Phone: (850)-637-8138
e-mail: wateng1@cox.net
Address: 1036 Chandelle Lake Drive
Pensacola, FL. 32507

Thomas B. Watson, III, P. E.

CIVIL ENGINEER

March 12, 2009

Mr. Geoff Sherfield
Parkson Corporation
2727 Northwest 62nd Street
Ft. Lauderdale, FL.
33309-1721

Re: GR 140 X 28 Foot Geo Reactor Finite Element & Structural Analysis

Mr. Sherfield

I am pleased to submit this report of the finite element & structural member analysis of the GR 140 X 28' Geo Reactor. We appreciate the opportunity to work with you on this project. Please contact us if you have any questions regarding this report or the results of the analysis.

Sincerely,

Thomas B. Watson, III, P.E.
New Jersey License No. GE46845

CC: TJL-w/2 Reports
File-w/1 Report

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Geo Reactor Components

Main Shaft: 24" Diameter Sch. 80 Pipe

Bulkheads: 140" Diameter X ½" Plate

Radial Spokes (Adjacent to Bulkheads): ¾" X 8" Plate

Radial Spokes (Between Bulkhead): TEE SECTION- BAR ¾" X 6" Welded to BAR ½" X 4"

Circumferential Tangentials (Left & Right Ends): BAR ¾" X 6"

Circumferential Tangentials ("B" & "D" Lines): BAR ¾" X 6"

Circumferential Tangentials ("A", "C" & "E" Lines): L3X3X¼"

Circumferential Diagonals: 2" Sch. 80 Pipe

Analysis

The Geo Reactor was modeled and analyzed in GTSTRUDL, a finite element analysis software program. All members/elements of the Geo Reactor were modeled individually in three-dimensions. The 24" diameter Sch. 80 Pipe main shaft, the ½" bulkheads, the Radial Spokes Adjacent to Bulkhead were modeled as finite elements. The stringers, radial spokes between bulkheads, circumferential tangentials and the circumferential diagonals were modeled as space frame prismatic structural members. The analysis accounted for the secondary stresses due to displacements for all loadings.

The maximum tensile and compressive stresses are shown below for the stringers, radial spokes, circumferential tangentials and circumferential diagonals in **BOLD BLUE** text.

The maximum tensile and compressive stresses for the main shaft, bulkheads and radial spokes adjacent to bulkheads are shown in the attached color coded stress contour figure below (See Figure 2).

Figure No. 1, shown below, shows the basic construct of the members that make up the Geo Reactor.

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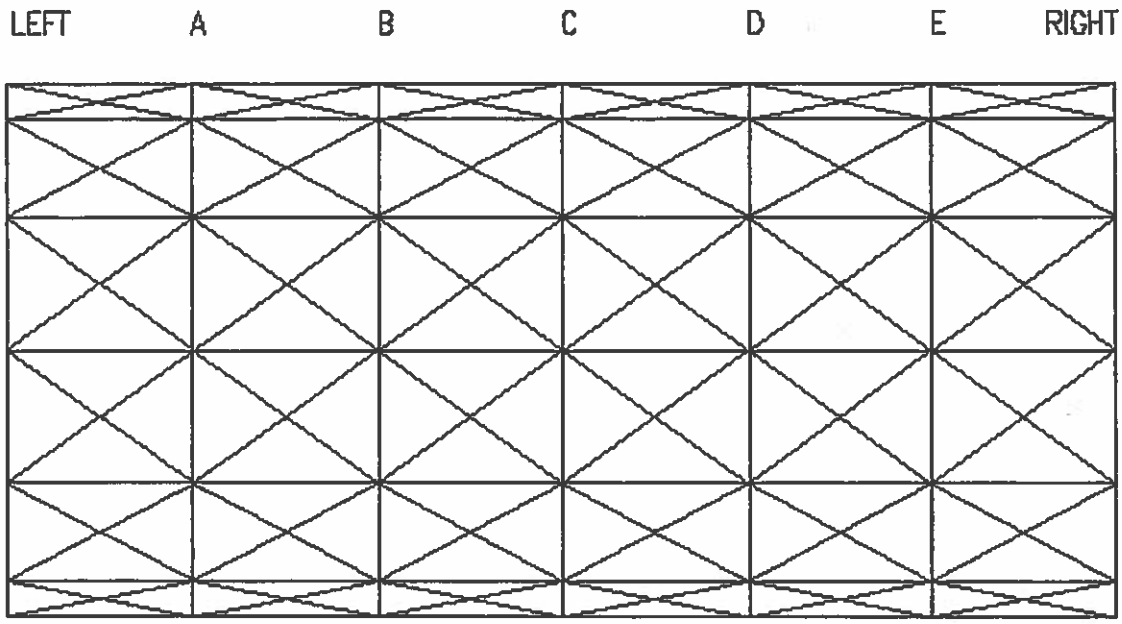
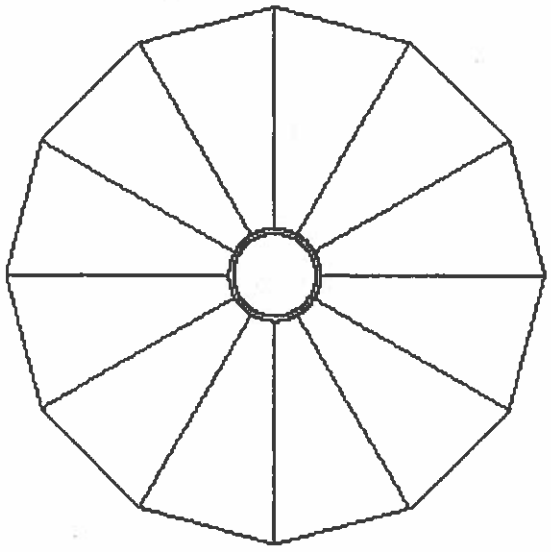


SIDE VIEW



END VIEW

Figure 1

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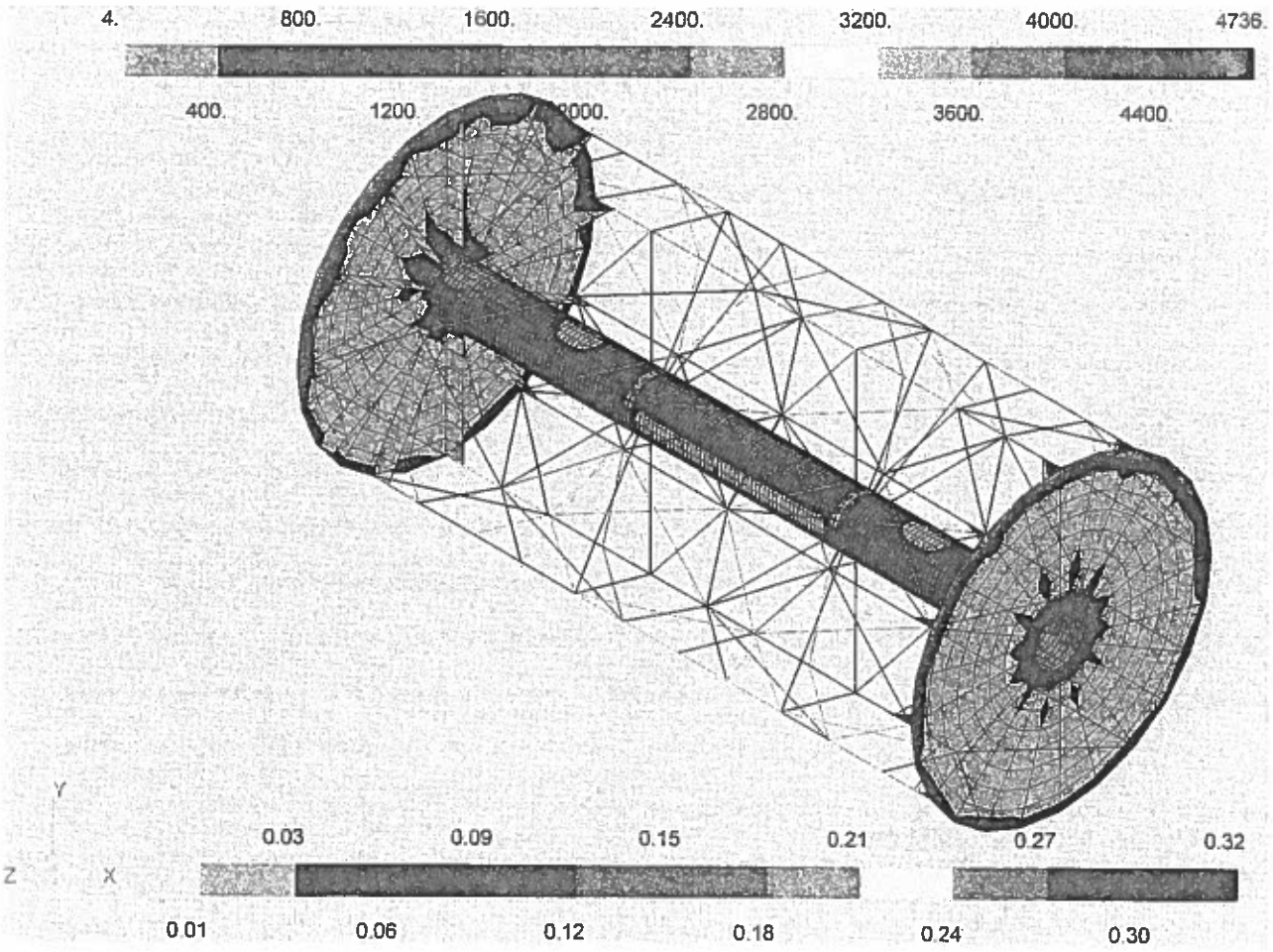
STRESS IN UNITS OF POUNDS PER SQUARE INCH FOR FINITE ELEMENTS SHOWN IN BAR GRAPH BELOW



DECIMAL COEFFICIENT OF ALLOWABLY STRESS FOR PRISMATIC MEMBERS SHOWN IN BAR GRAPH ABOVE

Figure 2

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STRINGERS

MEMBER W6X12	MAX PSI	MIN PSI	MEMBER W6X12	MAX PSI	MIN PSI
S1	2115.62	-1863.07	S37	2115.61	-1863.07
S2	2101.43	-1861.07	S38	2101.43	-1861.07
S3	2586.45	-2410.74	S39	2586.45	-2410.74
S4	2585.99	-2419.51	S40	2585.99	-2419.51
S5	2112.28	-1861.03	S41	2112.28	-1861.03
S6	2107.40	-1867.17	S42	2107.40	-1867.17
S7	2729.56	-2775.03	S43	1756.38	-1632.84
S8	3662.06	-4212.23	S44	1284.16	-392.17
S9	3849.58	-4425.30	S45	1500.51	-588.32
S10	3830.36	-4405.08	S46	1443.74	-533.44
S11	3651.65	-4201.54	S47	1313.06	-423.97
S12	2733.07	-2777.06	S48	1717.67	-1593.26
S13	2561.31	-2899.44	S49	1134.71	-286.06
S14	3944.80	-4311.44	S50	881.18	-44.35
S15	3714.36	-4870.68	S51	1366.12	-60.12
S16	3701.94	-4877.54	S52	1368.14	-61.38
S17	3961.46	-4316.29	S53	899.60	-48.03
S18	2538.79	-2899.04	S54	1151.02	-302.83
S19	2258.83	-2208.71	S55	158.76	-131.12
S20	2019.38	-3074.91	S56	1360.31	28.98
S21	2333.43	-3460.78	S57	1055.47	19.11
S22	2332.51	-3459.44	S58	1057.49	19.53
S23	2011.32	-3067.49	S59	1365.45	29.40
S24	2278.07	-2226.15	S60	157.84	-130.19
S25	2561.31	-2899.44	S61	1134.71	-286.06
S26	3944.80	-4311.44	S62	881.18	-44.35
S27	3714.36	-4870.68	S63	1366.12	-60.12
S28	3701.94	-4877.54	S64	1368.14	-61.38
S29	3961.46	-4316.29	S65	899.60	-48.03
S30	2538.79	-2899.04	S66	1151.03	-302.83
S31	2729.56	-2775.03	S67	1756.38	-1632.84
S32	3662.06	-4212.23	S68	1284.16	-392.17
S33	3849.58	-4425.30	S69	1500.51	-588.32
S34	3830.36	-4405.08	S70	1443.74	-533.44
S35	3651.65	-4201.54	S71	1313.06	-423.97
S36	2733.07	-2777.06	S72	1717.66	-1593.25
	3961 PSI	-4878 PSI		2586 PSI	-2420 PSI

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SPOKES

MEMBER TEE 6X4	MAX PSI	MIN PSI	MEMBER TEE 6X4	MAX PSI	MIN PSI
SPK13	181.05	-757.91	SPK37	181.26	-758.80
SPK14	138.75	-957.52	SPK38	138.72	-958.58
SPK15	56.47	-1166.99	SPK39	56.55	-1165.78
SPK16	290.61	-1293.43	SPK40	258.43	-1349.79
SPK17	56.47	-1166.99	SPK41	56.55	-1165.78
SPK18	138.75	-957.52	SPK42	138.72	-958.58
SPK19	181.05	-757.91	SPK43	181.26	-758.80
SPK20	477.19	-126.30	SPK44	477.42	-126.33
SPK21	640.47	-514.20	SPK45	638.52	-513.45
SPK22	837.29	-703.96	SPK46	790.35	-760.10
SPK23	640.47	-514.20	SPK47	638.52	-513.45
SPK24	477.19	-126.30	SPK48	477.42	-126.33
	837 PSI	-1293 PSI		790 PSI	-1350 PSI

TANGENTAILS

LEFT TANGENTAIL

MEMBER BAR 3/4X6	MAX PSI	MIN PSI
R1	1620.96	-1049.25
R2	1489.27	-1315.16
R3	1537.70	-892.52
R4	1537.70	-892.52
R5	1489.27	-1315.16
R6	1620.96	-1049.25
R7	683.90	-1402.12
R8	258.79	-574.63
R9	267.72	-763.38
R10	267.72	-763.38
R11	258.79	-574.63
R12	683.90	-1402.12
	1621 PSI	-1402 PSI

RIGHT TANGENTAIL

MEMBER BAR 3/4X6	MAX PSI	MIN PSI
R73	1614.54	-1042.46
R74	1492.92	-1318.36
R75	1538.18	-894.27
R76	1538.18	-894.27
R77	1492.92	-1318.36
R78	1614.54	-1042.46
R79	692.39	-1411.34
R80	259.64	-577.98
R81	267.59	-759.91
R82	267.59	-759.91
R83	259.64	-577.98
R84	692.39	-1411.34
	1615 PSI	-1411 PSI

TANGENTAILS ON "B" LINE

MEMBER BAR 3/4X6	MAX PSI	MIN PSI
R25	144.41	-373.61
R26	260.88	-319.03
R27	298.86	-538.47
R28	298.86	-538.47
R29	260.88	-319.03
R30	144.41	-373.61
R31	126.35	-585.57
R32	189.61	-559.47
R33	224.80	-333.58
R34	224.80	-333.58
R35	189.60	-559.47
R36	126.35	-585.57
	299 PSI	-586 PSI

TANGENTAILS ON "D" LINE

MEMBER BAR 3/4X6	MAX PSI	MIN PSI
R49	146.03	-365.01
R50	261.56	-320.34
R51	299.15	-533.25
R52	299.15	-533.24
R53	261.56	-320.34
R54	146.03	-365.01
R55	128.04	-585.16
R56	190.37	-553.22
R57	225.22	-334.45
R58	225.22	-334.45
R59	190.37	-553.22
R60	128.04	-585.16
	299 PSI	-585 PSI

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TANGENTAILS (CONT.)

TANGENTAILS ON "A" LINE

MEMBER L3X3X1/4	MAX PSI	MIN PSI
R13	194.01	-3508.44
R14	83.02	-5497.10
R15	43.53	-5502.32
R16	43.53	-5502.32
R17	83.02	-5497.10
R18	194.01	-3508.44
R19	142.27	-3648.11
R20	965.33	-1476.18
R21	280.75	-522.60
R22	280.75	-522.60
R23	965.33	-1476.18
R24	142.27	-3648.11
	965 PSI	-5502 PSI

TANGENTAILS ON "C" LINE

MEMBER L3X3X1/4	MAX PSI	MIN PSI
R37	105.98	-2318.47
R38	38.56	-4389.25
R39	99.49	-4415.12
R40	99.49	-4415.12
R41	38.56	-4389.25
R42	105.98	-2318.47
R43	54.58	-2766.32
R44	110.03	-876.67
R45	306.37	-548.19
R46	306.37	-548.19
R47	110.03	-876.67
R48	54.58	-2766.32
	306 PSI	-4415 PSI

TANGENTAILS ON "E" LINE

MEMBER L3X3X1/4	MAX PSI	MIN PSI
R61	180.75	-3489.39
R62	81.48	-5530.66
R63	82.40	-5150.84
R64	82.40	-5150.84
R65	81.48	-5530.66
R66	180.75	-3489.39
R67	148.94	-3750.33
R68	1229.42	-1261.77
R69	319.59	-639.31
R70	319.59	-639.31
R71	1229.42	-1261.77
R72	148.94	-3750.32
	1229 PSI	-5531 PSI

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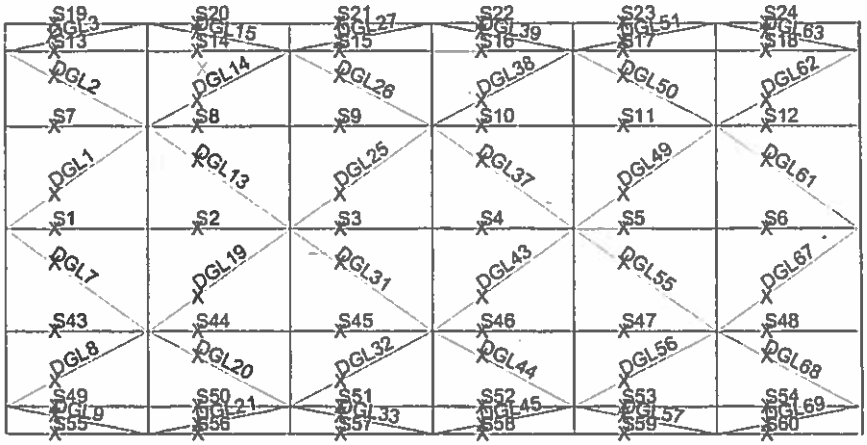
DIAGONALS

MEMBER 2" SCH. 80	MAX PSI	MIN PSI	MEMBER 2" SCH. 80	MAX PSI	MIN PSI
DGL1	-211	-4834	DGL37	59	-2069
DGL2	2242	83	DGL38	316	-987
DGL3	48	-2133	DGL39	92	-1219
DGL4	48	-2133	DGL40	92	-1219
DGL5	2242	83	DGL41	316	-987
DGL6	-211	-4834	DGL42	59	-2069
DGL7	4359	211	DGL43	1194	-59
DGL8	-83	-2547	DGL44	171	-531
DGL9	865	-48	DGL45	554	-92
DGL10	865	-48	DGL46	554	-92
DGL11	-83	-2547	DGL47	171	-531
DGL12	4359	211	DGL48	1194	-59
DGL13	847	-86	DGL49	911	-151
DGL14	10	-2786	DGL50	1	-2641
DGL15	164	-528	DGL51	165	-522
DGL16	164	-528	DGL52	165	-522
DGL17	10	-2786	DGL53	1	-2641
DGL18	847	-86	DGL54	911	-151
DGL19	-41	-1198	DGL55	-45	-1326
DGL20	1943	-10	DGL56	1796	-1
DGL21	160	-507	DGL57	160	-513
DGL22	160	-507	DGL58	160	-513
DGL23	1943	-10	DGL59	1796	-1
DGL24	-41	-1198	DGL60	-45	-1326
DGL25	61	-2070	DGL61	-207	-4835
DGL26	307	-995	DGL62	2263	88
DGL27	92	-1220	DGL63	47	-2113
DGL28	92	-1220	DGL64	47	-2113
DGL29	307	-995	DGL65	2263	88
DGL30	61	-2070	DGL66	-207	-4835
DGL31	1188	-62	DGL67	4429	207
DGL32	168	-550	DGL68	-88	-2383
DGL33	561	-92	DGL69	862	-47
DGL34	561	-92	DGL70	862	-47
DGL35	168	-550	DGL71	-88	-2383
DGL36	1188	-62	DGL72	4429	207
	4359 PSI	-4834 PSI		4429 PSI	-4835 PSI

Conclusion

The structure is capable of supporting the 90 Kip uniform live load (this load includes the dynamic factor of 1.5, hence, 60 Kip uniform static live load) and its self-weight without exceeding 6 Kips/in.^{2} of stress on any element or member.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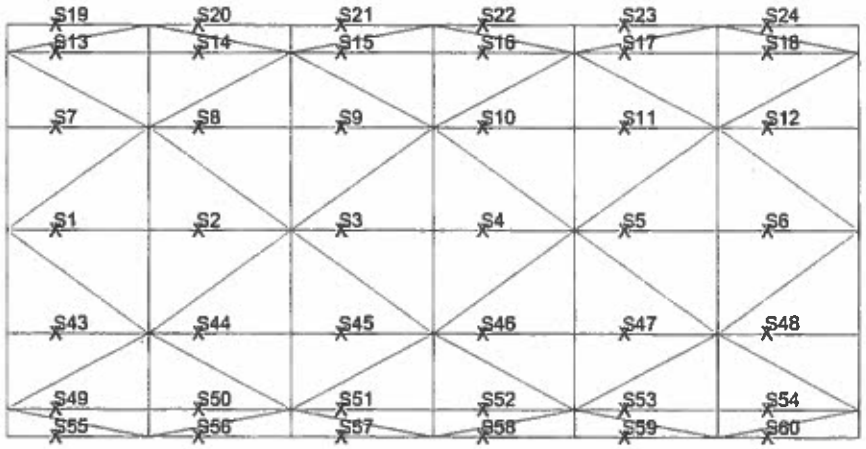
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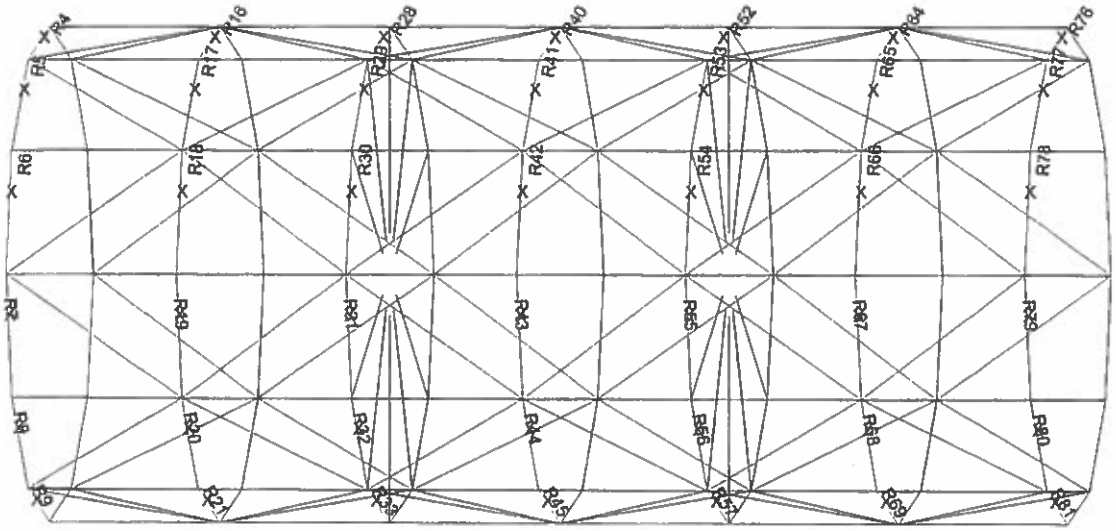

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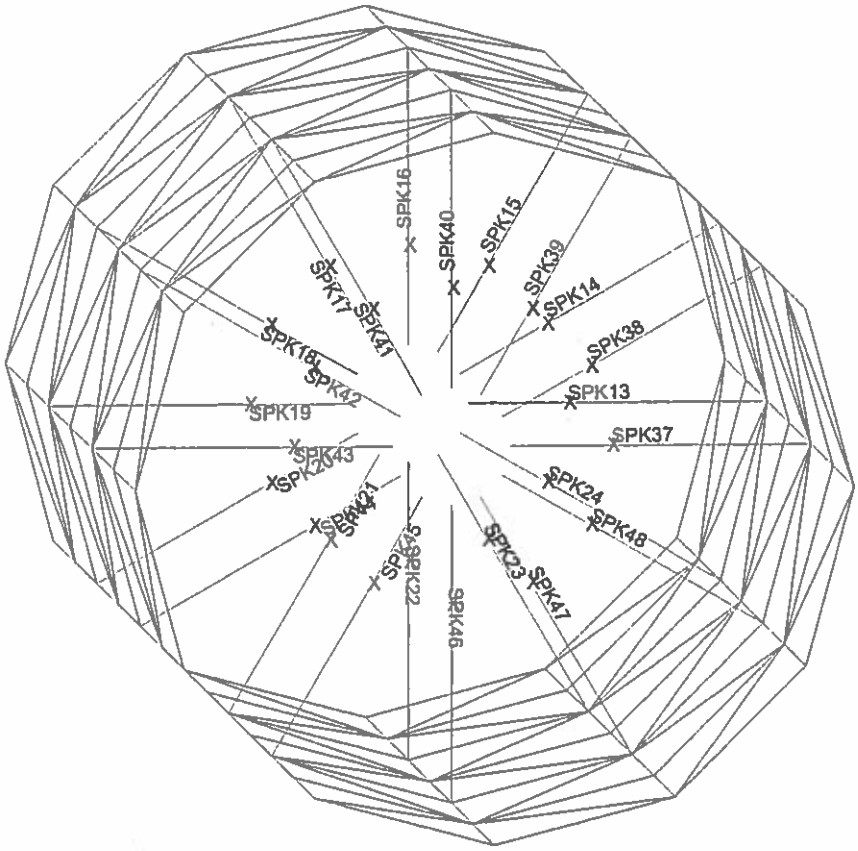
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