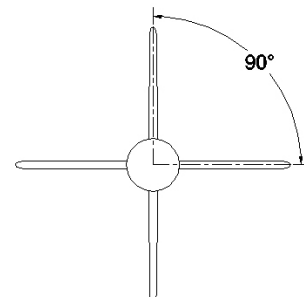
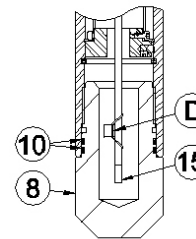
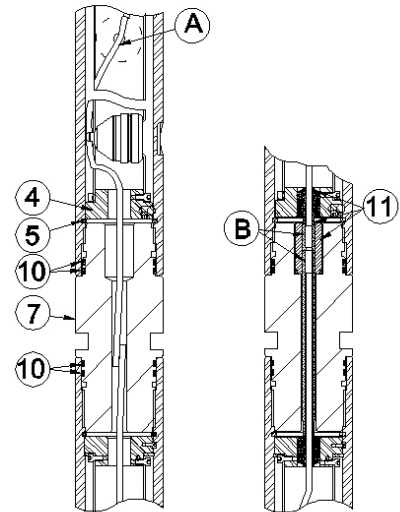
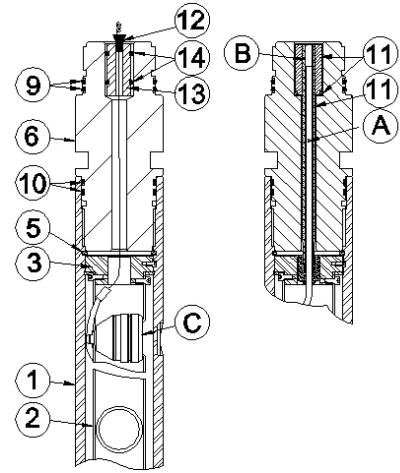


# 4 1/2" Scalloped Gun System

## 4 spf 90° Phased, XDP System

Item	Part Number	Description
	GA4504-4540A-B084	Carrier Assembly 4 1/2" x 22', 4 spf, 90° Phased
	GA4504-4540A-B056	Carrier Assembly 4 1/2" x 15', 4 spf, 90° Phased
	GA4504-4540A-B040	Carrier Assembly 4 1/2" x 11', 4 spf, 90° Phased
	GA4504-4540A-B024	Carrier Assembly 4 1/2" x 7', 4 spf, 90° Phased
	GA4504-4540A-B012	Carrier Assembly 4 1/2" x 4', 4 spf, 90° Phased
*1	C4504-B084	Carrier 4 1/2" x 22', 4 spf, 90° Phased
	C4504-B056	Carrier 4 1/2" x 15', 4 spf, 90° Phased
	C4504-B040	Carrier 4 1/2" x 11', 4 spf, 90° Phased
	C4504-B024	Carrier 4 1/2" x 7', 4 spf, 90° Phased
	C4504-B012	Carrier 4 1/2" x 4', 4 spf, 90° Phased
*2	T4540A-04-B084	Tube Strip 4" x 22', 4 spf, 90° Phased
	T4540A-04-B056	Tube Strip 4" x 15', 4 spf, 90° Phased
	T4540A-04-B040	Tube Strip 4" x 11', 4 spf, 90° Phased
	T4540A-04-B024	Tube Strip 4" x 7', 4 spf, 90° Phased
	T4540A-04-B012	Tube Strip 4" x 4', 4 spf, 90° Phased
*3	GN-EP45-4500	Top End Plate (1 qty)
*4	GN-EP45-4515	Bottom End Plate (1 qty)
*5	N5000-375	Snap Ring N5000-375 (2 qty)
* Included in Carrier Assembly		

6	GN-R45-0020	Top Sub, 4 1/2"
7	GN-R45-0021	Tandem, 4 1/2"
8	GN-R45-0022	Bull Plug, 4 1/2"
	GN-R45-0023	Bull Plug 4 1/2" w/2 7/8" EUE pin
9	OR-N569-230	O'Ring #230 Nitrile - Reference 'O'Ring Section
10	OR-N569-342	O'Ring #342 Nitrile - Reference 'O'Ring Section
11	GN-000-0030	TCP Transfer Kit., 4 1/2" - 7"
12	GN-E00-0020	Spring Contact Assembly
13	GN-E00-0011	Top Sub Wire Line Insert
14	OR-N569-211	O'Ring #211 Nitrile
15	--	Detonating Cord End Cover
A	--	Detonating Cord, 80 Grain Round - Reference Det Cord Section
B	--	Booster
C	EC2-40A3921	Charge, 39.0g RDX, 4" GEOcmt XDP
	EC2-40A3922	Charge, 39.0g HMX, 4" GEOcmt XDP
D	--	Detonator - Reference Detonator Section

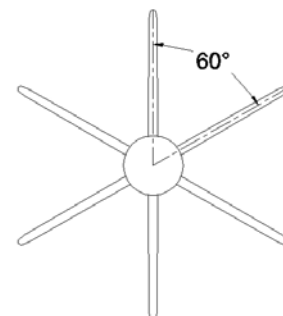
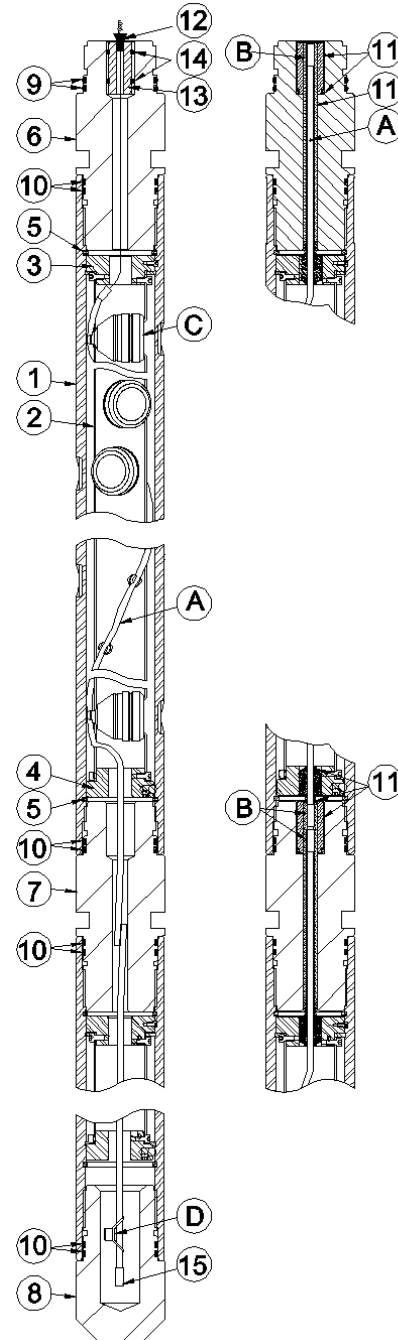


4 1/2" 4spf 90°

4 1/2" Scalloped Gun System  
5 spf 60° Phased, XDP System

Item	Part Number	Description
	GA4505-4540A-A105	Carrier Assembly 4 1/2" x 22', 5 spf, 60° Phased
	GA4505-4540A-A070	Carrier Assembly 4 1/2" x 15', 5 spf, 60° Phased
	GA4505-4540A-A050	Carrier Assembly 4 1/2" x 11', 5 spf, 60° Phased
	GA4505-4540A-A030	Carrier Assembly 4 1/2" x 7', 5 spf, 60° Phased
	GA4505-4540A-A015	Carrier Assembly 4 1/2" x 4', 5 spf, 60° Phased
*1	C4505-A105	Carrier 4 1/2" x 22', 5 spf, 60° Phased
	C4505-A070	Carrier 4 1/2" x 15', 5 spf, 60° Phased
	C4505-A050	Carrier 4 1/2" x 11', 5 spf, 60° Phased
	C4505-A030	Carrier 4 1/2" x 7', 5 spf, 60° Phased
	C4505-A015	Carrier 4 1/2" x 4', 5 spf, 60° Phased
*2	T4540A-05-A105	Tube Strip 4" x 22', 5 spf, 60° Phased
	T4540A-05-A070	Tube Strip 4" x 15', 5 spf, 60° Phased
	T4540A-05-A050	Tube Strip 4" x 11', 5 spf, 60° Phased
	T4540A-05-A030	Tube Strip 4" x 7', 5 spf, 60° Phased
	T4540A-05-A015	Tube Strip 4" x 4', 5 spf, 60° Phased
*3	GN-EP45-4500	Top End Plate (1 qty)
*4	GN-EP45-4515	Bottom End Plate (1 qty)
*5	N5000-375	Snap Ring N5000-375 (2 qty)
* Included in Carrier Assembly		

6	GN-R45-0020	Top Sub, 4 1/2"
7	GN-R45-0021	Tandem, 4 1/2"
8	GN-R45-0022	Bull Plug, 4 1/2"
	GN-R45-0023	Bull Plug 4 1/2" w/2 7/8" EUE pin
9	OR-N569-230	O'Ring #230 Nitrile - Reference 'O'Ring Section
10	OR-N569-342	O'Ring #342 Nitrile - Reference 'O'Ring Section
11	GN-000-0030	TCP Transfer Kit., 4 1/2" - 7"
12	GN-E00-0020	Spring Contact Assembly
13	GN-E00-0011	Top Sub Wire Line Insert
14	OR-N569-211	O'Ring #211 Nitrile
15	--	Detonating Cord End Cover
A	--	Detonating Cord, 80 Grain Round - Reference Det Cord Section
B	--	Booster
C	EC2-40A3921	Charge, 39.0g RDX, 4" GEOcmt XDP
	EC2-40A3922	Charge, 39.0g HMX, 4" GEOcmt XDP
D	--	Detonator - Reference Detonator Section

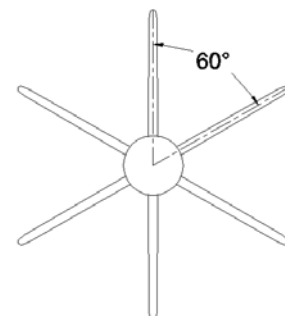
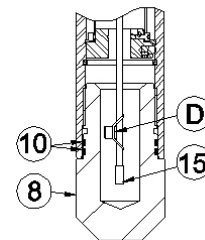
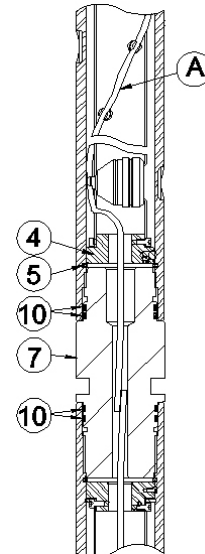
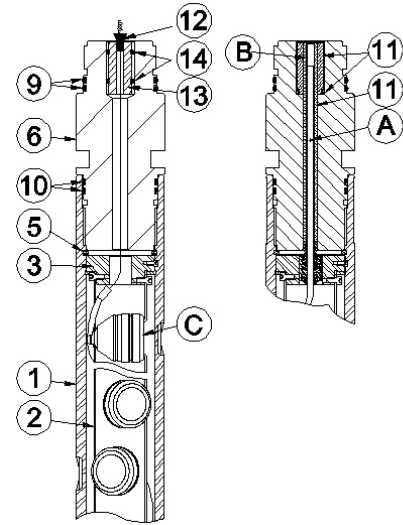


4 1/2" Scalloped Gun System  
6 spf 60° Phased, XDP System

Item	Part Number	Description
	GA4506-5833A-A126	Carrier Assembly 4 1/2" x 22', 6 spf, 60° Phased
	GA4506-5833A-A084	Carrier Assembly 4 1/2" x 15', 6 spf, 60° Phased
	GA4506-5833A-A060	Carrier Assembly 4 1/2" x 11', 6 spf, 60° Phased
	GA4506-5833A-A036	Carrier Assembly 4 1/2" x 7', 6 spf, 60° Phased
	GA4506-5833A-A018	Carrier Assembly 4 1/2" x 4', 6 spf, 60° Phased
*1	C4506-A126	Carrier 4 1/2" x 22', 6 spf, 60° Phased
	C4506-A084	Carrier 4 1/2" x 15', 6 spf, 60° Phased
	C4506-A060	Carrier 4 1/2" x 11', 6 spf, 60° Phased
	C4506-A036	Carrier 4 1/2" x 7', 6 spf, 60° Phased
	C4506-A018	Carrier 4 1/2" x 4', 6 spf, 60° Phased
*2	T5833A-06-A126	Tube Strip 4" x 22', 6 spf, 60° Phased
	T5833A-06-A084	Tube Strip 4" x 15', 6 spf, 60° Phased
	T5833A-06-A060	Tube Strip 4" x 11', 6 spf, 60° Phased
	T5833A-06-A036	Tube Strip 4" x 7', 6 spf, 60° Phased
	T5833A-06-A018	Tube Strip 4" x 4', 6 spf, 60° Phased
*3	GN-EP45-5800	Top End Plate (1 qty)
*4	GN-EP45-5815	Bottom End Plate (1 qty)
*5	N5000-375	Snap Ring N5000-375 (2 qty)

\* Included in Carrier Assembly

6	GN-R45-0020	Top Sub, 4 1/2"
7	GN-R45-0021	Tandem, 4 1/2"
8	GN-R45-0022	Bull Plug, 4 1/2"
	GN-R45-0023	Bull Plug 4 1/2" w/2 7/8" EUE pin
9	OR-N569-230	O'Ring #230 Nitrile - Reference O'Ring Section
10	OR-N569-342	O'Ring #342 Nitrile - Reference O'Ring Section
11	GN-000-0030	TCP Transfer Kit., 4 1/2" - 7"
12	GN-E00-0020	Spring Contact Assembly
13	GN-E00-0011	Top Sub Wire Line Insert
14	OR-N569-211	O'Ring #211 Nitrile
15	--	Detonating Cord End Cover
A	--	Detonating Cord, 80 Grain Round - Reference Det Cord Section
B	--	Booster
C	EC2-33A2311	Charge, 22.7g RDX, 3-3/8" GEOcmt SDP
	EC2-33A2312	Charge, 22.7g HMX, 3-3/8" GEOcmt SDP
	EC2-33A2321	Charge, 22.7g RDX, 3-3/8" GEOcmt XDP
	EC2-33A2322	Charge, 22.7g HMX, 3-3/8" GEOcmt XDP
	EC2-33A2341-C	Charge, 22.7g RDX, 3-3/8" GEOcmt DP
	EC2-33A2341	Charge, 22.7g RDX, 3-3/8" GEOcmt SDP
	EC2-33A2342	Charge, 22.7g HMX, 3-3/8" GEOcmt SDP
	EC2-33B2521	Charge, 25.0g RDX, 3-3/8" GEOcmt XDP
	EC2-33B2522	Charge, 25.0g HMX, 3-3/8" GEOcmt XDP
	EC2-33B2541	Charge, 25.0g RDX, 3-3/8" GEOcmt GH
D	--	Detonator - Reference Detonator Section

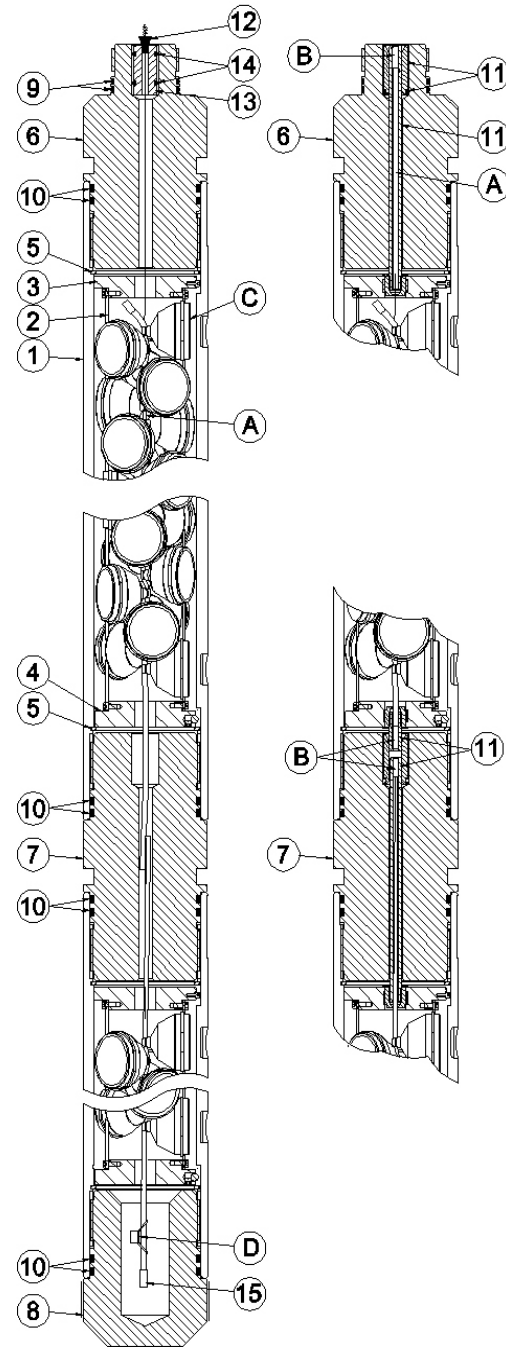


4 1/2" 6spf 60°

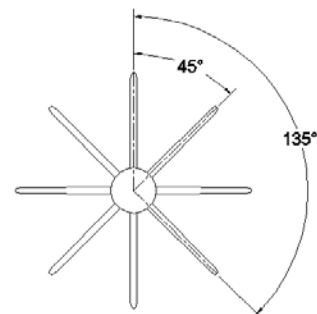
4 1/2" Scalloped Gun System  
12 spf 135° Phased, XDP System

Item	Part Number	Description
	GA4512-5033A-C253	Carrier Assembly 4 1/2" x 22', 12 spf, 135° Phased
	GA4512-5033A-C169	Carrier Assembly 4 1/2" x 15', 12 spf, 135° Phased
	GA4512-5033A-C121	Carrier Assembly 4 1/2" x 11', 12 spf, 135° Phased
	GA4512-5033A-C073	Carrier Assembly 4 1/2" x 7', 12 spf, 135° Phased
	GA4512-5033A-C037	Carrier Assembly 4 1/2" x 4', 12 spf, 135° Phased
*1	C4512-C253	Carrier 4 1/2" x 22', 12 spf, 135° Phased
	C4512-C169	Carrier 4 1/2" x 15', 12 spf, 135° Phased
	C4512-C121	Carrier 4 1/2" x 11', 12 spf, 135° Phased
	C4512-C073	Carrier 4 1/2" x 7', 12 spf, 135° Phased
	C4512-C037	Carrier 4 1/2" x 4', 12 spf, 135° Phased
*2	T5033A-12-C253	Tube Strip 4" x 22', 12 spf, 135° Phased
	T5033A-12-C169	Tube Strip 4" x 15', 12 spf, 135° Phased
	T5033A-12-C121	Tube Strip 4" x 11', 12 spf, 135° Phased
	T5033A-12-C073	Tube Strip 4" x 7', 12 spf, 135° Phased
	T5033A-12-C037	Tube Strip 4" x 4', 12 spf, 135° Phased
*3	GN-EP45-5000	Top End Plate (1 qty)
*4	GN-EP45-5015	Bottom End Plate (1 qty)
*5	N5000-375	Snap Ring N5000-375 (2 qty)
* Included in Carrier Assembly		

6	GN-R45-0020	Top Sub, 4 1/2"
7	GN-R45-0021	Tandem, 4 1/2"
8	GN-R45-0022	Bull Plug, 4 1/2"
	GN-R45-0023	Bull Plug 4 1/2" w/2 7/8" EUE pin
9	OR-N569-230	O'Ring #230 Nitrile - Reference 'O'Ring Section
10	OR-N569-342	O'Ring #342 Nitrile - Reference 'O'Ring Section
11	GN-000-0030	TCP Transfer Kit., 4 1/2" - 7"
12	GN-E00-0020	Spring Contact Assembly
13	GN-E00-0011	Top Sub Wire Line Insert
14	OR-N569-211	O'Ring #211 Nitrile
15	--	Detonating Cord End Cover
A	--	Detonating Cord, 80 Grain Round - Reference Det Cord Section
B	--	Booster
C	EC2-33A2322	Charge, 22.7g HMX, 3 3/8" GEOcmt XDP
D	--	Detonator - Reference Detonator Section



4 1/2" 12spf 135°

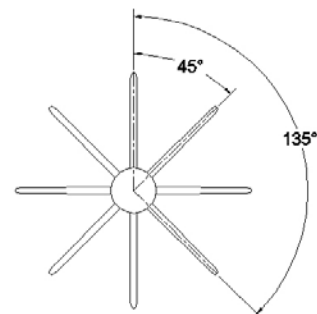
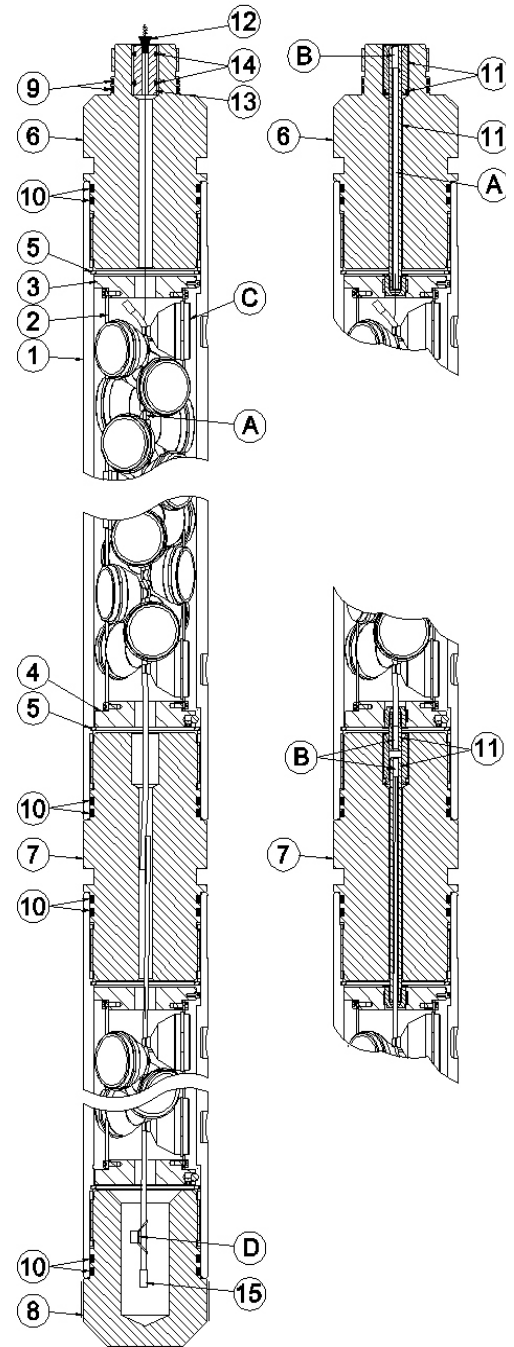


4 1/2" Scalloped Gun System  
12 spf 135° Phased, SBH System

Item	Part Number	Description
	GA4512-4045A-C253	Carrier Assembly 4 1/2" x 22', 12 spf, 135° Phased
	GA4512-4045A-C169	Carrier Assembly 4 1/2" x 15', 12 spf, 135° Phased
	GA4512-4045A-C121	Carrier Assembly 4 1/2" x 11', 12 spf, 135° Phased
	GA4512-4045A-C073	Carrier Assembly 4 1/2" x 7', 12 spf, 135° Phased
	GA4512-4045A-C037	Carrier Assembly 4 1/2" x 4', 12 spf, 135° Phased
*1	C4512-C253	Carrier 4 1/2" x 22', 12 spf, 135° Phased
	C4512-C169	Carrier 4 1/2" x 15', 12 spf, 135° Phased
	C4512-C121	Carrier 4 1/2" x 11', 12 spf, 135° Phased
	C4512-C073	Carrier 4 1/2" x 7', 12 spf, 135° Phased
	C4512-C037	Carrier 4 1/2" x 4', 12 spf, 135° Phased
*2	T4045A-12-C253	Tube Strip 4 1/2" x 22', 12 spf, 135° Phased
	T4045A-12-C169	Tube Strip 4 1/2" x 15', 12 spf, 135° Phased
	T4045A-12-C121	Tube Strip 4 1/2" x 11', 12 spf, 135° Phased
	T4045A-12-C073	Tube Strip 4 1/2" x 7', 12 spf, 135° Phased
	T4045A-12-C037	Tube Strip 4 1/2" x 4', 12 spf, 135° Phased
*3	GN-EP45-4000	Top End Plate (1 qty)
*4	GN-EP45-4015	Bottom End Plate (1 qty)
*5	N5000-375	Snap Ring N5000-375 (2 qty)

\* Included in Carrier Assembly

6	GN-R45-0020	Top Sub, 4 1/2"
7	GN-R45-0021	Tandem, 4 1/2"
8	GN-R45-0022	Bull Plug, 4 1/2"
	GN-R45-0023	Bull Plug 4 1/2" w/2 7/8" EUE pin
9	OR-N569-230	O'Ring #230 Nitrile - Reference 'O'Ring Section
10	OR-N569-342	O'Ring #342 Nitrile - Reference 'O'Ring Section
11	GN-000-0030	TCP Transfer Kit., 4 1/2" - 7"
12	GN-E00-0020	Spring Contact Assembly
13	GN-E00-0011	Top Sub Wire Line Insert
14	OR-N569-211	O'Ring #211 Nitrile
15	--	Detonating Cord End Cover
A	--	Detonating Cord, 80 Grain Round - Reference Det Cord Section
B	--	Booster
C	EC2-46A2631	Charge, 26g RDX, 4-1/2" GEOcmt SBH, Zinc Case
	EC2-45B2631	Charge, 26g RDX, 4-1/2" GEOcmt SBH, Steel Case
D	--	Detonator - Reference Detonator Section



Service Company <u>AVAILABLE FROM GEODynamics, INC.</u>	Explosive Weight <u>28</u> gm, <u>RDX</u> powder, Case Material <u>ZINC</u>
Gun OD & Trade Na <u>4-1/2" EXPENDABLE, 12 SPF 135°</u>	Max. Temp, F <u>325</u> 1 hr <u>3</u> hr <u>24</u> hr <u>100</u> hr
Charge Name <u>4-1/2" GEO BH LD</u>	Maximum Pressure Rating <u>17,200</u> psi, Carrier Material <u>STEEL</u>
Manufacturer Charge Part No. <u>EC2-45A2831</u> Date of Manufacture <u>3/8/2005</u>	Shot Density <u>12</u> shots/ft
Gun Type <u>SCALLOPED GUN (RETRIEVABLE, EXPENDABLE HOLLOW STEEL CARRIER)</u>	Recommended Minimum ID for Running <u>5.12</u> in.
Phasing Tested <u>135/45</u> degrees, Firing Order <u>X</u> Top down, <u>X</u> Bottom up	Available Firing Mode <u>X</u> Selective, <u>X</u> Simultaneous.
Debris Description <u>N/A</u>	Debris Weight <u>N/A</u> gm/charge, Debris <u>N/A</u> in.3/charge
Remarks <u>GUNS MAY BE TUBING OR WIRELINE CONVEYED</u>	

**SECTION 1 - CONCRETE TARGET**

Casing Data <u>7"</u>	OD, Weight <u>32</u> lb/ft,	L-80	API Grade, Date of Concrete Test	<u>4/12/2005</u>						
Target Data <u>60</u>	OD, Briquet Compressive Strength	<u>6573</u>	psi, Age of Target	<u>32</u> days						

Shot No.	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	
Clearance, in. ....	<u>0.63</u>	<u>0.92</u>	<u>0.79</u>	<u>0.67</u>	<u>0.97</u>	<u>0.67</u>	<u>0.79</u>	<u>0.92</u>	<u>0.63</u>	<u>0.92</u>	
Casing Hole Diameter, Short Axis, in. ....	<u>0.90</u>	<u>0.83</u>	<u>0.88</u>	<u>0.89</u>	<u>0.85</u>	<u>0.88</u>	<u>0.88</u>	<u>0.80</u>	<u>0.89</u>	<u>0.84</u>	
Casing Hole Diameter, Long Axis, in. ....	<u>0.92</u>	<u>0.85</u>	<u>0.91</u>	<u>0.90</u>	<u>0.86</u>	<u>0.90</u>	<u>0.92</u>	<u>0.81</u>	<u>0.92</u>	<u>0.86</u>	
Average Casing Hole Diameter, in. ....	<u>0.91</u>	<u>0.84</u>	<u>0.90</u>	<u>0.90</u>	<u>0.86</u>	<u>0.89</u>	<u>0.90</u>	<u>0.81</u>	<u>0.91</u>	<u>0.85</u>	
Total Depth, in. ....	<u>5.50</u>	<u>5.40</u>	<u>5.80</u>	<u>5.70</u>	<u>5.40</u>	<u>5.70</u>	<u>6.10</u>	<u>5.70</u>	<u>5.60</u>	<u>5.20</u>	
Burr Height, in. ....	<u>0.04</u>	<u>0.04</u>	<u>0.06</u>	<u>0.07</u>	<u>0.10</u>	<u>0.06</u>	<u>0.06</u>	<u>0.07</u>	<u>0.04</u>	<u>0.05</u>	
Shot No.	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19	No. 20	Average
Clearance, in. ....	<u>0.79</u>	<u>0.67</u>	<u>0.97</u>	<u>0.67</u>	<u>0.79</u>	<u>0.92</u>					<u>0.80</u>
Casing Hole Diameter, Short Axis, in. ....	<u>0.88</u>	<u>0.89</u>	<u>0.82</u>	<u>0.89</u>	<u>0.87</u>	<u>0.80</u>					<u>0.86</u>
Casing Hole Diameter, Long Axis, in. ....	<u>0.91</u>	<u>0.92</u>	<u>0.86</u>	<u>0.92</u>	<u>0.91</u>	<u>0.81</u>					<u>0.89</u>
Average Casing Hole Diameter, in. ....	<u>0.90</u>	<u>0.91</u>	<u>0.84</u>	<u>0.91</u>	<u>0.89</u>	<u>0.81</u>					<u>0.87</u>
Total Depth, in. ....	<u>5.90</u>	<u>6.00</u>	<u>5.60</u>	<u>5.90</u>	<u>5.60</u>	<u>5.60</u>					<u>5.67</u>
Burr Height, in. ....	<u>0.07</u>	<u>0.04</u>	<u>0.05</u>	<u>0.08</u>	<u>0.06</u>	<u>0.07</u>					<u>0.06</u>
Remarks _____											

**SECTION 2 - BEREA SANDSTONE CORE TARGET**

Shot No.	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	Average
Berea Bulk Porosity, _____	_____	_____	_____	_____	_____	_____	_____
Faceplate Hole Diameter, Short Axis, in. ....	_____	_____	_____	_____	_____	_____	_____
Faceplate Hole Diameter, Long Axis, in. ....	_____	_____	_____	_____	_____	_____	_____
Date of Beria Test _____	_____	_____	_____	_____	_____	_____	_____
Average Faceplate Hole Diameter, in. ....	_____	_____	_____	_____	_____	_____	_____
Total Depth, in. ....	_____	_____	_____	_____	_____	_____	_____

**CERTIFICATION**

Type of Certification:       Self       Third Party

I certify that these tests were made according to the procedures as outlined in API RP 43: Recommended Practices for Evaluation of Well Perforators, Fifth Edition, January 1991. All of the equipment used in these tests, such as the guns, jet charges, detonator cord, etc., was standard with our company for use in the gun being tested, and was not changed in any manner for the test. Furthermore, the equipment was chosen at random from stock and therefore will be substantially the same as the equipment which would be furnished to perforate a well for any operator.

CERTIFIED BY		C.E.O. <u>4/15/2005</u>	GEODynamics, Inc.	10500 West Interstate 20, Millsap, Texas 76140
RECERTIFIED	(Company Officer)	(Title)	(Date)	(Company)
<input checked="" type="checkbox"/> PRELIMINARY				(Address)