

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0176 757658

(Note: As practicable as possible the JIT report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Spill incident Number: 757658 2. Type of incident* OIL SPILL
 3. Name of Location 24" NEMBE CREEK PIPELINE
 4. Name of nearest community NEMBE BASSAMBIRI 5. State: BAYELSA 6. LGA NEMBE
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NPE/NEMBE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24TH DECEMBER, 2011
 b. Date/Period of investigation: 30TH AND 31ST DECEMBER, 2011.
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 d. Description of leak point (tick as applicable);
 Drilled hole Hack saw cut Explosive tear,
 Complete Rupture Inward dent, Well head tampering
 Failed Weld-on illegal hot tap valve, Missing Pipeline/Flowline
 Crude oil theft (illegal bunkering) point, Third party tampering with Clamp
 Third party tampering with valve setting, Third party tampering with flange,
 External Corrosion Internal Corrosion
 Saver-pit over flow, Surge vessel overflow, Outward dent
 Flare System/Bund wall Failure Valve Failure com unit failure
 Cold vent Relief valve failure Others (specify) _____
 e. Incident due to:
 Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit (METRE)		MINNA MID-BELT	
Northing:		Easting:	
SP1	52937.62		446124.35
SP2	52932.78		446108.74

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire,

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C. RISK ASSESSMENT

10. Type of environment:

- Land Swamp Water Seasonal swamp

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [,m]
 Drinking water source [,m]
 Built up area [,m]
 Farmlands [,m]
 Fish Farm/Pond [,m]
 Fishing net [,m]
 Others (specify). **FISHING SETTLEMENT** > 300m

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

13. Any pictures or video coverage? [Y] [N]

14. Was there any disruption to the investigation? [Y] [N]

If yes give brief description:

NOT APPLICABLE

D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL

15. Structures / Properties

S/N	Type of Structures	Description	Size	Number	Comments
NONE WITHIN AREA OF IMPACT					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	MANGROVE			✓	NUMEROUS	IMPACTED

17. Fish/Nets/Ponds

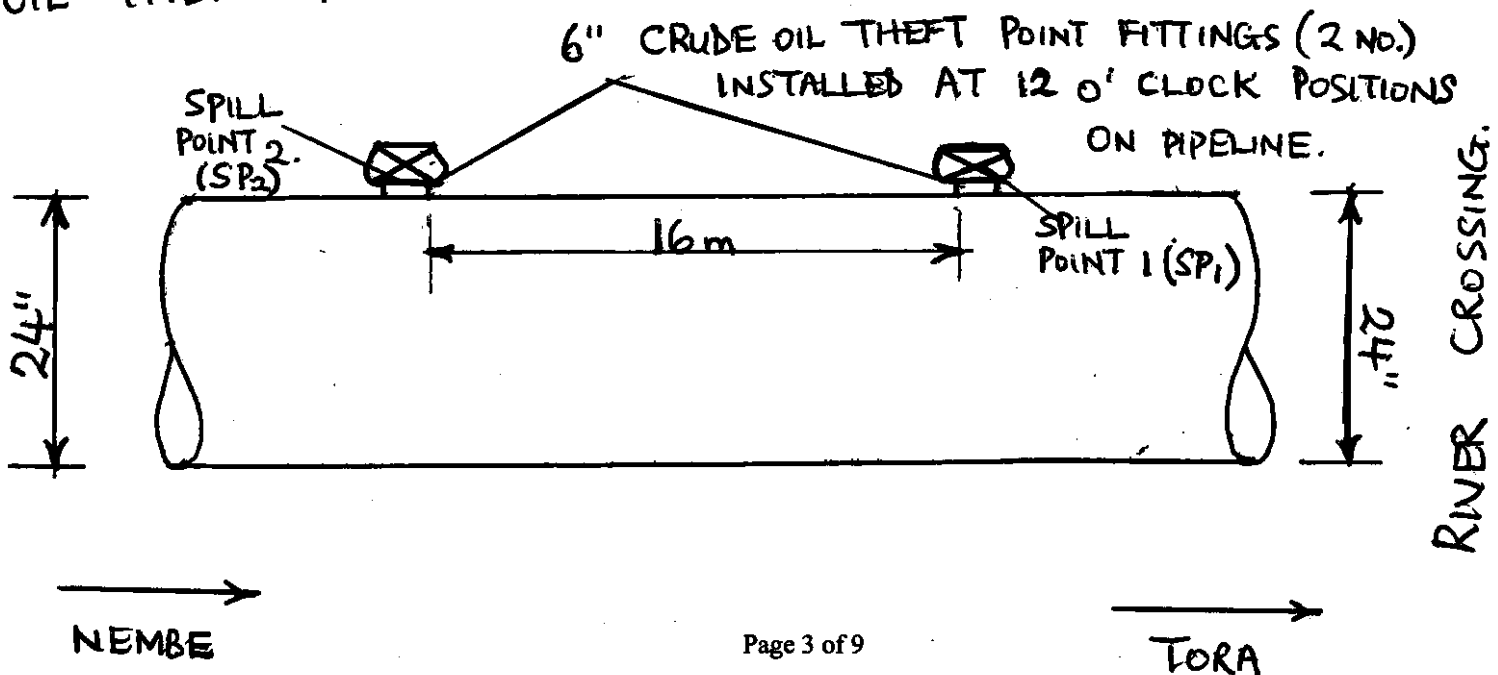
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

E. GRAPHIC DESCRIPTION OF LEAK POINT (Overview sketch of the site should be added as an appendix 1)

SECTION OF 24" NEMBE CREEK PIPELINE (NEWLINE) AT NEMBE BASSAMBIRI SHOWING POSITIONS OF CRUDE OIL THEFT POINT FITTINGS.



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F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

19. Impacted area boundary Coordinates (If more than 12 points, Attach as an appendix 2)

S/N	Northing	Easting

SEE ATTACHED APPENDIX FOR IMPACTED AREA COORDINATES

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 100.14 Ha
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

21. Volume of oil recovered before completion of JIV (V_{rec}):

Recovered oil V _{rec} :	<u>119</u>	barrels
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20. Computation of the residual volume on site

a. Computation of volume of pool of free phase oil (on land or confined water body).

- i. Area (m²) occupied by pool of free phase oil 15300
- ii. Average Depth (m) of pool of free phase oil DIL IMPACT OBSERVED AS DARK COLOUR (REFERENCE - SPILL FACTORS FROM USCG FOG)
- iii. Emulsification factor: NIL

iv. Volume of pool of free phase oil. V _{pool} :	<u>0.19</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 1900
- ii. Area of the pool of free phase oil in touch with soil: NIL
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.01
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>9.56</u>	barrels
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21. Computation of volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: 984200 m^2
- ii. Table of average depth of oil on water based on coloration *

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003	<u>34%</u>	<u>0.1</u>
Dull	0.001	<u>63%</u>	<u>0.62</u>
Dark	0.002		
Black oil	0.1	<u>2%</u>	<u>1.97</u>
Emulsion (30% Oil)	1	<u>1%</u>	<u>9.84</u>
Percent Total		100%	Total Volume <u>78.81</u> bbl

iii. Volume of oil on open water. V_{wat}	<u>78.81</u>	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%

iii. Volume of evaporated oil. V_{evap}	<u>69.19</u>	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

23. Gross Total Estimated Spilled Volume $V_{Est} (bbls) = V_{evap} (bbls) + V_{wat} (bbls) + V_{inf} (bbls) + V_{pool} (bbls) + V_{recf} (bbls) = 69.19 + 78.81 + 9.56 + 0.19 + 119 = 276.75$

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<u>V_{Est}(bbls)=</u>	276.8 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 69.19 + (0.6 \times 78.81) + 9.56 + 0.19 + 119 = 245.23$	
<u>V_{Est}(bbls)=</u>	245.2 BARRELS

*Calculation of the respective estimated volume is to be done using the new spill estimation software on site

*Conversion of m3 to barrels is Total volume VT (m3) x 6.29

*Emulsification factor for spill on water to consider is 60% of volume of oil.

25. GENERAL STATUS OF THE SITE

A. Joint investigation of the incident site found that there is no residual impact After the initial response and therefore recommend that the site be closed out <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

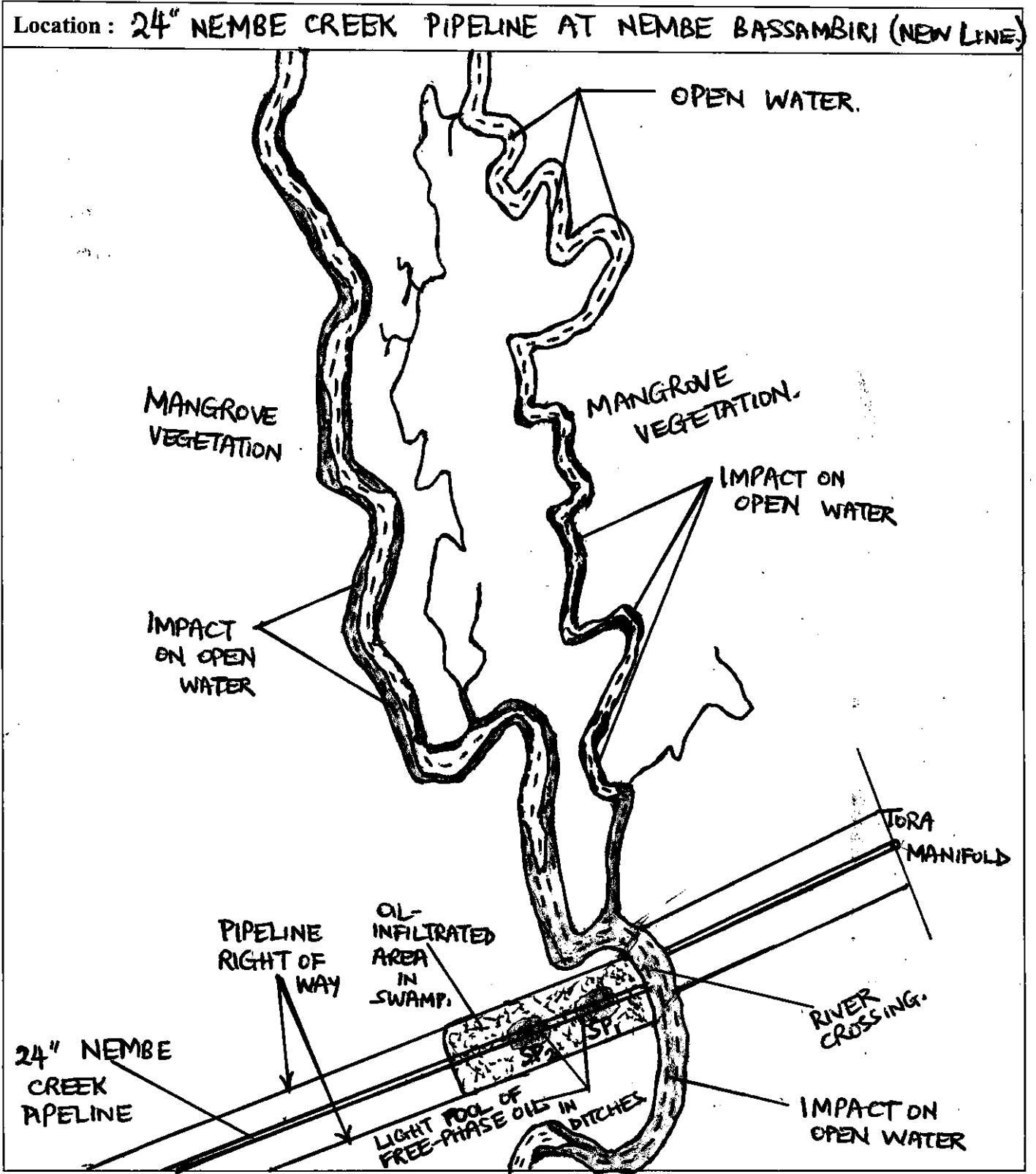
26 Signatories

This report was filled and signed on the <u>31/12/2011</u> at incident site by joint investigation representatives from
<ul style="list-style-type: none">• Host Community <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input checked="" type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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20. Appendix 1: Overview sketch of the site



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21. Appendix 2:TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting

SEE ATTACHED APPENDIX FOR IMPACTED AREA COORDINATES

APPENDIX

Impacted Area Coordinates (Minna Mid-Belt)

name	North (meter)	East (meter)
Light Impact (water)		
a1	52978.49	446450.98
a2	52989.40	446434.43
a3	52975.51	446381.62
a4	52993.57	446341.32
a5	53026.92	446337.15
a6	53057.50	446383.01
a7	53076.95	446383.01
a8	53108.91	446362.17
a9	53185.62	446266.28
a10	53203.69	446216.26
a11	53199.52	446106.47
a12	53162.00	446009.20
a13	53146.71	445934.16
a14	53142.54	445877.18
a15	53178.67	445774.35
a16	53203.69	445739.61
a17	53262.05	445682.64
a18	53321.80	445645.11
a19	53414.91	445608.98
a20	53620.58	445567.30
a21	53455.49	445721.55
a22	53347.10	445749.34
a23	53281.78	445779.91
a24	53263.72	445802.14
a25	53245.65	445832.72
a26	53233.15	445881.35
a27	53238.70	445928.60
a28	53270.67	446009.20
a29	53329.03	446098.14
a30	53406.85	446105.09
a31	53551.37	446128.71
a32	53426.58	446138.44
a33	53366.83	446160.67
a34	53327.92	446187.07
a35	53316.80	446212.09
a36	53300.68	446280.18
a37	53256.21	446359.39
a38	53238.15	446373.29
a39	53175.61	446481.68
a40	53155.60	446515.03
a41	53156.99	446538.65
a42	53144.49	446553.94
a43	53106.97	446560.89
a44	53088.90	446569.22
a45	53037.48	446606.74
a46	52899.91	446680.40
a47	52791.24	446729.03

name	North (meter)	East (meter)
a48	52602.25	446758.22
a49	52374.90	446758.22
a50	52201.20	446745.71
a51	52090.03	446704.02
a52	51957.46	446670.67
a53	51842.12	446623.42
a54	51782.36	446587.29
a55	51679.53	446488.63
a56	51626.72	446416.36
a57	51777.92	446519.20
a58	51970.24	446533.09
a59	52149.51	446603.97
a60	52313.48	446647.04
a61	52438.27	446658.16
a62	52573.07	446660.94
a63	52735.66	446633.15
a64	52854.33	446583.84
a65	52937.15	446513.64
Light Impact (swamp)		
b1	53108.91	446362.17
b2	53076.95	446383.01
b3	53057.50	446383.01
b4	53026.92	446337.15
b5	52993.57	446341.32
b6	52975.51	446381.62
b7	52989.40	446434.43
b8	52978.49	446450.98
b9	52970.21	446382.98
b10	52980.65	446338.91
b11	52914.54	446124.35
b12	52912.22	446106.95
b13	52919.18	446097.67
b14	52940.05	446081.43
b15	52996.89	446204.37
b16	53050.24	446331.95
b17	53108.91	446362.17
sheen on water		
c1	53738.30	445670.56
c2	53455.49	445721.55
c3	53620.58	445567.30
c4	53686.19	445566.34
c5	53870.75	445535.94
c6	54220.33	445520.74
c7	54400.55	445531.60
c8	54743.61	445620.62
c9	54793.55	445596.74
c10	54815.27	445570.68
c11	54823.95	445540.28
c12	54821.78	445468.63

name	North (meter)	East (meter)
c13	54752.30	445327.50
c14	54630.71	445173.33
c15	54591.62	445084.31
c16	54595.96	444984.43
c17	54578.59	444951.86
c18	54639.39	444726.04
c19	54724.07	444615.31
c20	54826.12	444543.65
c21	55002.00	444482.86
c22	55164.85	444443.77
c23	55490.54	444289.61
c24	55727.22	444163.67
c25	55950.86	444196.24
c26	56304.79	444302.64
c27	56376.44	444313.49
c28	56445.92	444293.95
c29	56517.57	444241.84
c30	56541.46	444168.02
c31	56582.71	444107.22
c32	56600.08	444016.02
c33	56686.94	443835.81
c34	56715.16	443811.92
c35	56719.51	443777.18
c36	56704.31	443764.15
c37	56726.02	443722.90
c38	56735.57	443720.73
c39	56755.12	443740.27
c40	56785.51	443720.73
c41	56809.40	443688.16
c42	56833.28	443683.81
c43	57013.50	443685.98
c44	57228.46	443638.22
c45	57365.25	443633.87
c46	57419.54	443620.85
c47	57744.36	443681.64
c48	57774.76	443679.47
c49	57959.32	443733.75
c50	58050.52	443798.89
c51	58091.77	443809.75
c52	58139.54	443857.52
c53	58200.34	443896.60
c54	58226.40	443898.77
c55	58266.78	443883.57
c56	58303.69	443846.66
c57	58336.26	443792.38
c58	58414.43	443707.70
c59	58551.22	443601.30
c60	58648.93	443555.71
c61	58698.87	443518.79



name	North (meter)	East (meter)
c62	58822.64	443375.49
c63	58866.06	443314.69
c64	58946.40	443252.16
c65	58995.04	443198.31
c66	59106.21	443139.25
c67	59180.90	443123.62
c68	59246.91	443127.09
c69	59307.71	443146.20
c70	59510.94	443279.95
c71	59389.35	443215.68
c72	59278.18	443160.09
c73	59179.17	443149.67
c74	59040.20	443227.84
c75	58991.56	443267.79
c76	58826.55	443444.97
c77	58729.27	443514.45
c78	58677.16	443552.67
c79	58541.67	443648.20
c80	58427.02	443788.91
c81	58251.58	443952.19
c82	58152.57	443931.34
c83	58103.93	443853.18
c84	58029.24	443804.54
c85	57968.44	443757.64
c86	57789.53	443700.32
c87	57744.36	443698.58
c88	57443.85	443634.31
c89	57322.61	443693.37
c90	57124.59	443714.21
c91	56967.56	443740.27
c92	56913.71	443761.11
c93	56802.54	443775.01
c94	56705.26	443861.86
c95	56635.78	443976.51
c96	56594.09	444146.74
c97	56554.14	444219.69
c98	56479.45	444292.65
c99	56408.23	444329.13
c100	56349.17	444334.34
c101	56276.21	444316.97
c102	56144.20	444280.49
c103	55880.16	444231.85
c104	55817.28	444212.74
c105	55676.58	444242.27
c106	55621.00	444264.86
c107	55247.18	444471.57
c108	55135.32	444514.99
c109	54868.85	444565.37
c110	54757.68	444622.69

name	North (meter)	East (meter)
c111	54681.95	444711.28
c112	54637.13	444770.34
c113	54593.71	444928.41
c114	54616.29	444996.15
c115	54607.60	445067.37
c116	54659.71	445183.75
c117	54817.09	445359.20
c118	54853.57	445444.31
c119	54865.73	445532.90
c120	54839.67	445614.54
c121	54761.50	445633.65
c122	54712.87	445631.91
c123	54429.73	445553.75
c124	54375.88	445545.06
c125	54167.09	445534.64
c126	53895.07	445572.85
c127	53886.03	445591.96
c128	53925.98	445602.38
c129	54196.96	445581.54
c130	54400.20	445598.91
c131	54685.07	445670.13
c132	54744.13	445689.24
c133	54806.67	445677.08
c134	54855.31	445626.70
c135	54896.99	445508.58
c136	54785.82	445202.86
c137	54763.24	445142.07
c138	54728.50	445093.43
c139	54702.45	445056.95
c140	54679.86	444909.30
c141	54707.66	444742.54
c142	54745.87	444680.01
c143	54785.82	444640.06
c144	54883.10	444593.16
c145	54985.58	444582.74
c146	55192.29	444523.68
c147	55263.51	444497.62
c148	55353.84	444450.72
c149	55557.07	444313.49
c150	55593.55	444289.18
c151	55668.24	444259.65
c152	55702.99	444249.22
c153	55765.52	444256.17
c154	55876.69	444264.86
c155	56337.01	444374.29
c156	56495.08	444349.97
c157	56557.61	444320.44
c158	56599.30	444263.12
c159	56606.25	444198.85

name	North (meter)	East (meter)
c160	56661.84	444023.41
c161	56746.95	443860.12
c162	56809.48	443813.22
c163	56845.96	443797.59
c164	56870.28	443787.17
c165	56903.29	443780.22
c166	56925.87	443780.22
c167	56974.50	443761.11
c168	57280.22	443719.42
c169	57620.69	443721.16
c170	57783.97	443755.90
c171	57961.15	443823.65
c172	58115.75	443920.92
c173	58174.80	443966.08
c174	58244.29	443981.72
c175	58324.19	443952.19
c176	58513.53	443726.37
c177	58730.66	443571.77
c178	58831.41	443479.71
c179	58913.05	443378.96
c180	59017.27	443279.95
c181	59109.34	443224.36
c182	59190.98	443208.73
c183	59272.62	443226.10
c184	59300.41	443250.42
c185	59350.79	443278.21
c186	59272.62	443245.21
c187	59187.50	443226.10
c188	59109.34	443240.00
c189	59024.22	443292.11
c190	58911.31	443398.07
c191	58852.25	443474.50
c192	58746.29	443585.67
c193	58643.81	443644.73
c194	58511.79	443748.95
c195	58449.26	443813.22
c196	58341.56	443959.14
c197	58247.76	443992.14
c198	58204.33	443990.40
c199	58157.43	443969.56
c200	58067.11	443905.29
c201	57907.30	443813.22
c202	57756.18	443764.59
c203	57615.48	443738.53
c204	57441.77	443729.85
c205	57255.91	443733.32
c206	57007.51	443769.80
c207	56960.61	443778.48
c208	56917.18	443794.12

name	North (meter)	East (meter)
c209	56878.97	443799.33
c210	56863.33	443806.28
c211	56840.75	443837.54
c212	56858.12	443844.49
c213	56858.12	443861.86
c214	56833.80	443879.23
c215	56811.22	443865.34
c216	56788.64	443847.96
c217	56755.64	443874.02
c218	56682.68	444012.98
c219	56627.09	444252.70
c220	56583.67	444315.23
c221	56528.08	444356.92
c222	56427.33	444386.45
c223	56324.85	444395.13
c224	56244.94	444381.24
c225	55888.85	444287.44
c226	55859.32	444277.02
c227	55706.46	444257.91
c228	55666.51	444270.07
c229	55593.55	444297.86
c230	55362.52	444457.67
c231	55279.15	444501.09
c232	55220.09	444528.89
c233	55162.76	444542.78
c234	54900.47	444614.00
c235	54855.31	444627.90
c236	54803.19	444647.01
c237	54758.03	444685.22
c238	54719.82	444746.02
c239	54690.29	444904.09
c240	54716.34	445050.00
c241	54785.82	445149.01
c242	54843.15	445155.96
c243	54916.10	445128.17
c244	54957.79	445100.38
c245	54938.68	445136.85
c246	54858.78	445180.28
c247	54822.30	445185.49
c248	54806.67	445197.65
c249	54817.09	445239.34
c250	54895.26	445380.04
c251	54926.52	445461.68
c252	54935.21	445510.32
c253	54930.00	445558.96
c254	54914.37	445602.38
c255	54883.10	445664.92
c256	54860.52	445684.02
c257	54766.72	445715.29

name	North (meter)	East (meter)
c258	54589.88	445704.87
c259	54402.28	445626.70
c260	54150.41	445612.81
c261	53931.54	445637.12
c262	53853.38	445664.92
c263	53804.74	445668.39
c264	53738.30	445670.56
Sheen on water		
d1	54050.81	446337.15
d2	54003.56	446335.77
d3	53922.96	446314.92
d4	53802.06	446256.56
d5	53731.19	446199.58
d6	53625.58	446148.16
d7	53548.98	446128.75
d8	53406.85	446105.09
d9	53490.51	446087.02
d10	53529.42	446085.63
d11	53686.45	446114.81
d12	53712.85	446121.76
d13	53768.43	446166.23
d14	53888.50	446232.93
d15	54035.80	446291.30
d16	54063.59	446280.18
d17	54076.10	446256.56
d18	54077.49	446166.23
d19	54066.37	446085.63
d20	54069.15	446031.43
d21	54084.44	445980.02
d22	54115.01	445936.94
d23	54176.15	445888.30
d24	54237.30	445859.12
d25	54365.15	445816.04
d26	54448.52	445809.09
d27	54501.33	445846.61
d28	54606.94	446046.72
d29	54681.98	446157.89
d30	54893.21	446388.57
d31	54916.83	446408.03
d32	54947.40	446412.20
d33	54971.03	446401.08
d34	54987.70	446371.90
d35	54980.76	446043.94
d36	54993.82	445978.63
d37	55029.95	445934.16
d38	55088.31	445916.09
d39	55175.86	445917.48
d40	55364.85	445985.58
d41	55495.48	446007.81

name	North (meter)	East (meter)
d42	55537.17	446007.81
d43	55584.69	445999.47
d44	55754.23	445899.42
d45	55836.77	445867.46
d46	55879.85	445868.85
d47	55927.10	445888.30
d48	55939.61	445898.03
d49	55977.13	446114.81
d50	55992.41	446120.37
d51	56025.21	446107.86
d52	56108.59	446017.54
d53	56282.29	445921.65
d54	56361.50	445927.21
d55	56446.27	445963.34
d56	56495.74	446011.98
d57	56520.75	446027.27
d58	56537.43	446024.49
d59	56547.16	446017.54
d60	56559.66	445982.80
d61	56572.17	445797.98
d62	56586.07	445770.18
d63	56627.75	445741.00
d64	56649.99	445735.44
d65	56706.96	445749.34
d66	56826.47	445760.45
d67	56730.59	445761.84
d68	56668.05	445753.51
d69	56611.08	445778.52
d70	56583.29	445820.21
d71	56570.78	445956.39
d72	56580.51	446000.86
d73	56548.55	446041.16
d74	56509.64	446035.60
d75	56469.34	445998.08
d76	56423.48	445964.73
d77	56328.98	445934.16
d78	56293.96	445934.16
d79	56236.99	445955.00
d80	56104.97	446036.99
d81	56049.39	446099.53
d82	56004.92	446137.05
d83	55966.01	446137.05
d84	55953.50	446099.53
d85	55954.89	446032.82
d86	55935.44	445939.72
d87	55928.49	445909.15
d88	55890.97	445885.52
d89	55849.28	445882.74
d90	55758.95	445923.04



name	North (meter)	East (meter)
d91	55591.92	446018.93
d92	55514.10	446028.66
d93	55387.92	446003.64
d94	55186.42	445934.16
d95	55112.77	445927.21
d96	55076.64	445932.77
d97	55043.29	445938.33
d98	55014.11	445974.46
d99	54997.43	445995.30
d100	54987.70	446068.95
d101	55012.72	446281.57
d102	55015.50	446334.38
d103	55009.94	446371.90
d104	54991.87	446394.13
d105	54972.42	446449.72
d106	54933.51	446439.99
d107	54908.49	446420.53
d108	54844.57	446351.05
d109	54707.00	446192.63
d110	54684.76	446170.40
d111	54619.45	446082.85
d112	54506.89	445870.24
d113	54483.26	445843.83
d114	54454.08	445821.60
d115	54392.10	445822.99
d116	54344.86	445828.55
d117	54219.79	445874.41
d118	54135.02	445953.61
d119	54116.96	445971.68
d120	54094.72	445991.13
d121	54078.05	446049.50
d122	54087.77	446178.74
d123	54087.77	446248.22
d124	54076.66	446274.62
d125	54098.89	446262.11
d126	54112.79	446217.65
d127	54116.96	446164.84
d128	54104.45	446074.51
d129	54107.23	446030.04
d130	54119.96	446003.09
d131	54129.96	445978.63
d132	54154.42	445949.72
d133	54184.44	445926.38
d134	54214.45	445906.37
d135	54373.87	445857.45
d136	54420.56	445847.45
d137	54471.70	445850.78
d138	54495.05	445866.35
d139	54522.17	445929.71

name	North (meter)	East (meter)
d140	54508.83	445960.84
d141	54527.73	445996.42
d142	54538.85	446026.43
d143	54551.08	446052.00
d144	54591.10	446106.47
d145	54673.37	446189.85
d146	54763.42	446307.69
d147	54859.02	446405.53
d148	54903.49	446448.88
d149	54934.62	446464.45
d150	54965.75	446475.56
d151	54997.99	446468.89
d152	55013.55	446458.89
d153	55028.00	446441.10
d154	55034.67	446411.08
d155	55034.67	446314.36
d156	55010.22	446153.17
d157	55013.55	446066.45
d158	55014.66	446053.11
d159	55035.78	445994.19
d160	55043.57	445985.30
d161	55054.68	445975.29
d162	55091.37	445958.62
d163	55179.20	445953.06
d164	55374.41	446020.87
d165	55423.33	446040.88
d166	55511.15	446049.78
d167	55551.17	446046.44
d168	55627.88	446029.77
d169	55689.03	446001.97
d170	55780.19	445933.05
d171	55802.42	445927.49
d172	55846.00	445918.60
d173	55873.79	445923.04
d174	55912.70	445963.06
d175	55939.38	446107.59
d176	55961.62	446153.17
d177	55997.19	446153.17
d178	56034.99	446143.16
d179	56060.78	446143.16
d180	56111.92	446097.58
d181	56146.38	446049.78
d182	56194.19	446000.86
d183	56240.88	445978.63
d184	56268.67	445968.62
d185	56298.69	445964.18
d186	56327.59	445970.85
d187	56352.05	445974.18
d188	56375.40	445981.96

name	North (meter)	East (meter)
d189	56483.23	446039.77
d190	56507.69	446066.45
d191	56526.59	446073.12
d192	56568.83	446065.34
d193	56628.87	446019.76
d194	56634.43	446008.64
d195	56636.65	445989.75
d196	56614.41	445873.02
d197	56624.42	445824.10
d198	56646.65	445810.76
d199	56687.79	445799.64
d200	56817.86	445795.20
d201	56995.73	445780.74
d202	56820.08	445804.09
d203	56696.68	445804.09
d204	56653.32	445814.09
d205	56631.09	445825.21
d206	56617.75	445864.12
d207	56639.98	445983.08
d208	56639.98	446014.20
d209	56575.50	446069.79
d210	56516.58	446080.91
d211	56478.79	446045.33
d212	56365.39	445983.08
d213	56297.58	445970.85
d214	56244.21	445979.74
d215	56239.77	445987.52
d216	56194.19	446010.87
d217	56096.36	446129.82
d218	56060.78	446154.28
d219	56021.87	446167.62
d220	55955.17	446165.40
d221	55931.82	446144.27
d222	55892.91	445977.52
d223	55866.23	445934.16
d224	55799.53	445931.94
d225	55761.73	445951.95
d226	55689.47	446008.64
d227	55630.55	446035.33
d228	55524.94	446055.34
d229	55433.78	446047.55
d230	55349.29	446029.77
d231	55284.81	446016.43
d232	55158.07	445974.18
d233	55090.26	445968.62
d234	55050.24	445984.19
d235	55040.23	445995.30
d236	55019.11	446049.78
d237	55014.66	446099.36

name	North (meter)	East (meter)
d238	55013.77	446147.39
d239	55038.68	446308.36
d240	55038.68	446415.09
d241	55028.00	446450.66
d242	55006.66	446470.23
d243	54963.08	446483.57
d244	54903.49	446457.78
d245	54762.97	446315.48
d246	54671.37	446196.30
d247	54542.41	446052.22
d248	54519.28	445993.53
d249	54476.59	445924.15
d250	54457.92	445866.35
d251	54402.78	445859.23
d252	54227.57	445909.04
d253	54167.98	445945.50
d254	54135.97	445976.63
d255	54116.40	446024.65
d256	54109.28	446060.23
d257	54134.19	446158.06
d258	54134.19	446251.44
d259	54118.18	446294.13
d260	54050.81	446337.15
Sheen on water		
e1	51970.24	446533.09
e2	51777.92	446519.20
e3	51626.72	446416.36
e4	51606.03	446374.53
e5	51577.71	446339.13
e6	51577.71	446314.36
e7	51683.89	445942.71
e8	51726.37	445539.21
e9	51715.75	445394.10
e10	51747.61	445620.62
e11	51751.14	445840.07
e12	51722.83	445995.81
e13	51790.08	445854.23
e14	51850.25	445606.46
e15	51821.93	445801.14
e16	51818.39	445847.15
e17	51744.07	446126.77
e18	51729.91	446257.73
e19	51719.29	446335.59
e20	51821.93	446441.78