**Radiological Baseline around the Barakah Nuclear Power Plant, UAE**

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**Table S1:** Labels, coordinates and location of the collected samples from the Barakah NPP area.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Label | Coordinates |  | Label | Coordinates |  | Label | Coordinates |
|  |  |  |  |  |  |  |  |  |
| Shore Samples (sediments in Barakah) | B1 | N 23 57 33.2 E 52 08 54.2 | Soil Samples (soil in Barakah)  | S1 | N 23 56 22.1 E 52 08 54.0 | Bottom samples (marine sediments M1-M5 in Sila, M6-M10 in Barakah and M11-M18 in Jebel Dhannah ) | M1 | N 24 04 12.7 E 51 47 37.2 |
| B2 | N 23 57 38.9 E 52 10 10.2 | S2 | N 23 56 35.6 E 52 10 13.2 | M2 | N 24 00 41.6 E 51 53 22.2 |
| B3 | N 23 57 41.2 E 52 11 19.1 | S3 | N 23 56 51.2 E 52 11 10.6 | M3 | N 24 03 06.5 E 51 56 37.8 |
| B4 | N 23 57 43.7 E 52 11 46.1 | S4 | N 23 56 36.8 E 52 11 51.5 | M4 | N 24 02 46.8 E 52 01 08.0 |
| B5 | N 23 58 50.5 E 52 16 0.5 | S5 | N 23 56 51.5 E 52 12 03.4 | M5 | N 24 01 47.5 E 52 04 42.4 |
| B6 | N 23 58 55.2 E 52 16 27.8 | S6 | N 23 57 06.2 E 52 13 55.0 | M6 | N 23 58 36.9 E 52 09 22.1 |
| B7 | N 23 59 05.7 E 52 17 03.6 | S7 | N 23 57 33.8 E 52 14 26.9 | M7 | N 23 58 12.3 E 52 11 22.3 |
| B8 | N 23 59 35.7 E 52 18 17.5 | S8 | N 23 57 55.6 E 52 15 10.6 | M8 | N 23 58 19.9 E 52 12 32.5 |
| B9 | N 24 00 01.4 E 52 19 13.7 | S9 | N 23 57 57.2 E 52 15 33.0 | M9 | N 23 59 09.5 E 52 15 40.5 |
| B10 | N 24 00 48.9 E 52 19 52.8 | S10 | N 23 57 11.9 E52 15 17.7 | M10 | N 24 01 06.4 E 52 18 23.8 |
| B11 | N 24 01 23.6 E 52 20 54.1 | S11 | N 23 58 01.5 E 52 16 23.7 | M11 | N 24 02 59.3 E 52 20 37.8 |
| B12 | N 24 02 04.1 E 52 22 02.3 | S12 | N 23 58 19.0 E 52 16 39.5 | M12 | N 24 03 38.0 E 52 23 35.9 |
| B13 | N 24 02 20.4 E 52 22 34.5 | S13 | N 23 58 32.2 E 52 17 45.1 | M13 | N 24 06 20.1 E 52 25 44.9 |
| B14 | N 24 02 41.5 E 52 23 33.3 | S14 | N 23 58 43.6 E 52 17 46.3 | M14 | N 24 08 41.2 E 52 27 34.2 |
| B15 | N 24 02 54.2 E 52 24 29.4 | S15 | N 23 59 15.3 E 52 18 45.0 | M15 | N 24 08 00.9 E 52 30 55.9 |
| B16 | N 24 03 16.3 E 52 25 24.6 | S16 | N 23 59 25.5 E 52 19 25.5 | M16 | N 24 09 25.9 E 52 32 55.6 |
|  |  |  | S17 | N 23 59 45.8 E 52 19 41.3 | M17 | N 24 10 49.2 E 52 33 46.9 |
|  |  |  | S18 | N 23 59 08.5 E 52 12 24.6 | M18 | N 24 12 21.7 E 52 34 33.9 |
|  |  |  | S19 | N 24 00 21.0 E 52 20 39.7 |  |  |  |
|  |  |  | S20 | N 24 00 55.5 E 52 21 40.4 |  |  |  |
|  |  |  | S21 | N 24 01 11.0 E 52 22 46.8 |  |  |  |
|  |  |  | S22 | N 24 01 19.5 E 52 23 58.1 |  |  |  |
|  |  |  | S23 | N 24 01 37.4 E 52 25 06.4 |  |  |  |
|  |  |  | S24 | N 24 01 58.1 E 52 26 12.3 |  |  |  |

**Table S2:** Weights (in kg) of the samples analyzed using gamma spectroscopy.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Shore | B1 | 1.33 | Soil | S1 | 1.09 | Bottom | M1 | 1.18 |
| B2 | 1.30 | S2 | 1.30 | M2 | 1.39 |
| B3 | 1.47 | S3 | 1.23 | M3 | 1.64 |
| B4 | 1.28 | S4 | 1.47 | M4 | 1.05 |
| B5 | 1.29 | S5 | 1.11 | M5 | 1.43 |
| B6 | 1.34 | S6 | 1.28 | M6 | 1.24 |
| B7 | 1.41 | S7 | 1.18 | M7 | 1.28 |
| B8 | 1.38 | S8 | 1.11 | M8 | 1.20 |
| B9 | 1.44 | S9 | 1.61 | M9 | 1.09 |
| B10 | 1.42 | S10 | 1.40 | M10 | 1.08 |
| B11 | 1.35 | S11 | 1.50 | M11 | 1.19 |
| B12 | 1.36 | S12 | 1.43 | M12 | 1.11 |
| B13 | 1.14 | S13 | 1.63 | M13 | 1.30 |
| B14 | 1.06 | S14 | 1.21 | M14 | 1.20 |
| B15 | 1.05 | S15 | 1.58 | M15 | 1.26 |
| B16 | 1.33 | S16 | 1.39 | M16 | 1.50 |
|  |  |  | S17 | 1.50 | M17 | 1.41 |
|  |  |  | S18 | 1.61 | M18 | 1.60 |
|  |  |  | S19 | 1.59 |  |  |  |
|  |  |  | S20 | 1.62 |  |  |  |
|  |  |  | S21 | 1.64 |  |  |  |
|  |  |  | S22 | 1.47 |  |  |  |
|  |  |  | S23 | 1.56 |  |  |  |
|  |  |  | S24 | 1.53 |  |  |  |

**Table S3:** Radionuclides activity concentrations in (Bq/kg), radium equivalent in (Bq/kg) and absorbed dose rates (nGy/hr) in shore and soil and bottom sediment samples. All values are reported with their associated experimental uncertainties.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| shore | Sample | 238U(226Ra) | 232Th | 40K | Raeq | Absorbance Dose |
| B1 | 5.14±0.40 | 2.04±0.15 | 101.45±8.25 | 15.87±1.24 | 7.84±0.31 |
| B2 | 4.39±0.34 | 1.5±0.19 | 89.33±6.1 | 13.41±1.08 | 6.66±0.30 |
| B3 | 4.22±0.22 | 1.66±0.21 | 86.81±5.9 | 13.29±0.97 | 6.58±0.25 |
| B4 | 5.87±0.38 | 2±0.17 | 186.42±7.95 | 23.09±1.23 | 11.7±0.31 |
| B5 | 5.77±0.36 | 2.23±0.13 | 99.32±6.85 | 16.61±1.07 | 8.15±0.27 |
| B6 | 6.2±0.51 | 1.82±0.17 | 142.01±7.9 | 19.73±1.35 | 9.88±0.37 |
| B7 | 3.55±0.51 | 1.25±0.15 | 71.94±7.35 | 10.88±1.30 | 5.4±0.36 |
| B8 | 3.22±0.47 | 1.5±0.22 | 128.41±7.5 | 15.24±1.37 | 7.74±0.39 |
| B9 | 4.23±0.54 | 2.17±0.20 | 116.86±7.25 | 16.34±1.38 | 8.14±0.40 |
| B10 | 4.44±0.51 | 2.46±0.26 | 102.19±9.25 | 15.83±1.60 | 7.8±0.43 |
| B11 | 3.15±0.21 | 0.87±0.18 | 40.71±5.59 | 7.53±0.94 | 3.68±0.24 |
| B12 | 3.14±0.25 | 1.1±0.12 | 47.14±5.9 | 8.35±0.88 | 4.09±0.21 |
| B13 | 3.33±0.28 | 0.98±0.13 | 61.62±6.45 | 9.48±0.97 | 4.7±0.24 |
| B14 | 3.04±0.58 | 1.27±0.11 | 90.42±7.5 | 11.82±1.31 | 5.94±0.37 |
| B15 | 5.37±0.30 | 2.22±0.17 | 240.91±9.7 | 27.09±1.29 | 13.87±0.28 |
| B16 | 5.78±0.36 | 1.76±0.17 | 95.19±6.5 | 15.63±1.11 | 7.7±0.30 |
| soil | Sample | 238U(226Ra) | 232Th | 40K | Raeq | Absorbance Dose |
| S1 | 5.33±0.25 | 2.23±0.10 | 141.35±8.6 | 19.41±1.05 | 9.71±0.21 |
| S2 | 8.48±0.58 | 3.82±0.15 | 323.84±11.3 | 38.88±1.66 | 19.73±0.40 |
| S3 | 9.05±0.31 | 3.31±0.20 | 239.4±8.4 | 32.22±1.23 | 16.16±0.30 |
| S4 | 10.29±0.38 | 4.21±0.20 | 287.24±10.2 | 38.43±1.44 | 19.28±0.33 |
| S5 | 10.3±0.45 | 4.51±0.21 | 308.52±11.7 | 40.5±1.63 | 20.35±0.38 |
| S6 | 14.51±0.39 | 9.37±0.22 | 394.97±10.1 | 58.33±1.50 | 28.84±0.36 |
| S7 | 13.3±0.62 | 11.52±0.23 | 485.04±12.9 | 67.11±1.93 | 33.33±0.47 |
| S8 | 7.66±0.34 | 4.65±0.22 | 258.4±11.0 | 34.21±1.50 | 17.12±0.34 |
| S9 | 15.57±0.47 | 13.76±0.33 | 444.97±20.6 | 69.51±2.53 | 34.06±0.50 |
| S10 | 16.92±0.56 | 8.9±0.22 | 447.34±10.4 | 64.1±1.67 | 31.85±0.43 |
| S11 | 64.82±0.87 | 7.08±0.10 | 455.57±12.6 | 110.03±1.98 | 53.22±0.51 |
| S12 | 12.67±0.39 | 8.4±0.18 | 314.95±10.1 | 48.93±1.42 | 24.06±0.33 |
| S13 | 17.59±0.48 | 12.46±0.23 | 362.78±10.9 | 63.34±1.65 | 30.78±0.41 |
| S14 | 14.8±0.55 | 11.34±0.27 | 347.82±14 | 57.8±2.01 | 28.19±0.47 |
| S15 | 18.63±0.73 | 10.91±0.22 | 465.2±12.9 | 70.05±2.05 | 34.6±0.53 |
| S16 | 22.02±0.52 | 7.6±0.24 | 307.01±10.7 | 56.54±1.71 | 27.57±0.43 |
| S17 | 14.4±0.62 | 13.21±0.24 | 389.62±13.1 | 63.29±1.98 | 30.88±0.49 |
| S18 | 12.9±0.97 | 8.92±0.27 | 415.5±10.9 | 57.65±2.20 | 28.67±0.66 |
| S19 | 16.44±0.74 | 18.15±0.43 | 340.78±12.7 | 68.63±2.33 | 32.77±0.66 |
| S20 | 15.16±0.54 | 5.14±0.21 | 174.07±8.05 | 35.92±1.45 | 17.37±0.41 |
| S21 | 7.97±0.84 | 8.11±0.31 | 611.16±14.9 | 66.62±2.42 | 34.07±0.63 |
| S22 | 17.28±0.69 | 6.47±0.32 | 251.86±10.9 | 45.93±1.99 | 22.4±0.56 |
| S23 | 17.98±0.66 | 6.11±0.29 | 243.16±12.5 | 45.43±2.04 | 22.13±0.53 |
| S24 | 12.21±0.39 | 9.35±0.19 | 382.62±12.5 | 55.04±1.62 | 27.24±0.35 |
| bottom | Sample | 238U(226Ra) | 232Th | 40K | Raeq |
| M1 | 6.98±0.54 | 2.19±0.49 | 76.93±14.6 | 16.04±2.37 |
| M2 | 2.83±0.53 | 0.95±0.04 | 38.05±15 | 7.11±2.24 |
| M3 | 3.59±0.42 | 2.34±0.35 | 152.29±19.4 | 18.66±2.41 |
| M4 | 2.03±0.47 | 0.64±0.04 | 21.84±8.2 | 4.62±1.60 |
| M5 | 5.54±0.74 | 1.54±0.31 | 93.65±16.9 | 14.95±2.50 |
| M6 | 3.66±0.50 | 1.24±0.22 | 51.94±7.75 | 9.44±1.40 |
| M7 | 5.83±0.38 | 1.89±0.24 | 112.27±15.2 | 17.17±1.90 |
| M8 | 8.83±0.79 | 3.38±0.40 | 166.91±15.5 | 26.51±2.55 |
| M9 | 7.12±0.31 | 1.98±0.11 | 121.04±10.6 | 19.28±1.28 |
| M10 | 1.3±0.15 | 0.36±0.05 | 10.6±3 | 2.62±0.45 |
| M11 | 1.24±0.15 | 0.54±0.05 | 7.81±2.7 | 2.6±0.42 |
| M12 | 1.53±0.16 | 0.42±0.02 | 11.45±2.7 | 3.01±0.58 |
| M13 | 1.96±0.17 | 0.54±0.07 | 15.95±3.05 | 3.95±0.50 |
| M14 | 10.63±0.46 | 1.6±0.14 | 99.87±6.7 | 20.6±1.18 |
| M15 | 2.49±0.20 | 1.17±0.61 | 58.51±4.95 | 8.67±0.66 |
| M16 | 3.2±0.67 | 1.12±0.24 | 30.49±4.95 | 7.14±1.40 |
| M17 | 9.47±0.86 | 7.29±0.34 | 544.12±14.8 | 61.79±2.49 |
| M18 | 6.88±0.87 | 3.71±0.41 | 280.48±14.4 | 33.78±2.57 |