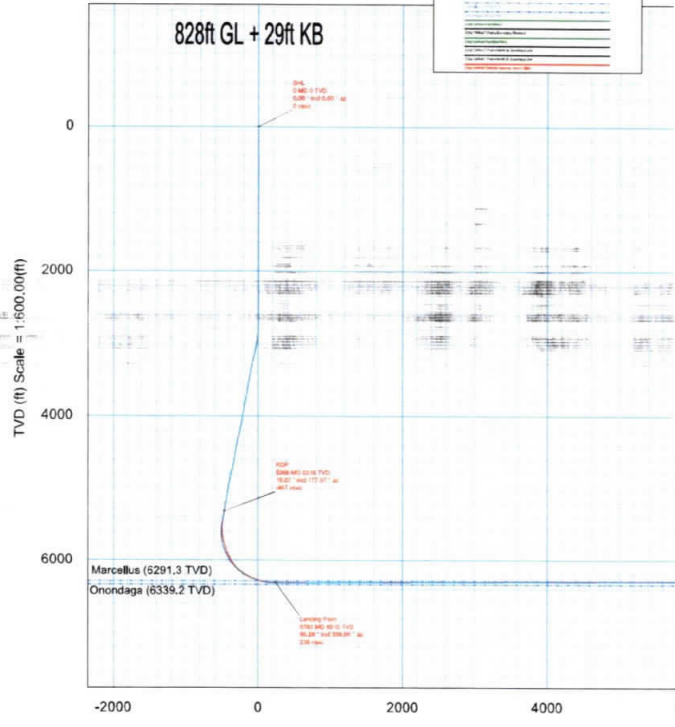
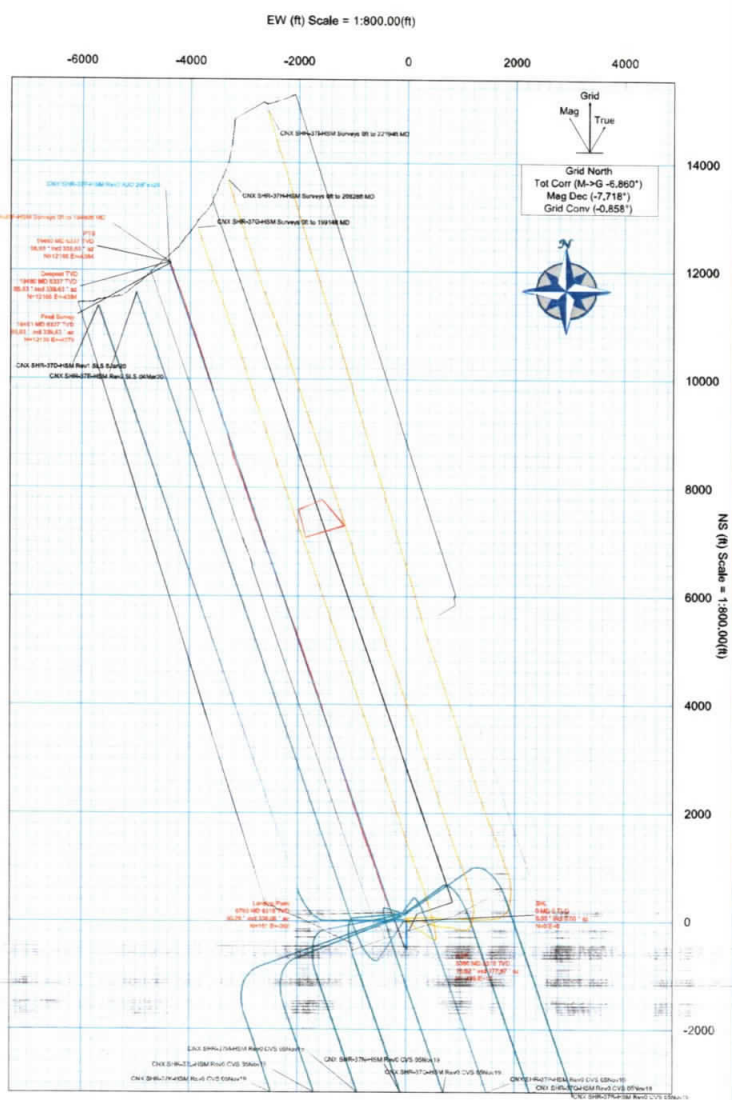


<b>Borehole:</b>	<b>Original Borehole</b>	<b>Well:</b>	<b>SHR-37F-HSM</b>	<b>Field:</b>	<b>WV Tyler County (NAD 27)</b>	<b>Structure:</b>	<b>CNX SHR-37 Pad</b>
<b>Gravity &amp; Magnetic Parameters</b>		<b>Surface Location</b>		<b>Miscellaneous</b>			
Model: HDGM 2019	Dip: 66.356°	Date: 02-Mar-2020	Surface Location: NAD27 West Virginia State Plane, Northern Zone, US Feet	Lat: N 39 21 11.11	Northing: 313561.078US	Grid Conv: -0.8582"	Slot: SHR-37F-HSM
MagDec: -7.718°	FS: 51732.275Nt	Gravity FS: 999.338mgN (9.80665 Based)	Lon: W 80 50 44.35	Easting: 1619487.361US	Scale Fact: 6.89995202	Plan: CNX SHR-37F-HSM Surveys 01 to 19480R MD	TYD Ref: RKB(857R above MSL)

Critical Point	NO	WCL	ADM	TVD	VSEC	N/VSEC	E/VSEC	SL
SHL	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.17
RCF	5360.00	1562	177.87	5317.86	-487.26	-488.77	16.16	5.17
Monobla	8917.26	7724	336.87	1791.30	74.79	-594.67	6.07	7.00
Landing Point	8750.00	8039	336.06	1300.66	238.85	-188.88	-288.23	5.07
Monobla	10966.29	8042	343.29	5291.00	4429.18	413.02	-1888.28	1.37
Monobla	13446.11	8044	338.34	8291.20	3982.48	892.128	-2094.02	5.77
Final Survey	13487.00	8040	338.63	8386.62	12981.68	12176.13	-4873.62	2.86
Present TVD	13486.00	8040	338.63	8387.04	12980.64	12176.13	-4873.62	5.00
PTB	13486.00	8040	338.63	8387.16	12980.64	12176.13	-4873.62	5.00
Overhaul	N/A	N/A	638.20	638.20				

PTB	SL	Survey Type	WCL	ADM	Case	Case	Case	Case	Case	Case	Case
1	1	SHR-37F-HSM	30	30	30	30	30	30	30	30	30
1	2	SHR-37F-HSM	30	30	30	30	30	30	30	30	30
1	3	SHR-37F-HSM	30	30	30	30	30	30	30	30	30
1	4	SHR-37F-HSM	30	30	30	30	30	30	30	30	30
1	5	SHR-37F-HSM	30	30	30	30	30	30	30	30	30

Surface Location		Northing		Easting		Latitude		Longitude		Vise Azimuth		Local Coord	
313561.078		1619487.361		N 39 21 11.11		W 80 50 44.35		341.80					
Target Name	Description	Latitude	Longitude	Northing	Easting	TVD	VSec	N/VSec	E/VSec	SL	Case	Case	Case
CNX SHR-37F-HSM	Pad - Boundary	N 39 24 52.84	W 80 50 44.35	313561.078	1619487.361	857.00	11176.36	2384.82	91.17				
CNX SHR-37F-HSM	Pad - North A Boundary	N 39 21 11.23	W 80 50 44.14	313572.85	1619533.52	857.00	1.88	17.18	16.16				
CNX SHR-37F-HSM	Pad - North B Boundary	N 39 21 11.23	W 80 50 44.14	313572.85	1619533.52	857.00	1.88	17.18	16.16				
CNX SHR-37F-HSM	Pad - West Boundary	N 39 21 11.23	W 80 50 44.14	313572.85	1619533.52	857.00	1.88	17.18	16.16				
CNX SHR-37F-HSM	Pad - East Boundary	N 39 21 11.23	W 80 50 44.14	313572.85	1619533.52	857.00	1.88	17.18	16.16				
CNX SHR-37F-HSM	Pad - South Boundary	N 39 21 11.23	W 80 50 44.14	313572.85	1619533.52	857.00	1.88	17.18	16.16				



Vertical Section (ft) Azim = 341.00° Scale = 1:600.00(ft) Origin = 0N/-S, 0E/-W

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<b>CONTROLLED</b>	
Drawn by	S. Shannon
Checked by	
Date	7/12/2021
Scale	1" = 800'
Sheet	1 of 1
Project	CNX SHR-37F-HSM



# CNX SHR-37F-HSM Surveys 0ft to 19480ft MD Survey Geodetic Report

(Def Survey)

**Report Date:** March 17, 2020 - 11:51 AM  
**Client:** CNX  
**Field:** WV Tyler County (NAD 27)  
**Structure / Slot:** CNX SHR-37 Pad / SHR-37F-HSM  
**Well:** SHR-37F-HSM  
**Borehole:** Original Borehole  
**UWI / API#:** Unknown / Unknown  
**Survey Name:** CNX SHR-37F-HSM Surveys 0ft to 19480ft MD  
**Survey Date:** March 02, 2020  
**Tort / AHD / DDI / ERD Ratio:** 351.861 \* / 13973.144 ft / 7.179 / 2.205  
**Coordinate Reference System:** NAD27 West Virginia State Plane, Northern Zone, US Feet  
**Location Lat / Long:** N 39° 21' 11.11041", W 80° 50' 44.34594"  
**Location Grid N/E Y/X:** N 313561.087 fRUS, E 1619487.359 fRUS  
**CRS Grid Convergence Angle:** -0.8582 \*  
**Grid Scale Factor:** 0.99995202  
**Version / Patch:** 2.10.794.0

**Survey / DLS Computation:** Minimum Curvature / Lubinski  
**Vertical Section Azimuth:** 341.000 \* (Grid North)  
**Vertical Section Origin:** 0.000 ft, 0.000 ft  
**TVD Reference Datum:** RKB  
**TVD Reference Elevation:** 857.000 ft above MSL  
**Seabed / Ground Elevation:** 828.000 ft above MSL  
**Magnetic Declination:** -7.718 \*  
**Total Gravity Field Strength:** 999.3376mgn (9.80665 Based)  
**Gravity Model:** GARM  
**Total Magnetic Field Strength:** 51732.275 nT  
**Magnetic Dip Angle:** 66.356 \*  
**Declination Date:** March 02, 2020  
**Magnetic Declination Model:** HDGM 2019  
**North Reference:** Grid North  
**Grid Convergence Used:** -0.8582 \*  
**Total Corr Mag North->Grid North:** -6.8601 \*  
**Local Coord Referenced To:** Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (f/100ft)	TF (ft)	BR (f/100ft)	TR (f/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (°)	Longitude (°)	Directional Difficulty Index
SHL	0.00	0.00	0.00	0.00	-857.00	0.00	0.00	0.00	N/A	305.45M	N/A	N/A	313561.07	1619487.36	39.35308622	-80.84565165	0.00
	100.00	0.32	305.45	100.00	-757.00	0.23	0.16	-0.23	0.32	290.96M	0.32	0.00	313561.23	1619487.13	39.35308666	-80.84565246	0.00
	200.00	0.34	290.96	200.00	-657.00	0.64	0.43	-0.73	0.09	341.53M	0.02	-14.49	313561.50	1619486.63	39.35308737	-80.84565426	0.00
	300.00	0.14	341.53	300.00	-557.00	0.96	0.65	-1.05	0.27	340.66M	-0.20	50.57	313561.72	1619486.31	39.35308797	-80.84565539	0.00
	400.00	0.29	340.66	400.00	-457.00	1.33	1.01	-1.17	0.15	301.74M	0.15	-0.87	313562.07	1619486.19	39.35308894	-80.84565584	0.13
	511.00	0.35	301.74	510.99	-346.01	1.88	1.45	-1.55	0.20	260.91M	0.05	-35.06	313562.52	1619485.81	39.35309014	-80.84565721	0.37
	605.00	0.54	260.91	604.99	-262.01	2.17	1.53	-2.23	0.38	255.94M	0.20	-43.44	313562.60	1619485.13	39.35309034	-80.84565963	0.61
	699.00	0.93	255.94	698.98	-158.02	2.32	1.28	-3.41	0.42	250.98M	0.41	-5.29	313562.34	1619483.95	39.35308959	-80.84566378	0.87
	794.00	0.97	250.98	793.97	-83.03	2.38	0.83	-4.92	0.10	229.22M	0.04	-5.22	313561.89	1619482.44	39.35308829	-80.84566699	1.03
	889.00	0.71	229.22	888.96	31.96	2.16	0.18	-6.12	0.43	202.29M	-0.27	-22.91	313561.25	1619481.23	39.35308647	-80.84567301	1.21
	983.00	0.68	202.29	982.95	125.95	1.53	-0.72	-6.78	0.35	209.47M	-0.03	-28.65	313560.35	1619480.58	39.35308398	-80.84567557	1.33
	1077.00	0.46	209.47	1076.95	219.95	0.86	-1.56	-7.17	0.25	209.83M	-0.23	7.64	313559.51	1619480.18	39.35308164	-80.84567693	1.42
	1172.00	0.59	209.83	1171.95	314.95	0.28	-2.32	-7.61	0.14	216.83M	0.14	0.38	313558.75	1619479.75	39.35307955	-80.84567842	1.48
	1266.00	0.44	216.83	1265.94	408.94	-0.24	-3.03	-8.06	0.17	71.69M	-0.16	7.45	313558.04	1619479.30	39.35307759	-80.84568000	1.53
	1361.00	0.13	71.69	1360.94	503.94	-0.44	-3.28	-8.18	0.58	359.96M	-0.33	-152.78	313557.78	1619479.18	39.35307687	-80.84568039	1.62
	1456.00	0.22	359.96	1455.94	598.94	-0.27	-3.07	-8.08	0.23	78.53M	0.09	-75.51	313558.00	1619479.28	39.35307747	-80.84568004	1.65
	1550.00	0.14	78.53	1549.94	692.94	-0.12	-2.86	-7.96	0.25	22.75M	-0.09	83.59	313558.20	1619479.40	39.35307803	-80.84567966	1.69
	1644.00	0.21	22.75	1643.94	786.94	0.00	-2.66	-7.79	0.19	350.92M	0.07	-59.34	313558.38	1619479.57	39.35307854	-80.84567903	1.71
	1739.00	0.21	350.92	1738.94	881.94	0.30	-2.35	-7.75	0.12	49.23M	0.00	-33.51	313558.72	1619479.61	39.35307945	-80.84567891	1.74
	1833.00	0.31	49.23	1832.94	975.94	0.56	-2.01	-7.58	0.29	47.21M	0.11	62.03	313559.05	1619479.78	39.35308038	-80.84567834	1.78
	1928.00	0.17	47.21	1927.94	1070.94	0.72	-1.75	-7.28	0.15	22.82M	-0.15	-2.13	313559.32	1619480.08	39.35308112	-80.84567730	1.80
	2022.00	0.20	22.82	2021.94	1164.94	0.89	-1.50	-7.12	0.09	67.73M	0.03	-25.95	313559.56	1619480.24	39.35308180	-80.84567673	1.82
	2116.00	0.21	67.73	2115.94	1258.94	1.03	-1.29	-6.89	0.17	18.42M	0.01	47.78	313559.78	1619480.47	39.35308240	-80.84567595	1.84
	2211.00	0.26	18.42	2210.94	1353.94	1.21	-1.02	-6.66	0.21	256.06M	0.05	-51.91	313560.05	1619480.70	39.35308316	-80.84567516	1.87
	2297.00	0.15	256.06	2296.94	1439.94	1.37	-0.86	-6.71	0.42	152.22M	-0.13	-142.28	313560.21	1619480.65	39.35308359	-80.84567533	1.91
	2400.00	0.03	152.22	2399.94	1542.94	1.36	-0.92	-6.83	0.16	93.45M	-0.12	-100.82	313560.15	1619480.53	39.35308343	-80.84567575	1.92
	2495.00	0.23	93.45	2494.94	1637.94	1.26	-0.95	-6.63	0.23	48.58M	0.21	-61.86	313560.12	1619480.73	39.35308334	-80.84567503	1.95
	2589.00	0.30	48.58	2588.93	1731.93	1.28	-0.80	-6.25	0.23	2.24M	0.07	-47.73	313560.27	1619481.10	39.35308378	-80.84567372	1.97
	2683.00	0.30	2.24	2682.93	1825.93	1.60	-0.39	-6.06	0.25	168.21M	0.00	-49.30	313560.68	1619481.30	39.35308491	-80.84567306	2.00
	2778.00	1.45	168.21	2777.92	1920.92	0.64	-1.32	-5.81	1.83	159.89M	1.21	174.71	313559.75	1619481.55	39.35308237	-80.84567211	2.13
	2872.00	1.51	159.89	2871.67	2014.67	-5.87	-7.49	-3.73	5.40	161.12M	5.38	-8.85	313553.58	1619483.63	39.35306551	-80.84566444	2.49
	2967.00	9.05	161.12	2965.79	2108.79	-18.73	-9.04	0.54	2.68	34.83R	2.67	1.29	313541.45	1619487.90	39.35303239	-80.84564870	2.76
	3061.00	10.69	167.07	3058.39	2201.39	-34.79	-35.11	4.88	2.05	23.79R	1.74	6.33	313525.96	1619492.24	39.35299004	-80.84563252	2.97
	3156.00	12.68	171.01	3151.42	2294.42	-53.82	-54.00	8.49	2.26	70.85R	2.09	4.15	313507.07	1619495.84	39.35283833	-80.84561879	3.15
	3251.00	13.01	174.87	3244.05	2387.05	-74.47	-74.95	11.07	0.97	152.36L	0.35	4.06	313486.12	1619498.43	39.35288093	-80.84560853	3.29
	3344.00	11.36	170.39	3334.95	2477.95	-93.67	-94.41	13.54	2.04	156.81R	-1.77	-4.82	313466.66	1619500.90	39.35282762	-80.84559879	3.41
	3439.00	10.13	173.42	3428.28	2571.28	-111.06	-111.93	16.06	1.42	75.06R	-1.29	3.19	313449.14	1619503.41	39.35277961	-80.84558895	3.50
	3533.00	10.76	183.10	3520.73	2663.73	-127.27	-128.91	16.53	1.98	70.92R	0.67	10.30	313432.16	1619503.89	39.35273303	-80.84558638	3.58
	3629.00	10.83	184.15	3615.03	2758.03	-143.86	-146.85	15.39	0.22	84.11L	0.07	1.09	313414.22	1619502.75	39.35268373	-80.84558645	3.64
	3724.00	10.93	180.28	3708.33	2851.33	-160.57	-164.76	14.70	0.78	133.53R	0.11	-4.07	313396.31	1619502.06	39.35263454	-80.84559094	3.69
	3818.00	10.62	182.08	3800.67	2943.67	-177.07	-182.33	14.34	0.49	33.59L	-0.33	1.91	313378.75	1619501.70	39.35258630	-80.84559128	3.74
	3913.00	11.90	180.90	3893.99	3036.99	-193.72	-200.11	13.88	0.43	2.51R	0.36	-1.24	313360.97	1619501.24	39.35253747	-80.84559196	3.78
	4007.00	10.96	181.10	3986.12	3129.12	-211.23	-218.73	13.56	1.00	126.34L	1.00	0.21	313342.35	1619500.92	39.35248633	-80.84559213	3.83
	4102.00	11.40	177.51	4079.17	3222.17	-228.43	-237.90	13.78	0.93	34.21R	-0.53	-3.78	313323.17	1619501.14	39.35243371	-80.84559304	3.88

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSB (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	TF (ft)	BR (°/100ft)	TR (°/100ft)	Northings (ftUS)	Eastings (ftUS)	Latitude (°)	Longitude (°)	Directional Difficulty Index
	4196.00	12.58	181.12	4171.12	3314.12	-247.95	-257.42	13.98	1.49	144.76L	1.28	3.84	313303.66	1619501.34	39.35238014	-80.84558858	3.93
	4290.00	11.81	178.42	4263.00	3406.00	-266.74	-277.27	14.05	1.02	148.36R	-0.82	-2.87	313263.81	1619501.40	39.35232565	-80.84558730	3.98
	4385.00	11.62	179.05	4356.02	3499.02	-265.11	-296.56	14.47	0.24	139.31L	-2.20	0.66	313284.53	1619501.83	39.35227273	-80.84558677	4.01
	4479.00	11.24	177.29	4448.15	3591.15	-302.91	-315.17	15.06	0.55	58.18R	-0.40	-1.87	313245.91	1619502.42	39.35222185	-80.84558170	4.04
	4574.00	11.35	178.18	4541.31	3684.31	-320.72	-333.76	15.80	0.22	130.22R	0.12	0.94	313227.32	1619503.16	39.35217064	-80.84557812	4.07
	4668.00	11.25	178.79	4633.49	3776.49	-338.29	-352.18	16.29	0.17	1.61R	-0.11	0.65	313208.91	1619503.64	39.35212012	-80.84557542	4.09
	4763.00	12.48	178.95	4726.46	3869.46	-358.88	-371.71	16.67	1.30	57.44L	1.29	0.17	313189.38	1619504.03	39.35208653	-80.84557303	4.13
	4857.00	12.72	177.28	4818.20	3961.20	-376.48	-392.20	17.35	0.46	156.99R	0.26	-1.78	313168.89	1619504.70	39.35201030	-80.84556965	4.16
	4951.00	11.71	179.41	4910.07	4053.07	-395.46	-412.07	17.94	1.18	3.34R	-1.07	2.27	313149.01	1619505.29	39.35195578	-80.84556641	4.21
	5046.00	11.78	179.43	5003.08	4146.08	-413.81	-431.41	18.13	0.07	149.63R	0.07	0.02	313129.88	1619505.49	39.35190269	-80.84556469	4.21
	5140.00	10.46	183.79	5095.31	4238.31	-430.78	-449.52	17.66	1.66	173.97R	-1.40	4.64	313111.57	1619506.02	39.35185295	-80.84556339	4.25
KOP	5235.00	9.86	184.16	5188.82	4331.82	-446.21	-466.24	16.50	0.64	44.22R	-0.63	0.39	313094.85	1619503.86	39.35180701	-80.84556861	4.27
	5329.00	9.96	184.72	5281.42	4424.42	-461.05	-482.37	15.25	0.15	90.39L	0.11	0.80	313078.72	1619502.61	39.35178269	-80.84557218	4.29
	5368.00	10.02	177.97	5317.98	4480.86	-467.06	-488.77	15.10	3.17	120.31L	1.16	-18.24	313072.32	1619502.46	39.35174509	-80.84557237	4.30
	5460.00	8.68	152.88	5410.65	4503.65	-481.91	-503.27	18.63	4.52	131.93R	0.13	-26.89	313057.83	1619505.98	39.35170546	-80.84555914	4.36
	5555.00	6.48	191.37	5504.87	4647.87	-493.63	-514.89	20.84	5.69	313.39M	-2.34	40.52	313046.20	1619508.20	39.35167363	-80.84555069	4.42
	5649.00	5.95	313.39	5598.60	4741.60	-493.87	-516.74	16.24	11.55	324.72M	-0.54	120.81	313044.36	1619503.60	39.35166838	-80.84556885	4.51
	5744.00	12.29	324.72	5692.36	4835.36	-479.79	-505.09	6.82	6.90	5.7L	8.87	11.93	313056.00	1619494.17	39.35169907	-80.84560060	4.57
	5838.00	17.31	323.04	5783.21	4926.21	-458.87	-485.73	-7.38	5.38	42.1R	5.34	-1.79	313075.36	1619476.98	39.35172521	-80.84565201	4.62
	5933.00	21.52	332.74	5872.81	5019.81	-426.16	-458.63	-23.87	5.57	30.62R	4.43	10.21	313102.16	1619463.49	39.35182541	-80.84571174	4.68
	6027.00	25.69	338.29	5958.94	5101.94	-388.72	-424.86	-39.31	5.02	11.78R	4.44	5.90	313136.43	1619448.05	39.35191888	-80.84576815	4.73
	6122.00	35.28	341.72	6040.72	5183.72	-340.81	-379.37	-55.57	10.26	4.12L	10.09	3.61	313181.72	1619431.79	39.35204252	-80.84582805	4.81
	6216.00	46.03	340.85	6111.93	5254.93	-278.46	-321.51	-75.35	11.46	10.85L	11.44	-1.14	313239.58	1619412.01	39.35220055	-80.84590105	4.90
	6311.00	56.03	338.40	6111.80	5314.60	-205.73	-252.44	-101.25	10.68	0.27L	10.53	-2.37	313308.84	1619386.11	39.35238907	-80.84599627	4.98
	6405.00	63.71	338.36	6218.75	5361.75	-124.57	-176.92	-131.18	8.17	5.38R	5.55	-0.04	313384.16	1619356.18	39.35259516	-80.84610610	5.05
	6499.00	68.93	338.08	6256.49	5399.49	-38.62	-67.01	-163.12	5.56	5.38R	5.55	-0.30	313464.06	1619324.25	39.35281321	-80.84622325	5.11
Landing Point	6594.00	75.21	338.89	6285.72	5483.72	51.83	-13.02	-196.39	6.84	3.57L	6.81	0.84	313548.05	1619290.98	39.35304241	-80.84634533	5.18
	6689.00	82.70	338.22	6303.91	5496.91	144.71	73.84	-230.81	7.90	1.21L	7.88	-0.49	313634.71	1619256.76	39.35327890	-80.84647092	5.24
	6783.00	90.28	338.06	6309.66	5452.66	238.35	160.86	-285.52	8.07	165.62R	8.08	-0.17	313721.72	1619221.85	39.35351633	-80.84659986	5.30
	6877.00	89.89	338.16	6309.52	5452.52	332.23	247.88	-300.56	0.43	89.27L	-0.41	0.11	313808.93	1619180.81	39.35375432	-80.84672750	5.34
	6972.00	89.94	341.71	6309.86	5452.66	427.20	337.10	-333.15	3.74	92.5R	0.05	3.74	313888.15	1619154.22	39.35399790	-80.84684745	5.39
	7066.00	89.72	336.80	6309.84	5452.94	521.12	424.98	-366.44	5.23	87.19R	-0.23	-5.22	313988.02	1619120.94	39.35423777	-80.84698990	5.43
	7161.00	89.83	338.99	6310.32	5453.32	615.98	512.99	-402.16	2.31	91.31R	0.12	2.31	314074.03	1619085.20	39.35447790	-80.84710888	5.47
	7256.00	89.79	340.74	6310.63	5453.63	710.96	602.18	-434.88	1.84	90.51R	-0.04	1.84	314163.22	1619052.50	39.35472139	-80.84722121	5.51
	7351.00	89.78	341.86	6310.99	5453.99	805.95	692.16	-465.34	1.18	72.72R	0.01	1.18	314253.19	1619022.04	39.35498716	-80.84733367	5.54
	7445.00	90.06	342.76	6311.12	5454.12	899.93	781.72	-483.91	1.00	84.51R	-0.30	0.96	314342.74	1618993.48	39.35521182	-80.84743942	5.57
	7540.00	90.11	343.28	6310.98	5453.98	994.87	872.57	-521.85	0.55	92.87L	0.05	0.55	314433.60	1618965.74	39.35546009	-80.84754233	5.59
	7634.00	89.89	338.57	6310.98	5453.98	1088.84	961.39	-552.36	5.02	96.23R	-0.23	-5.01	314522.41	1618935.03	39.35570294	-80.84765563	5.63
	7729.00	89.83	339.12	6311.21	5454.21	1183.77	1049.98	-588.84	0.58	47.91R	0.58	0.58	314611.00	1618900.74	39.35594443	-80.84778158	5.66
	7823.00	90.39	339.74	6311.03	5454.03	1277.74	1137.99	-619.67	0.89	81.97R	0.80	0.66	314699.00	1618867.72	39.35618468	-80.84790300	5.68
	7918.00	90.78	342.51	6310.06	5453.06	1372.72	1227.87	-650.40	2.94	95.8L	0.41	2.92	314788.87	1618836.99	39.35643012	-80.84801642	5.71
	8013.00	90.50	339.78	6309.00	5452.00	1467.71	1317.75	-681.11	2.91	90L	-0.29	-2.89	314878.75	1618806.28	39.35667560	-80.84812079	5.74
	8107.00	90.50	338.45	6308.18	5451.18	1561.67	1405.85	-713.87	0.33	90R	0.00	-0.33	314966.85	1618773.53	39.35691611	-80.84825029	5.76
	8202.00	90.50	339.90	6307.35	5450.35	1658.85	1494.94	-748.87	0.47	82.77R	0.00	0.47	315055.93	1618740.53	39.35715929	-80.84837169	5.79
	8296.00	91.06	344.33	6306.07	5449.07	1750.80	1584.36	-775.72	4.75	98.57L	0.80	4.71	315145.35	1618711.67	39.35740359	-80.84847848	5.82
	8390.00	90.39	339.90	6304.88	5447.88	1844.55	1673.79	-804.58	4.77	106.28R	-0.71	-4.71	315234.77	1618682.82	39.35764789	-80.84858526	5.85
	8484.00	90.06	341.03	6304.51	5447.51	1938.54	1762.38	-836.01	1.25	78.74R	-0.35	1.20	315323.38	1618651.39	39.35788978	-80.84870111	5.87
	8578.00	90.67	343.62	6303.91	5446.91	2032.50	1851.93	-864.55	2.83	104.44L	0.65	2.78	315412.90	1618622.85	39.35813443	-80.84880677	5.89
	8673.00	90.00	341.02	6303.35	5446.35	2127.47	1942.43	-893.40	2.83	93.37L	-0.71	-2.74	315503.40	1618594.00	39.35838169	-80.84891358	5.92
	8768.00	89.94	340.00	6303.40	5446.40	2222.46	2031.99	-925.09	1.08	75.27R	-0.06	-1.07	315592.95	1618562.31	39.35862822	-80.84903041	5.94
	8862.00	90.45	341.94	6303.08	5446.08	2316.46	2120.85	-955.74	2.13	99.88R	0.54	2.06	315681.81	1618531.66	39.35888889	-80.84914350	5.96
	8957.00	90.22	343.28	6302.53	5445.53	2411.42	2211.49	-984.15	1.41	90.91L	-0.24	1.39	315772.45	1618503.26	39.35911656	-80.84924876	5.98
	9051.00	90.17	340.14	6302.21	5445.21	2505.40	2300.73	-1013.66	3.32	123.6R	-0.05	-3.32	315861.68	1618473.75	39.35936030	-80.84935786	6.00
	9146.00	89.27	341.50	6302.67	5445.67												

Comments	MD (ft)	Incl (°)	Azim (°)	Grid (ft)	TVD (ft)	TVSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	TF (ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ft)	Easting (ft)	Latitude (°)	Longitude (°)	Directional Difficulty Index
	10468.00	90.56	341.21	6294.51	5437.51	3921.97	3645.60	-1458.95	1.27	91.52R	0.41	1.20	317206.48	1618028.48	39.36303378	-80.85100394	6.27	
	10563.00	90.50	343.46	6293.63	5436.63	4018.94	3736.11	-1487.78	2.37	72.89L	-0.06	2.37	317206.99	1617999.68	39.36328106	-80.85111088	6.29	
	10657.00	90.62	343.07	6292.71	5435.71	4110.88	3826.13	-1514.84	0.43	150.8R	0.13	-0.41	317387.00	1617972.59	39.36352704	-80.85121118	6.30	
	10751.00	90.28	343.26	6291.98	5434.98	4204.79	3916.09	-1542.07	0.41	97.76L	-0.36	0.20	317476.96	1617945.37	39.36377289	-80.85131223	6.31	
	10845.00	89.89	340.40	6291.84	5434.84	4298.77	4005.40	-1571.38	3.07	79.2R	-0.41	-3.04	317586.26	1617916.06	39.36401683	-80.85142063	6.33	
	10940.00	90.50	343.80	6291.51	5434.51	4393.74	4095.73	-1600.73	3.43	102.52L	0.64	3.37	317656.80	1617886.71	39.36426361	-80.85152924	6.35	
	11034.00	90.22	342.34	6290.92	5433.92	4487.68	4185.61	-1628.26	1.37	101.21L	-0.30	-1.34	317748.47	1617859.18	39.36450919	-80.85163137	6.36	
	11129.00	90.00	341.23	6290.74	5433.74	4582.67	4275.85	-1657.95	1.19	26.58L	-0.23	-1.17	317836.70	1617829.49	39.36475568	-80.85174118	6.37	
	11223.00	90.34	341.06	6290.46	5433.46	4676.67	4364.90	-1688.33	0.40	98.74L	0.36	-0.18	317925.65	1617799.11	39.36499862	-80.85185334	6.39	
	11317.00	90.06	339.24	6290.13	5433.13	4770.65	4453.21	-1720.25	1.98	85.8R	-0.30	-1.94	318014.06	1617767.20	39.36524000	-80.85197091	6.40	
	11412.00	90.28	342.10	6289.85	5432.85	4865.64	4542.85	-1751.89	3.02	110.70L	0.23	3.01	318103.60	1617735.76	39.36548476	-80.85208937	6.42	
	11507.00	89.18	339.15	6290.31	5433.31	4960.63	4632.48	-1783.20	3.32	67.78R	-1.18	-3.11	318193.29	1617704.25	39.36572944	-80.85220908	6.43	
	11602.00	90.39	342.16	6290.69	5433.69	5055.61	4722.08	-1814.67	3.42	110.34L	1.29	3.17	318282.91	1617672.78	39.36597417	-80.85232912	6.45	
	11696.00	90.06	341.27	6290.32	5433.32	5149.60	4811.33	-1844.16	1.01	87.35L	-0.35	-0.95	318372.16	1617643.29	39.36621796	-80.85242817	6.46	
	11791.00	90.11	340.19	6290.18	5433.18	5244.60	4901.01	-1875.51	1.14	85.88R	0.05	-1.14	318461.83	1617611.94	39.36646284	-80.85254381	6.47	
	11885.00	90.28	342.55	6289.86	5432.86	5339.59	4990.07	-1905.54	2.52	90L	0.18	2.51	318550.89	1617581.92	39.36670710	-80.85265474	6.49	
	11980.00	90.28	342.48	6289.39	5432.39	5433.56	5080.68	-1934.08	0.07	93.03L	0.00	-0.07	318641.50	1617553.38	39.36695365	-80.85276500	6.50	
	12074.00	90.11	339.27	6288.75	5431.75	5527.53	5169.99	-1965.99	1.70	121.16L	-0.09	-1.70	318732.03	1617491.47	39.36744223	-80.85289897	6.52	
	12169.00	89.33	340.56	6289.21	5432.21	5718.51	5347.51	-2028.27	1.60	90L	-0.83	1.37	318823.31	1617459.19	39.36793182	-80.85303782	6.53	
	12263.00	89.33	338.26	6290.31	5433.31	5810.48	5435.49	-2061.33	2.45	81.32R	0.00	-2.45	318914.29	1617426.14	39.36842141	-80.85317229	6.55	
	12357.00	89.44	338.98	6291.33	5434.33	5905.37	5523.95	-2095.96	0.77	51.9L	0.12	0.76	319004.74	1617391.51	39.36891100	-80.85330668	6.56	
	12452.00	89.55	338.97	6292.16	5435.16	5999.31	5611.89	-2129.68	0.12	86.24L	0.12	-0.01	319172.47	1617357.79	39.36940059	-80.85344052	6.57	
	12546.00	89.72	341.55	6292.76	5435.76	6093.29	5700.15	-2161.42	1.75	99.1L	0.18	2.74	319260.94	1617326.04	39.36989018	-80.85357450	6.58	
	12640.00	89.44	339.80	6293.44	5436.44	6187.28	5788.85	-2192.53	2.89	77.83R	-0.10	-1.86	319349.63	1617294.94	39.37037977	-80.85370847	6.59	
	12734.00	89.66	340.82	6294.19	5437.19	6282.27	5878.29	-2224.54	1.10	122.01R	0.23	1.07	319439.07	1617262.93	39.36986937	-80.85384244	6.60	
	12829.00	89.16	341.62	6295.16	5438.16	6378.27	5967.28	-2254.80	1.00	78.37L	-0.53	0.85	319528.05	1617232.66	39.36935222	-80.85397641	6.61	
	12923.00	89.44	340.26	6297.47	5440.47	6468.25	6056.25	-2284.81	0.73	107.08R	0.15	-0.72	319617.06	1617202.97	39.36883500	-80.85411037	6.63	
	13017.00	89.27	340.80	6296.60	5439.60	6558.23	6144.23	-2314.81	0.30	94.43L	-0.09	0.29	319706.07	1617172.97	39.36831779	-80.85424434	6.65	
	13112.00	89.05	337.95	6300.97	5443.97	6648.17	6232.17	-2344.81	3.04	91.48R	-0.23	-3.03	319795.08	1617142.97	39.36780057	-80.85437831	6.66	
	13206.00	89.99	340.30	6302.80	5445.80	6738.10	6320.10	-2374.81	2.47	77.9R	-0.06	2.47	320084.07	1617112.97	39.36728336	-80.85451228	6.67	
	13300.00	89.33	340.48	6303.98	5446.98	6828.08	6408.08	-2404.81	0.41	78.82R	0.36	0.19	320173.06	1617082.97	39.36676615	-80.85464625	6.68	
	13394.00	89.61	341.87	6304.86	5447.86	6918.06	6496.06	-2434.81	1.49	103.80L	0.29	1.46	320262.05	1617052.97	39.36624894	-80.85478032	6.69	
	13488.00	89.88	338.87	6306.09	5449.09	7008.05	6584.05	-2464.81	3.28	103.86L	-0.78	-3.19	320351.04	1617022.97	39.36573173	-80.85491439	6.71	
	13582.00	89.71	338.17	6308.00	5451.00	7120.94	6672.94	-2494.81	0.76	115.07R	-0.18	-0.74	320440.03	1616992.97	39.36521452	-80.85504846	6.71	
	13676.00	89.93	339.84	6310.85	5453.85	7214.84	6760.84	-2524.81	1.98	50.54L	-0.83	1.78	320529.02	1616962.97	39.36469731	-80.85518253	6.73	
	13770.00	89.05	338.48	6313.33	5456.33	7308.75	6848.75	-2554.81	1.87	84.89R	1.19	-1.45	320618.01	1616932.97	39.36418010	-80.85531660	6.74	
	13864.00	89.33	341.60	6314.67	5457.67	7402.66	6936.66	-2584.81	3.30	92.35L	0.29	3.28	320707.00	1616902.97	39.36366289	-80.85545067	6.75	
	13958.00	89.27	340.13	6315.82	5458.82	7496.57	7024.57	-2614.81	1.57	84.08R	-0.08	-1.56	320796.00	1616872.97	39.36314568	-80.85558474	6.76	
	14052.00	89.38	341.19	6316.94	5459.94	7588.48	7112.48	-2644.81	1.12	100.32L	0.12	1.12	320885.00	1616842.97	39.36262847	-80.85571881	6.77	
	14146.00	88.71	337.50	6318.50	5461.50	7680.39	7200.39	-2674.81	3.99	78.84R	-0.71	-3.93	320974.00	1616812.97	39.36211126	-80.85585288	6.78	
	14240.00	89.27	340.28	6320.18	5463.18	7772.30	7288.30	-2704.81	2.98	56.93R	0.59	2.93	321063.00	1616782.97	39.36159405	-80.85598695	6.79	
	14334.00	90.11	341.57	6320.89	5463.89	7864.21	7376.21	-2734.81	1.62	91.83L	0.88	1.36	321152.00	1616752.97	39.36107684	-80.85612102	6.80	
	14428.00	90.06	340.09	6320.55	5463.55	7956.12	7464.12	-2764.81	1.59	92.91R	-0.05	-1.59	321241.00	1616722.97	39.36055963	-80.85625509	6.81	
	14522.00	89.94	342.45	6320.55	5463.55	8048.03	7552.03	-2794.81	2.49	77.81L	-0.13	2.48	321330.00	1616692.97	39.36004242	-80.85638916	6.82	
	14616.00	90.06	341.89	6320.55	5463.55	8139.94	7640.94	-2824.81	0.61	113.83L	0.13	-0.60	321419.00	1616662.97	39.35952521	-80.85652323	6.83	
	14710.00	89.78	341.25	6320.89	5463.89	8231.85	7728.85	-2854.81	0.74	75.96L	-0.29	-0.67	321508.00	1616632.97	39.35900800	-80.85665730	6.84	
	14804.00	89.83	341.05	6321.01	5464.01	8323.76	7816.76	-2884.81	0.92	91.55L	0.05	-0.21	321597.00	1616602.97	39.35849079	-80.85679137	6.84	
	14898.00	89.78	339.20	6321.33	5464.33	8414.67	7904.67	-2914.81	1.25	102.78L	-0.05	-1.95	321686.00	1616572.97	39.35797358	-80.85692544	6.85	
	14992.00	89.66	338.67	6321.79	5464.79	8506.58	7992.58	-2944.81	0.58	81.21R	-0.13	-0.57	321775.00	1616542.97	39.35745637	-80.85705951	6.86	
	15086.00	90.11	341.58	6321.97	5464.97	8598.49	8080.49	-2974.81	3.13	102.16L	0.48	3.10	321864.00	1616512.97	39.35693916	-80.85719358	6.87	
	15180.00	89.55	338.98	6322.28	5465.28	8690.40	8168.40	-3004.81	2.80	8.12L	-0.59	-2.74	321953.00	1616482.97	39.35642195	-80.85732765	6.88	
	15274.00	89.83	338.85	6322.88	5465.88	8782.31	8256.31	-3034.81	0.15	90.84R	0.15	-0.02	322042.00	1616452.97	39.35590474	-80.85746172	6.89	
	15368.00	89.78	343.46	6323.60	5466.60	8874.22	8344.22	-3064.81	4.79	88.52R	-0.05	4.79	322131.00	1616422.97	39.35538753	-80.85759579	6.91	
	15462.00	89.83	345.38	6323.93	5466.93	8966.13	8432.13	-3094.81	2.03	119.75R	0.05	2.03	322220.00	1616392.97	39.35487032	-80.85772986	6.92	
	15556.00	89.55	345.87	6324.44	5467.44	9058.04	8520.04	-3124.81	0.59	90L	-0.29	0.52	322309.00	1616362.97	39.35435311	-80.85786393	6.93	
	15650.00	89.55	344.97	6325.18	5468.18	9149.95	8607.95	-3154.81	0.96	84.69L	0.00	-0.98	322398.00	1616332.97	39.35383590	-80.85799800	6.94	
	15744.00	90.22	343.56	6325.37	5468.37	9241.86	8695.86	-3184.81	1.64	123.59L	0.71	-1.48	322487.00	1616302.97	39.35331869	-80.85813207	6.95	
	15838.00	89.33	342.22	6325.74	5468.74	9333.77	87											

Comments	MD (ft)	Incl (°)	Azim (°)	TVD (ft)	TYDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	TF (ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (°)	Longitude (°)	Directional Difficulty Index
	17268.00	89.89	341.93	6333.96	5476.96	10719.02	10075.41	-3662.94	0.86	144.46R	0.00	-0.86	323635.97	1615624.60	39.38059318	-80.85914172	7.03
	17362.00	89.61	342.13	6334.37	5477.37	10813.00	10164.82	-3691.94	0.37	50.83R	-0.30	0.21	323725.38	1615795.60	39.38083742	-80.85924909	7.04
	17457.00	89.83	342.40	6334.84	5477.84	10907.00	10255.30	-3720.88	0.37	81.59L	0.23	0.28	323815.88	1615706.03	39.38157250	-80.85967326	7.06
	17645.00	90.00	341.25	6335.12	5478.12	11095.96	10433.92	-3779.52	0.62	110.14R	0.09	-0.61	323994.47	1615677.73	39.38161841	-80.85968526	7.06
	17740.00	89.89	341.55	6335.21	5478.21	11190.95	10523.96	-3806.82	0.34	50.19R	-0.12	0.32	324084.50	1615648.03	39.38206200	-80.85979510	7.07
	17834.00	89.94	341.61	6335.35	5478.35	11284.95	10613.14	-3839.52	0.08	06.17L	0.05	0.06	324173.68	1615618.90	39.38230708	-80.85991003	7.08
	17929.00	89.78	340.13	6335.58	5478.58	11379.95	10702.89	-3870.66	1.57	78.69L	-0.17	-1.56	324263.43	1615551.81	39.38279146	-80.86014977	7.09
	18118.00	89.89	339.58	6336.12	5479.12	11568.91	10880.33	-3935.75	0.30	85.66R	0.06	-0.29	324440.85	1615520.59	39.38303378	-80.86028410	7.10
	18212.00	90.06	341.93	6336.17	5479.17	11662.90	10969.07	-3966.73	2.51	90L	0.16	2.50	324529.59	1615491.35	39.38328046	-80.86037323	7.10
	18307.00	90.06	341.91	6336.07	5479.07	11757.89	11059.38	-3996.21	0.02	50.31R	0.00	-0.02	324619.89	1615462.53	39.38352487	-80.86047697	7.11
	18401.00	90.45	342.38	6335.65	5478.65	11851.87	11148.85	-4025.03	0.65	131.55L	0.41	0.50	324709.36	1615404.63	39.38401634	-80.86069442	7.12
	18590.00	90.06	341.94	6334.81	5477.81	12040.83	11328.76	-4082.93	0.31	94.02L	-0.21	-0.23	324899.26	1615342.28	39.38450347	-80.86092460	7.13
	18779.00	89.89	339.52	6334.89	5477.89	12229.81	11507.16	-4145.30	1.28	72.82L	-0.09	-1.28	325067.65	1615275.29	39.38498584	-80.86117068	7.14
	18968.00	90.06	338.97	6334.97	5477.97	12418.72	11683.89	-4212.28	0.30	93.14R	0.09	-0.29	325244.37	1615242.90	39.38522964	-80.86129034	7.15
	19063.00	89.94	341.16	6334.97	5477.97	12513.70	11773.19	-4244.67	2.31	65.22R	-0.13	2.31	325333.67	1615213.07	39.38547020	-80.86140059	7.16
	19156.00	90.06	341.42	6334.97	5477.97	12606.70	11861.28	-4274.50	0.31	99.96L	0.13	0.28	325421.75	1615151.14	39.38595489	-80.86162019	7.17
	19344.00	89.83	340.11	6335.15	5478.15	12794.69	12038.78	-4336.43	0.71	146.91L	-0.12	-0.70	325599.25	1615118.60	39.38619559	-80.86174902	7.18
Final Survey	19438.00	88.71	339.38	6336.35	5479.35	12888.66	12126.06	-4368.97	1.42	48.65R	-1.19	-0.78	325887.42	1615114.05	39.38622883	-80.86176577	7.18
PTB	19451.00	88.93	339.63	6336.62	5479.62	12901.66	12139.13	-4373.52	2.56	HS	1.69	1.92	325959.59	1615103.96	39.38630302	-80.86180293	7.18
	19480.00	88.93	339.63	6337.16	5480.16	12930.64	12166.31	-4383.62	0.00		0.00	0.00	325726.77	1615103.96	39.38630302	-80.86180293	7.18

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 \*\*\* 3-D 95.000% Confidence 2.7955 sigma  
 Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Free (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	29.000	1/88.425	30.000	30.000	NAL_NSG+MSHOT-Depth Only	Original Borehole / CNX SHR-37F-HSM Surveys Off to 19480ft MD
	1	29.000	29.000	Act Slms	30.000	30.000	NAL_NSG+MSHOT-Depth Only	Original Borehole / CNX SHR-37F-HSM Surveys Off to 19480ft MD
	1	29.000	400.000	Act Slms	30.000	30.000	NAL_NSG+MSHOT	Original Borehole / CNX SHR-37F-HSM Surveys Off to 19480ft MD
	1	400.000	5329.000	Act Slms	30.000	30.000	NAL_MWD-NON_SLB	Original Borehole / CNX SHR-37F-HSM Surveys Off to 19480ft MD
	1	5329.000	19480.000	Act Slms	30.000	30.000	NAL_MWD_1.0_DEG	Original Borehole / CNX SHR-37F-HSM Surveys Off to 19480ft MD

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 Environmental Protection