPHSE_2K

COLUMN 2

ROW 7

SUBGRID 7

GPHSE_2K

COLUMN 2

ROW 7

SUBGRID 7

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 1

ROW 1

SUBGRID 13

*recreate
something wrong*

GPHSE_2K

COLUMN 1

ROW 41

SUBGRID 2

GPHSE_2K

COLUMN 2

ROW 7

SUBGRID 7

GPHSE_2K

COLUMN 2

ROW 7

SUBGRID 7

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 3

ROW 4

SUBGRID 5

GPHSE_2K

COLUMN 1

ROW 1

SUBGRID 13

GPHS_2KEI 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

GPHS_2KEI 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_2KEI 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

GPHS_2KEI 2000 PSI

COLUMN 3 ROW 4 SUBGRID 5

EULIR-2K APPENDIX

GPHS_2KEI 2000 PSI

COLUMN 1 ROW 41 SUBGRID 2

GPHS_2KEI 2000 PSI

COLUMN 2 ROW 7 SUBGRID 7

PALPHA_GPHS_SRB

COLUMN 1 ROW 41 SUBGRID 2

PALPHA_GPHS_SRB

COLUMN 3 ROW 4 SUBGRID 5

PALPHA_GPHS_SRB

COLUMN 3 ROW 4 SUBGRID 5

PALPHA_GPHS_SRB

COLUMN 3 ROW 4 SUBGRID 5

PALPHA_GPHS_SRB

COLUMN 2 ROW 7 SUBGRID 7

PALPHA_GPHS_SRB

COLUMN 2 ROW 7 SUBGRID 7

PALPHA_GPHS_SRB

COLUMN 1 ROW 1 SUBGRID 13

PALPHA_GPHS_SRB

COLUMN 1 ROW 7 SUBGRID 13

PALPHA_GPHS_SRB

COLUMN 1 ROW 7 SUBGRID 14

SIRAI TT

PALPHA_GPHS_SRB
AT TIME = 6000.

10.0 PROBLEM DIST UNITS

ONE INCH =

CYCLE 12797

PALPHA_GPHS_SRB
AT TIME = 6000.

ONE INCH = 1.0

PROBLEM DIST UNITS

CYCLE 12797

SRB IMPACTS SHIELD 100 M/SEC

AT TIME 0.0

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 0

SPR IMPACTS SHIELD 100 M/SEC

AT TIME 5.001 E+2

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 766

SRB IMPACTS SHIELD 100 M/SEC

AT TIME 1000.

ONE INCH = 10.0 PROBLEM DIST UNITS

CYCLE 1546

SHB IMPHCTS SHIELD 100 M/SEC

AT TIME 1.5 E+3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 2323

SRS IMPACTS SIZE 100 M/SEC

AT TIME 2.061 E-3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 3101

SRB IMPACTS SHIELD 100 M/SEC

AT TIME 2.5 ETS

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 3879

PALPHA_SRB
AT TIME = 4.795 E3

ONE INCH = 10.0 PROBLEM DIST UNITS
CYCLE 7470

PALPHA_SRB
AT TIME = 4.872 E3

ONE INCH = 100 PROBLEM DIST UNITS
CYCLE 7809