

# Tubbergen 7; Tubbergen Mander 1 & 2; Rossum Weerseloo 2, 3, 5 & 6

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*Rapportage tbv Wet Milieubeheer vergunning en ontheffing in het kader van het Lozings besluit*

Dit rapport is bedoelt om aan de rapportage eisen te voldoen van de Wet Milieubeheer vergunning en ontheffing in het kader van het lozings besluit.

## Hoeveelheid afvalstoffen verwerkt per reservoir

| Installatie        | Injectieput          | 2011 [m3]      |
|--------------------|----------------------|----------------|
| Rossum Weerselo 2  | ROSSUM-WEERSELO- 2   | 65.318         |
|                    | ROSSUM-WEERSELO- 7A  | 100.581        |
| Rossum Weerselo 3  | ROSSUM-WEERSELO- 3   | 14.798         |
|                    | ROSSUM-WEERSELO- 4   | 50.785         |
| Rossum Weerselo 5  | ROSSUM-WEERSELO- 5   | 41.327         |
| Rossum Weerselo 6  | ROSSUM-WEERSELO- 9   | 61.845         |
| Tubbergen 7        | TUBBERGEN- 7         | 58.610         |
|                    | TUBBERGEN-10         | 94.701         |
| Tubbergen Mander 1 | TUBBERGEN-MANDER- 1  | 46.557         |
| Tubbergen Mander 2 | TUBBERGEN-MANDER- 2  | 9.845          |
|                    | TUBBERGEN-MANDER- 3C | 26.603         |
| <b>Grand Total</b> |                      | <b>570.970</b> |

\* Totale toegestane activiteiten ROW-2 volgens vergunning: 19,1 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten ROW-3 volgens vergunning: 7,8 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten ROW-5 volgens vergunning: 6,59 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten ROW-6 volgens vergunning: 1,61 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten TUB-7 volgens vergunning: 9,8 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten TUM-1 volgens vergunning: 1,57 miljoen m<sup>3</sup> produktie water.

\* Totale toegestane activiteiten TUM-2 volgens vergunning: 2,2 miljoen m<sup>3</sup> produktie water.

## Geinjecteerde hoeveelheid chemicalien

|            |                    | Van                                 | Tot                          |                            |                  |                               |
|------------|--------------------|-------------------------------------|------------------------------|----------------------------|------------------|-------------------------------|
|            |                    | 1-1-2011                            | 31-12-2011                   |                            |                  |                               |
| Tank       | Chemical           | Function                            | remark                       | Injectiepunt               | flowmeter        | Liters                        |
| T-3300     | Cortron<br>UCA 622 | Biocide                             | batch dosing in<br>V-2001    | V2001                      | SCH.330FQISA001  | 1216                          |
| T3320/3325 | X8161              | Demulsifier<br>SCH1000              | based on net oil             | T1002                      | SCH.332FISA001   | 2432                          |
| T3320/3325 | X8161              | Demulsifier<br>SCH3100              | based on net oil             | T1202                      | SCH.332FIA002    | 13940                         |
| T-3330     | Cortron<br>CK941-G | Corr. Inhibitor                     | in suction<br>P-1102A/B      | P1102A/B                   | SCH.333FFICSA001 | was toen nog<br>niet aanwezig |
| T-3350     | K157               | H2S scavenger                       | liter/kg H2S                 | V2001<br>V2005<br>A2002A/B | SCH.335FFICSA001 | 810                           |
| T-3360     | AF340              | Antifoam                            | based on net oil             | V1001                      | SCH.336FISA001   | 2261                          |
| T-3360     | AF340              | Antifoam                            | based on net oil             | V5001                      | SCH.336FIA002    | 694                           |
| T-3370     | Cortron<br>CK941-G | Corr. Inhibitor<br>water export     | in suction<br>P-1201A/B      | P1201A/B                   | SCH.337FFICSA001 | 16696                         |
| T-3380     | OS19               | Oxygen<br>Scavenger<br>water export | in suction P-<br>1201A/B     | P1201A/B                   | SCH.338FFICSA001 | 8773                          |
| T-3390     | Gyptron<br>SA 3440 | Scale<br>inhibitor<br>water export  | injection upstream<br>V-1001 | V1001<br>E1001<br>P1201    | SCH.339FFICSA001 | 18936                         |

## Analyse resultaten van geïnjecteerd water

Gedurende het jaar is in het injectiewater een verlaging van de hoeveelheid ionen die van nature in het Schoonebeek formatie water aanwezig zijn geobserveerd. Deze verlaging is het resultaat van de productie van meer gecondenseerde stoom.

Table 1: Wekelijkse analyse resultaten volgens tabel 6 (deel 1)

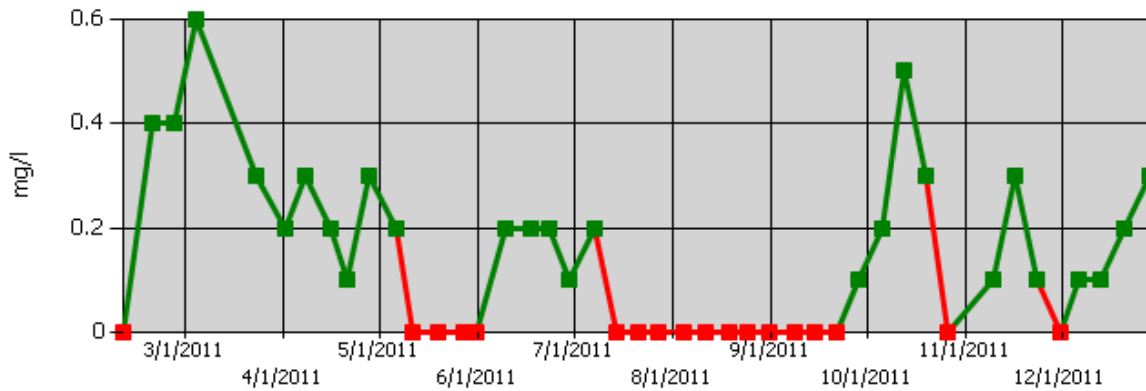
| Sample Date    | Sample Number   | Sulphide, S <sup>2-</sup> (mg/l) | pH  | Sulphate, SO <sub>4</sub> (mg/l) | Sodium chloride, NaCl (calc) (mg/l) | Barium, Ba (mg/l) | Calcium, Ca (mg/l) |
|----------------|-----------------|----------------------------------|-----|----------------------------------|-------------------------------------|-------------------|--------------------|
| 09/02/11 09:30 | SN-2011-2-00130 | <0.1                             | 6.5 | <19                              | 79129                               | 38                | 4700               |
| 18/02/11 15:00 | SN-2011-2-00249 | 0.4                              | 6.8 | <25                              | 83000                               | 38                | 4600               |
| 25/02/11 10:00 | SN-2011-2-00296 | 0.4                              | 6.3 | <19                              | 81000                               | 38                | 4600               |
| 04/03/11 09:45 | SN-2011-3-00075 | 0.6                              | 6.5 | <19                              | 80000                               | 37                | 4600               |
| 11/03/11 09:25 | SN-2011-3-00151 |                                  | 6.1 | <19                              | 78000                               | 42                | 4500               |
| 23/03/11 10:00 | SN-2011-3-00253 | 0.3                              | 5.8 | <19                              | 78000                               | 43                | 4500               |
| 01/04/11 13:50 | SN-2011-04-0020 | 0.2                              | 6.3 | <19                              | 81000                               | 45                | 4700               |
| 07/04/11 13:40 | SN-2011-04-0087 | 0.3                              | 6.4 | <19                              | 80000                               | 45                | 4600               |
| 15/04/11 09:20 | SN-2011-04-0189 | 0.2                              | 6.0 | 120                              | 81000                               | 35                | 4600               |
| 20/04/11 14:34 | SN-2011-04-0267 | 0.1                              | 6.6 | 42                               | 83000                               | 38                | 4500               |
| 27/04/11 08:45 | SN-2011-04-0339 | 0.3                              | 6.3 | <19                              | 81000                               | 36                | 4100               |
| 06/05/11 11:30 | SN-2011-05-0040 | 0.2                              |     | <19                              | 83000                               | 38                | 4500               |
| 11/05/11 10:00 | SN-2011-05-0089 | < 0.1                            | 6.3 | <25                              | 82000                               | 38                | 4100               |
| 19/05/11 12:15 | SN-2011-05-0185 | <0.1                             | 6.3 | <25                              | 84000                               | 43                | 4800               |
| 27/05/11 09:55 | SN-2011-05-0275 | < 0.1                            | 6.4 | <25                              | 85000                               | 43                | 4900               |
| 31/05/11 11:20 | SN-2011-05-0294 | <0.1                             |     | <25                              | 87000                               | 45                | 5000               |
| 09/06/11 15:00 | SN-2011-06-0071 | 0.2                              |     | <25                              | 87000                               | 45                | 5000               |
| 17/06/11 13:00 | SN-2011-06-0118 | 0.2                              | 6.4 | <25                              | 85000                               | 43                | 4700               |
| 23/06/11 09:45 | SN-2011-06-0165 | 0.2                              | 6.6 | <19                              | 80000                               | 39                | 4300               |
| 29/06/11 14:05 | SN-2011-06-0224 | 0.1                              | 6.5 | <19                              | 82000                               | 40                | 4500               |
| 07/07/11 16:25 | SN-2011-07-0083 | 0.2                              | 6.3 | <25                              | 85000                               | 42                | 4500               |
| 14/07/11 14:00 | SN-2011-07-0134 | <0.1                             | 6.5 | <25                              | 83000                               | 44                | 4500               |
| 21/07/11 09:10 | SN-2011-07-0220 | <0.1                             | 6.4 | <19                              | 82000                               | 41                | 4500               |
| 27/07/11 14:30 | SN-2011-07-0278 | <0.1                             |     | <25                              | 82000                               | 43                | 4500               |
| 04/08/11 09:30 | SN-2011-08-0114 | <0.1                             | 6.5 | <25                              | 82000                               | 43                | 4500               |
| 11/08/11 10:00 | SN-2011-08-0190 | <0.1                             | 6.4 | <25                              | 82000                               | 43                | 4500               |
| 18/08/11 11:15 | SN-2011-08-0261 | <0.1                             |     | <19                              | 81000                               | 41                | 4400               |
| 24/08/11 14:00 | SN-2011-08-0320 | <0.1                             | 6.4 | <19                              | 80000                               | 39                | 4300               |
| 31/08/11 08:55 | SN-2011-09-0003 | <0.1                             |     | <19                              | 81000                               | 43                | 4300               |
| 08/09/11 12:20 | SN-2011-09-0088 | < 0.1                            | 6.6 | <19                              | 79000                               | 41                | 4300               |
| 14/09/11 09:00 | SN-2011-09-0154 | <0.1                             | 6.3 | <19                              | 79000                               | 42                | 4200               |
| 21/09/11 09:40 | SN-2011-09-0232 | <0.1                             | 6.4 | <19                              | 78000                               | 42                | 4200               |
| 28/09/11 12:30 | SN-2011-09-0284 | 0.1                              | 6.3 | <19                              | 79000                               | 46                | 4400               |
| 05/10/11 11:55 | SN-2011-10-0088 | 0.2                              | 6.5 | <19                              | 73000                               | 41                | 4000               |
| 12/10/11 15:15 | SN-2011-10-0162 | 0.5                              | 6.5 | <19                              | 70000                               | 37                | 3900               |
| 19/10/11 13:15 | SN-2011-10-0267 | 0.3                              | 6.5 | <19                              | 74000                               | 44                | 4100               |
| 26/10/11 09:15 | SN-2011-10-0375 | <0.1                             | 6.5 | <19                              | 75000                               | 46                | 4000               |
| 02/11/11 09:55 | SN-2011-11-0019 |                                  | 6.6 |                                  | 77000                               |                   | 4300               |
| 09/11/11 09:10 | SN-2011-11-0116 | 0.1                              | 6.5 | <19                              | 76000                               | 45                | 4100               |
| 16/11/11 14:40 | SN-2011-11-0223 | 0.3                              | 6.5 | <19                              | 74000                               | 48                | 4000               |
| 23/11/11 09:15 | SN-2011-11-0282 | 0.1                              | 6.5 | <19                              | 75000                               | 47                | 4100               |
| 30/11/11 09:15 | SN-2011-11-0386 | <0.1                             | 6.4 | <19                              | 73000                               | 46                | 4000               |
| 06/12/11 09:15 | SN-2011-12-0072 | 0.1                              | 6.6 | <19                              | 70000                               | 37                | 3900               |
| 13/12/11 10:25 | SN-2011-12-0151 | 0.1                              | 6.4 | <19                              | 71000                               | 39                | 3900               |
| 20/12/11 08:50 | SN-2011-12-0236 | 0.2                              | 6.3 | <19                              | 69000                               | 38                | 3800               |
| 28/12/11 12:30 | SN-2011-12-0337 | 0.3                              | 6.2 | <19                              | 71000                               | 36                | 3900               |

Table 2: Wekelijkse analyses volgens tabel 6 (deel 2)

| Sample Date    | Sample Number   | Magnesium, Mg (mg/l) | Strontium, Sr (mg/l) | Iron (total) (mg/l) | Bicarbonate, HCO <sub>3</sub> (mg/l) | Carbon dioxide, CO <sub>2</sub> | Potassium, K (mg/l) | Sodium, Na (mg/l) | Chloride (mg/l) |
|----------------|-----------------|----------------------|----------------------|---------------------|--------------------------------------|---------------------------------|---------------------|-------------------|-----------------|
| 09/02/11 09:30 | SN-2011-2-00130 | 920                  | 570                  | 30                  | 260                                  | 140                             | 880                 | 24000             | 48000           |
| 18/02/11 15:00 | SN-2011-2-00249 | 1000                 | 600                  | 30                  | 360                                  | 230                             | 480                 | 25000             | 51000           |
| 25/02/11 10:00 | SN-2011-2-00296 | 1000                 | 620                  | 25                  | 570                                  | 590                             | 300                 | 24000             | 49000           |
| 04/03/11 09:45 | SN-2011-3-00075 | 990                  | 620                  | 25                  | 340                                  | 220                             | 290                 | 23000             | 49000           |
| 11/03/11 09:25 | SN-2011-3-00151 | 1000                 | 630                  | 20                  | 200                                  | 260                             | 250                 | 25000             | 47000           |
| 23/03/11 10:00 | SN-2011-3-00253 | 970                  | 590                  | 25                  | 270                                  | 350                             | 260                 | 23000             | 47000           |
| 01/04/11 13:50 | SN-2011-04-0020 | 970                  | 590                  | 30                  | 310                                  | 260                             | 290                 | 24000             | 49000           |
| 07/04/11 13:40 | SN-2011-04-0087 | 980                  | 620                  | 20                  | 310                                  | 330                             | 240                 | 24000             | 48000           |
| 15/04/11 09:20 | SN-2011-04-0189 | 1000                 | 590                  | 20                  | 190                                  | 310                             | 250                 | 24000             | 49000           |
| 20/04/11 14:34 | SN-2011-04-0267 | 950                  | 600                  | 20                  | 250                                  | 100                             | 310                 | 25000             | 50000           |
| 27/04/11 08:45 | SN-2011-04-0339 | 950                  | 570                  | 10                  | 440                                  | 230                             | 240                 | 24000             | 49000           |
| 06/05/11 11:30 | SN-2011-05-0040 | 1000                 | 620                  | 20                  | 230                                  | 150                             | 210                 | 24000             | 50000           |
| 11/05/11 10:00 | SN-2011-05-0089 | 1000                 | 580                  | 20                  | 350                                  | 180                             | 210                 | 25000             | 50000           |
| 19/05/11 12:15 | SN-2011-05-0185 | 1000                 | 630                  | 25                  | 350                                  | 230                             | 190                 | 25000             | 51000           |
| 27/05/11 09:55 | SN-2011-05-0275 | 1100                 | 640                  | 25                  | 350                                  | 290                             | 200                 | 25000             | 52000           |
| 31/05/11 11:20 | SN-2011-05-0294 | 1100                 | 650                  | 15                  | 350                                  | 290                             | 200                 | 26000             | 53000           |
| 09/06/11 15:00 | SN-2011-06-0071 | 1000                 | 650                  | 20                  | 300                                  | 200                             | 210                 | 26000             | 53000           |
| 17/06/11 13:00 | SN-2011-06-0118 | 1100                 | 640                  | 20                  | 300                                  | 200                             | 210                 | 26000             | 51000           |
| 23/06/11 09:45 | SN-2011-06-0165 | 980                  | 590                  | 20                  | 290                                  | 150                             | 210                 | 24000             | 48000           |
| 29/06/11 14:05 | SN-2011-06-0224 | 1000                 | 620                  | 20                  | 300                                  | 160                             | 200                 | 25000             | 50000           |
| 07/07/11 16:25 | SN-2011-07-0083 | 1000                 | 620                  | 20                  | 280                                  | 230                             | 210                 | 25000             | 52000           |
| 14/07/11 14:00 | SN-2011-07-0134 | 980                  | 620                  | 15                  | 280                                  | 230                             | 190                 | 25000             | 50000           |
| 21/07/11 09:10 | SN-2011-07-0220 | 1000                 | 620                  | 20                  | 520                                  | 340                             | 200                 | 25000             | 50000           |
| 27/07/11 14:30 | SN-2011-07-0278 | 1000                 | 610                  | 15                  | 400                                  | 210                             | 190                 | 25000             | 50000           |
| 04/08/11 09:30 | SN-2011-08-0114 | 1000                 | 630                  | 25                  | 310                                  | 260                             | 190                 | 25000             | 50000           |
| 11/08/11 10:00 | SN-2011-08-0190 | 990                  | 610                  | 20                  | 320                                  | 260                             | 200                 | 24000             | 50000           |
| 18/08/11 11:15 | SN-2011-08-0261 | 980                  | 600                  | 20                  | 390                                  | 260                             | 200                 | 24000             | 49000           |
| 24/08/11 14:00 | SN-2011-08-0320 | 1000                 | 600                  | 20                  | 300                                  | 200                             | 190                 | 24000             | 48000           |
| 31/08/11 08:55 | SN-2011-09-0003 | 970                  | 610                  | 20                  | 270                                  | 220                             | 180                 | 24000             | 49000           |
| 08/09/11 12:20 | SN-2011-09-0088 | 950                  | 590                  | 15                  | 310                                  | 250                             | 180                 | 23000             | 48000           |
| 14/09/11 09:00 | SN-2011-09-0154 | 930                  | 560                  | 15                  | 300                                  | 310                             | 180                 | 24000             | 48000           |
| 21/09/11 09:40 | SN-2011-09-0232 | 910                  | 560                  | 20                  | 270                                  | 220                             | 170                 | 23000             | 47000           |
| 28/09/11 12:30 | SN-2011-09-0284 | 910                  | 590                  | 15                  | 364                                  | 379                             | 180                 | 24000             | 48000           |
| 05/10/11 11:55 | SN-2011-10-0088 | 850                  | 550                  | 20                  | 473                                  | 297                             | 230                 | 22000             | 44000           |
| 12/10/11 15:15 | SN-2011-10-0162 | 820                  | 530                  | 30                  | 499                                  | 261                             | 320                 | 21000             | 43000           |
| 19/10/11 13:15 | SN-2011-10-0267 | 850                  | 540                  | 20                  | 489                                  | 287                             | 240                 | 22000             | 45000           |
| 26/10/11 09:15 | SN-2011-10-0375 | 860                  | 530                  | 15                  | 524                                  | 274                             | 200                 | 23000             | 45000           |
| 02/11/11 09:55 | SN-2011-11-0019 | 860                  | 540                  | 15                  | 508                                  | 265                             | 180                 | 23000             | 47000           |
| 09/11/11 09:10 | SN-2011-11-0116 | 860                  | 530                  | 20                  | 517                                  | 340                             | 170                 | 23000             | 46000           |
| 16/11/11 14:40 | SN-2011-11-0223 | 820                  | 530                  | 15                  | 510                                  | 420                             | 180                 | 22000             | 45000           |
| 23/11/11 09:15 | SN-2011-11-0282 | 850                  | 540                  | 15                  | 340                                  | 280                             | 200                 | 23000             | 46000           |
| 30/11/11 09:15 | SN-2011-11-0386 | 840                  | 530                  | 20                  | 370                                  | 250                             | 200                 | 22000             | 44000           |
| 06/12/11 09:15 | SN-2011-12-0072 | 820                  | 490                  | 20                  | 330                                  | 220                             | 170                 | 21000             | 42000           |
| 13/12/11 10:25 | SN-2011-12-0151 | 850                  | 510                  | 15                  | 380                                  | 250                             | 170                 | 22000             | 43000           |
| 20/12/11 08:50 | SN-2011-12-0236 | 840                  | 520                  | 15                  | 350                                  | 360                             | 200                 | 22000             | 42000           |
| 28/12/11 12:30 | SN-2011-12-0337 | 850                  | 510                  | 15                  | 260                                  | 430                             | 170                 | 21000             | 43000           |

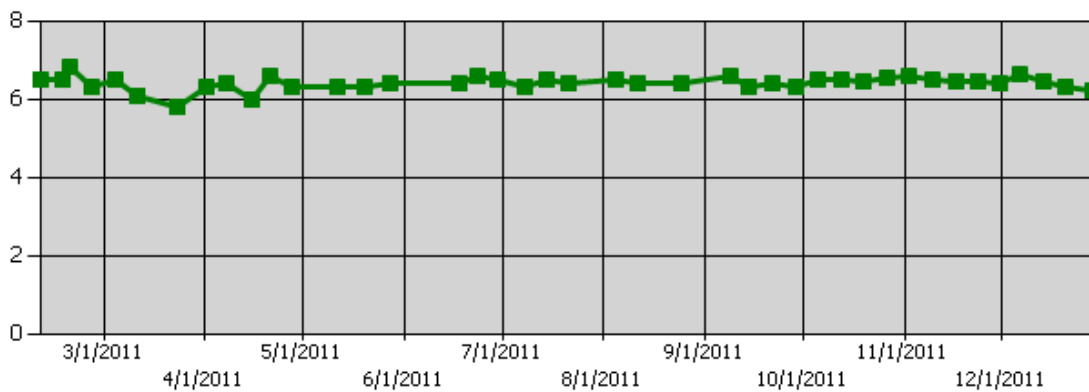
## Grafische weergave van de analyse resultaten

### Sulphide, S<sup>2-</sup>



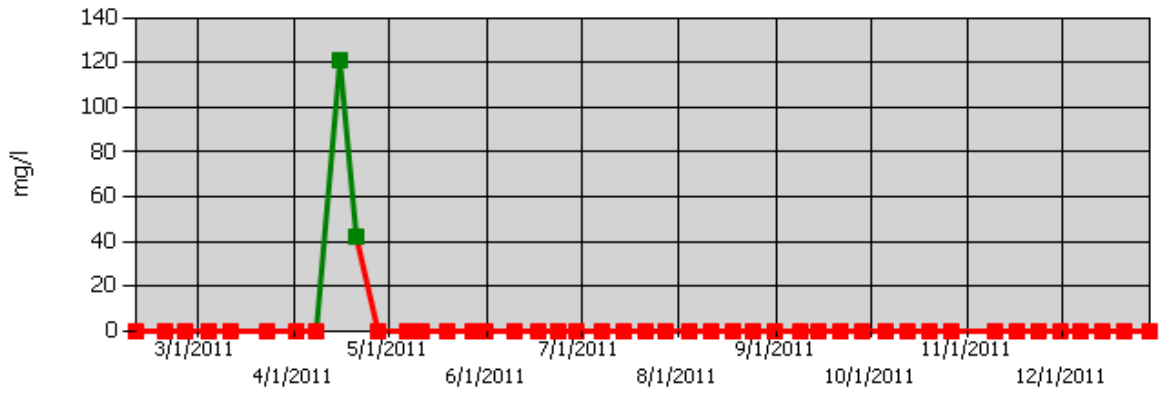
A value of 0 means < result, for the actual result see the table with the Trend Results

### pH



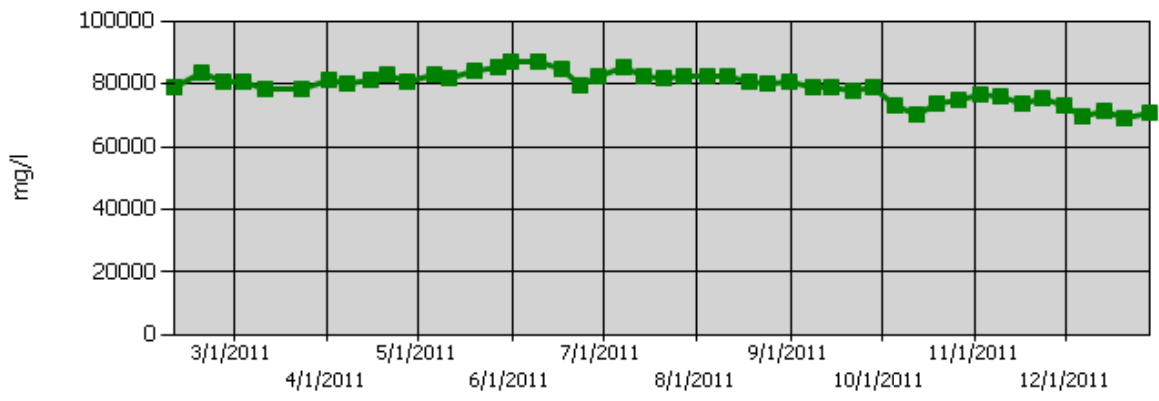
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### Sulphate, SO4



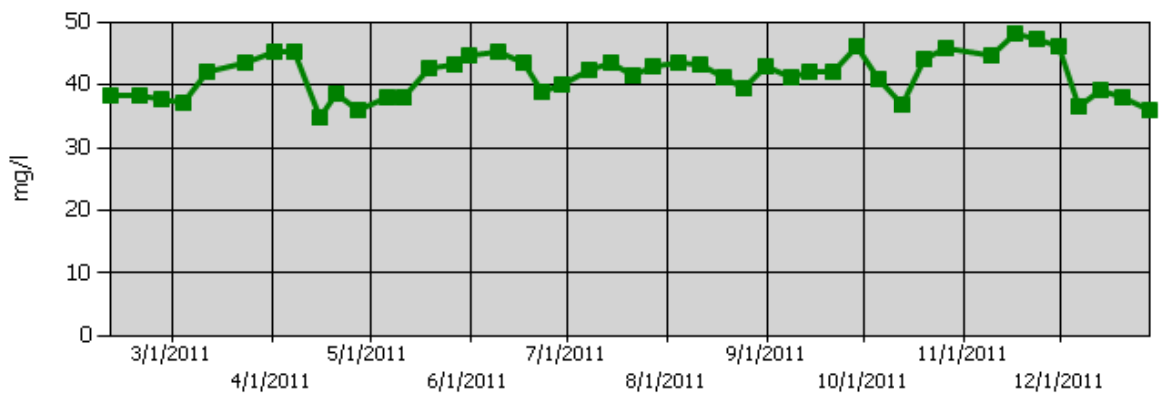
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### Sodium chloride, NaCl (calc)



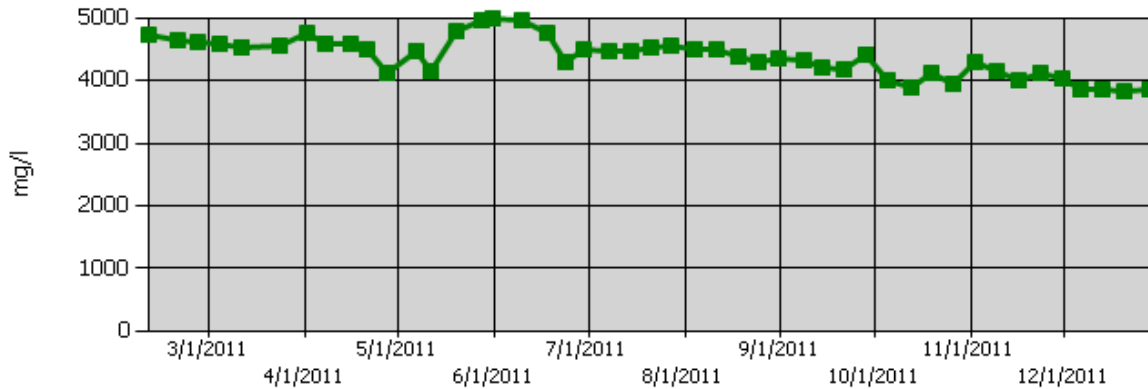
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### Barium, Ba



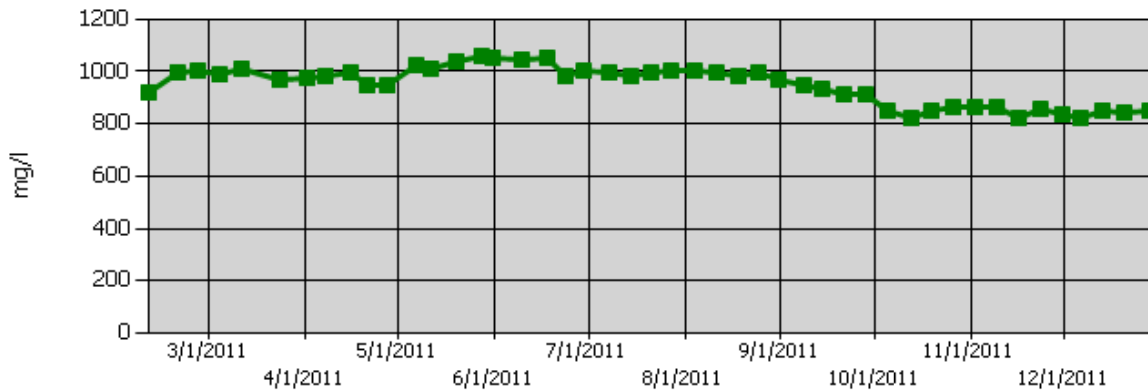
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### Calcium, Ca



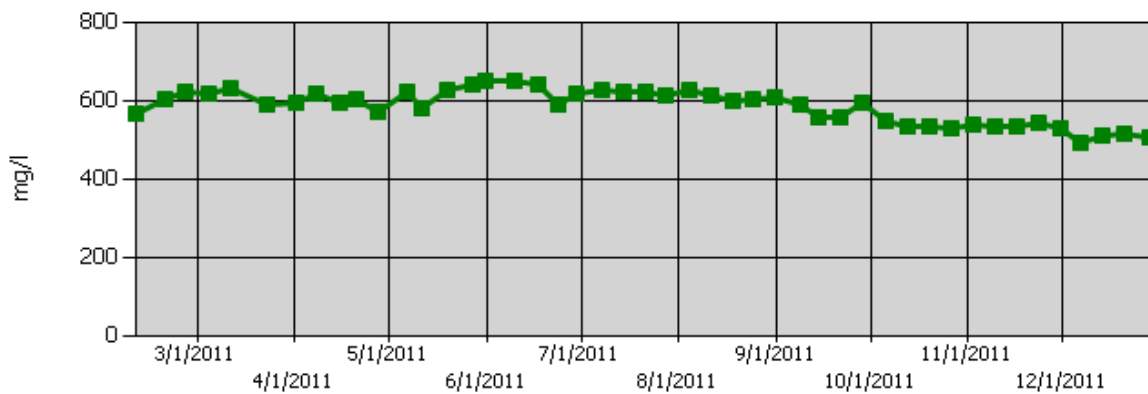
A value of 0 means < result, for the actual result see the table with the Trend Results

### Magnesium, Mg



A value of 0 means < result, for the actual result see the table with the Trend Results

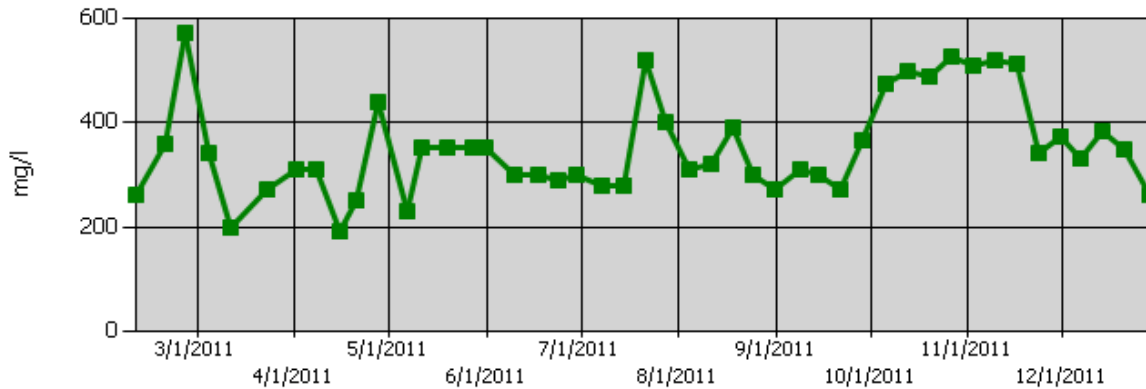
### Strontium, Sr



A value of 0 means < result, for the actual result see the table with the Trend Results

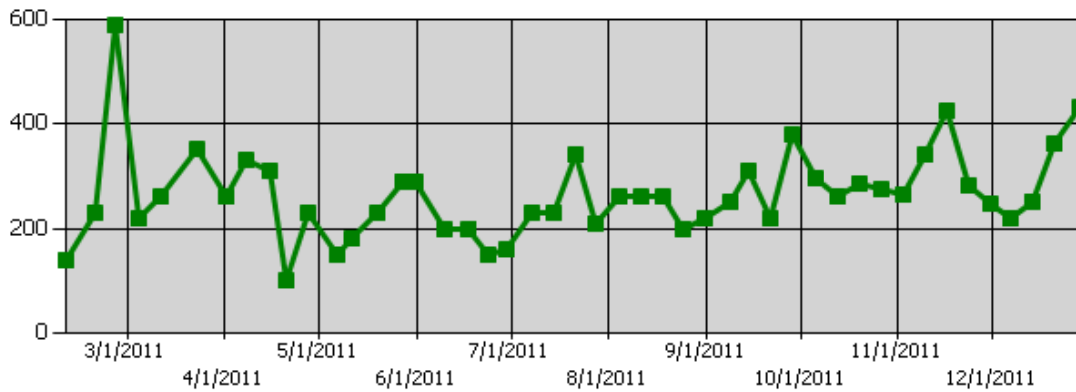


### Bicarbonate, HCO<sub>3</sub>



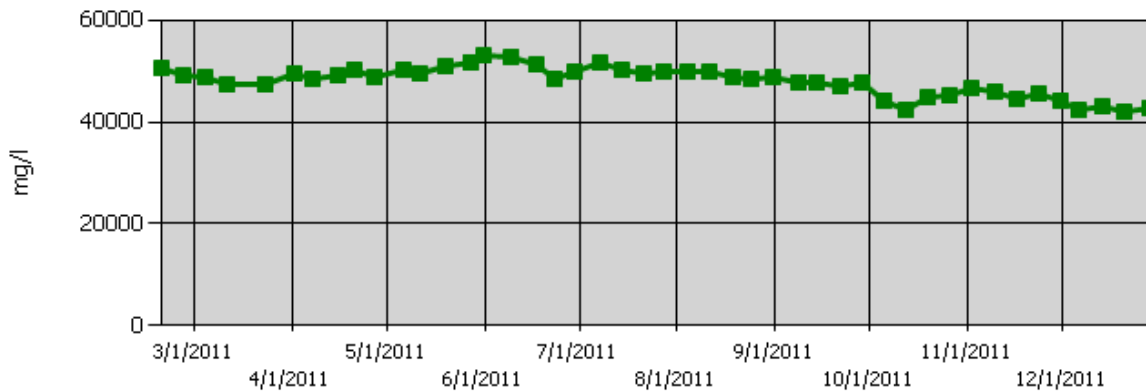
A value of 0 means < result, for the actual result see the table with the Trend Results

### Carbon dioxide, CO<sub>2</sub>



A value of 0 means < result, for the actual result see the table with the Trend Results

### Chloride



A value of 0 means < result, for the actual result see the table with the Trend Results

