

## Health Physics Sample Records

**Sample ID:** 142449

**Type:** RLSSS

**Type Detail:** SAND

**Status:** APPROVED

**Rasterized:** ☐

**Description:** 140528BD 19 STAR 19-20 Dirt Sample

### Common

**Resp Org:** P4000 - PROJECT MANAGEMENT

**Cross Ref Sample ID:**

**Priority:** N

**Contact:** COOPER, TERRY L

**Survey No:**

**Reference ID:**

**Accounting Subcode:**

**Unknown Mat:** NO

**Hazardous Mat:** NO

**Comments:** COUNT TO MDA

**Reviewed:** DYNES, WILLIAM J

**Date:** 05/30/14 09:01

**Comments:**

### Origin

**Mat. Size/Volume:** 2221 GRAMS

**Docmnt/MO/Act #:**

**Proposed Ship Date:** 00/00/00 00:00

**Description:** STAR 19 SOIL SAMPLE

### Collection

**Sample Tech:** DYNES, WILLIAM J

**Sample Date:** 05/29/14 08:15

**Count Time:** 900 (secs.)

**Tritium Req:** No

**Sample Size/Volume:** 2221 GRAMS

**Instructions:**

**Comments:** COUNT TO MDA

### RLSSS

**Exempt:** No

**Evaluated:** No

**Chem Notification:** No

**State Permit:** No

**Offsite Analysis:** No

**Effluent Permit:** No

**Container Surveyed:** No

**Cleared For Release:** Yes

**Container Evaluated:** Yes

**Form 212 Ready:** ☒

### Location

**Unit:** NON-UNIT RE

**Area:** MS

**Elev:** 100

**Room:**

**Depth:** 3" (in.)

**Equip ID:**

**Stored By:** ,

**Date:** 00/00/00 00:00

**Sample Loc:**

**Other:**

**Material Loc:**

# Health Physics Sample Records

Sample ID: 142449

Type: RLSSS


















Type Detail: SAND

Status: APPROVED

Rasterized: 

Description: 140528BD 19 STAR 19-20 Dirt Sample

## Analysis

| Geometry             | MCA ID | Quant.     | Units            | Method  | FP/AP    | Lab       | Analysis By     | Date           | Mod ID | Mod Date |
|----------------------|--------|------------|------------------|---|----------|-----------|-----------------|----------------|--------|----------|
| C_1L_marinelli_sand_ | 30297  | 2221       | GR               |   | .000     |           | PARK, MICHAEL C | 06/02/14 09:58 |        |          |
| Isotope              | Mode   | Activity   | Activity Uncert. | LLD/MDA   | % Abund. | Atom. No. | Comments        |                | Mod Id | Mod Date |
| 0 K-40               | NT     | 0.00001131 | 1.16E-6          |    | 69.696%  | 40        |                 |                |        |          |
| 0 TL-208             | NT     | 2.656E-7   | 7.26E-8          |    | 1.637%   | 208       |                 |                |        |          |
| 0 PB-212             | NT     | 8.025E-7   | 9.01E-8          |    | 4.945%   | 212       |                 |                |        |          |
| 0 BI-214             | NT     | 2.14E-7    | 1.031E-7         |    | 1.319%   | 214       |                 |                |        |          |
| 0 PB-214             | NT     | 7.054E-7   | 2.321E-7         |    | 4.347%   | 214       |                 |                |        |          |
| 0 RA-224             | NT     | 2.036E-6   | 8.1E-7           |    | 12.546%  | 224       |                 |                |        |          |
| 0 AC-228             | NT     | 8.942E-7   | 1.68E-7          |    | 5.510%   | 228       |                 |                |        |          |
| 0 BE-7               | AP     | 6.2356E-7  |                  |    | 0.000%   | 7         |                 |                |        |          |
| 0 MN-54              | AP     | 9.9459E-8  |                  |    | 0.000%   | 54        |                 |                |        |          |
| 0 MN-56              | AP     | 9.487E-8   |                  |    | 0.000%   | 56        |                 |                |        |          |
| 0 CO-57              | AP     | 8.1745E-8  |                  |    | 0.000%   | 57        |                 |                |        |          |
| 0 CO-58              | AP     | 9.1172E-8  |                  |    | 0.000%   | 58        |                 |                |        |          |
| 0 CO-60              | AP     | 8.4669E-8  |                  |    | 0.000%   | 60        |                 |                |        |          |
| 0 SB-124             | AP     | 6.6535E-8  |                  |    | 0.000%   | 124       |                 |                |        |          |
| 0 SB-125             | FP     | 2.4056E-7  |                  |   | 0.000%   | 125       |                 |                |        |          |
| 0 CS-134             | FP     | 6.2965E-8  |                  |  | 0.000%   | 134       |                 |                |        |          |
| 0 CS-137             | FP     | 1.0084E-7  |                  |  | 0.000%   | 137       |                 |                |        |          |

## Analysis Review

Re-Analyze: No

Lic Rad Mat Present: No

Reviewed: COOPER, TERRY L

Date: 06/10/14 10:21

Hp Eng Rvw Req'd: Yes

Rad Mat Present: Yes

HP Notified Name:

Comments:

## Health Physics Sample Records

Sample ID: 142449

Type: RLSSS

Type Detail: SAND

Status: APPROVED

Rasterized: 

Description: 140528BD 19 STAR 19-20 Dirt Sample

**Review/Approve**

### HP Eng Review

Reviewed: COOPER, TERRY L

Date: 06/10/14 10:21

Comments:

### Disposition

Disposition: OTHER

Result: Sample contains only natural isotopes

Remarks:

### Final Approval

Approved: COOPER, TERRY L

Date: 06/10/14 10:21

Comments:

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*****
* SONGS HEALTH PHYSICS REPORT 2-JUN-2014 09:55 *
*-----*
* >>>> SAMPLE PARAMETERS <<<< *
* *
* Title : 140528BD 19 STAR 19-20 DIRT SAMPLE *
* *
* ID : 30297 Acquisition date: 2-JUN-2014 09:52:37. *
* Start Time: 2-JUN-2014 09:52:00. *
* Stop Time: 2-JUN-2014 09:52:00. Counting System : U2GSP *
* Quantity : 2.22100E+03 GR IHPS Sample Number: 142449 *
* Geometry : C_1L_marinelli_sand_1 Analysis Library : HP_NATURAL *
* Operator: MICHAEL PARK *
*-----*
* >>>> C #41-TP11750A PARAMETERS <<<< *
* *
* Elapsed Live Time : 0 00:03:00.38 Calibration : 1-JUN-2014 20:29: *
* Elapsed Real Time : 0 00:03:00.45 Energy Offset : -1.46898E-01 *
* Deadtime : 0.0% Energy Slope : 4.99817E-01 *
* Activity Mult Factor: 1.00000E+00 Energy Tolerance: 1.00000 *
* Half Life Ratio : 8.00000 Sensitivity : 5.00000 *
*
*****

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Post-NID Peak Search Report

| It | Energy  | Area | Bkgnd | FWHM | Channel | Left | Pw | %Err | Fit      | Nuclides                   |
|----|---------|------|-------|------|---------|------|----|------|----------|----------------------------|
| 1  | 77.24   | 35   | 63    | 0.99 | 154.82  | 152  | 8  | 43.2 | 2.39E+00 | BI-214<br>PB-212<br>PB-214 |
| 3  | 238.58  | 106  | 14    | 1.08 | 477.61  | 471  | 18 | 11.2 | 1.99E+00 | PB-212                     |
| 3  | 241.60  | 24   | 7     | 1.50 | 483.66  | 471  | 18 | 39.8 |          | RA-224<br>PB-214           |
| 1  | 295.23  | 35   | 22    | 1.73 | 590.94  | 586  | 12 | 32.9 | 1.67E+00 | PB-214                     |
| 1  | 338.37  | 27   | 4     | 1.62 | 677.26  | 673  | 8  | 22.3 | 2.93E-01 | AC-228                     |
| 1  | 351.83  | 38   | 18    | 1.30 | 704.17  | 700  | 10 | 26.6 | 1.59E+00 | PB-214                     |
| 1  | 583.25  | 25   | 5     | 1.04 | 1167.11 | 1163 | 10 | 27.3 | 6.31E-01 | TL-208                     |
| 1  | 609.13  | 15   | 14    | 1.74 | 1218.89 | 1215 | 8  | 48.2 | 1.30E+00 | BI-214                     |
| 1  | 911.06  | 29   | 0     | 1.86 | 1822.83 | 1818 | 9  | 18.8 | 8.17E-01 | AC-228                     |
| 1  | 968.83  | 23   | 3     | 2.62 | 1938.38 | 1933 | 11 | 24.1 | 7.56E-01 | AC-228                     |
| 1  | 1460.57 | 99   | 0     | 1.93 | 2921.86 | 2916 | 11 | 10.3 | 1.81E+00 | K-40                       |

Summary of Nuclide Activity  
Sample ID : 30297

Page : 2  
Acquisition date : 2-JUN-2014 09:52:37

Total number of lines in spectrum 11  
Number of unidentified lines 0  
Number of lines tentatively identified by NID 11 100.00%

Nuclide Type : natural

| Nuclide          | Hlife     | Decay | Uncorrected<br>uCi/GR | Decay Corr<br>uCi/GR | Decay Corr<br>1-Sigma Error | 1-Sigma<br>%Error | Flags |
|------------------|-----------|-------|-----------------------|----------------------|-----------------------------|-------------------|-------|
| K-40             | 1.28E+09Y | 1.00  | 1.131E-05             | 1.131E-05            | 0.116E-05                   | 10.25             | A     |
| TL-208           | 3.05M     | 1.59  | 1.673E-07             | 2.656E-07            | 0.726E-07                   | 27.33             | A     |
| PB-212           | 10.64H    | 1.00  | 8.006E-07             | 8.025E-07            | 0.901E-07                   | 11.22             | A     |
| BI-214           | 19.90M    | 1.08  | 1.989E-07             | 2.140E-07            | 1.031E-07                   | 48.17             | A     |
| PB-214           | 26.80M    | 1.06  | 6.679E-07             | 7.054E-07            | 2.321E-07                   | 32.90             | A     |
| RA-224           | 3.66D     | 1.00  | 2.036E-06             | 2.036E-06            | 0.810E-06                   | 39.75             | A     |
| AC-228           | 6.13H     | 1.00  | 8.906E-07             | 8.942E-07            | 1.680E-07                   | 18.79             | A     |
|                  |           |       | -----                 | -----                |                             |                   |       |
| Total Activity : |           |       | 1.607E-05             | 1.623E-05            |                             |                   |       |

Grand Total Activity : 1.607E-05 1.623E-05

Flags: "K" = Keyline not found "M" = Manually accepted  
"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines  
Sample ID : 30297

Page : 3  
Acquisition date : 2-JUN-2014 09:52:37

None

Flags: "T" = Tentatively associated

Interference Report  
Sample ID : 30297

Page : 4  
Acquisition date : 2-JUN-2014 09:52:37

No interference correction performed

Nuclide Type: natural

| Nuclide | Energy  | Area  | %Abn   | %Eff      | Uncorrected Decay Corr |                | 1-Sigma |
|---------|---------|-------|--------|-----------|------------------------|----------------|---------|
|         |         |       |        |           | uCi/GR                 | uCi/GR         | %Error  |
| K-40    | 1460.83 | 99    | 10.67* | 5.560E-01 | 1.131E-05              | 1.131E-05      | 10.25   |
| TL-208  | 72.80   | ----- | 2.14   | 1.486E+00 | -----                  | Line Not Found | -----   |
|         | 74.97   | ----- | 3.60   | 1.577E+00 | -----                  | Line Not Found | -----   |
|         | 84.79   | ----- | 1.27   | 1.917E+00 | -----                  | Line Not Found | -----   |
|         | 252.45  | ----- | 0.80   | 2.004E+00 | -----                  | Line Not Found | -----   |
|         | 277.28  | ----- | 6.80   | 1.917E+00 | -----                  | Line Not Found | -----   |
|         | 510.61  | ----- | 21.60  | 1.298E+00 | -----                  | Line Not Found | -----   |
|         | 583.02  | 25    | 86.00* | 1.157E+00 | 1.673E-07              | 2.656E-07      | 27.33   |
|         | 763.06  | ----- | 1.64   | 8.934E-01 | -----                  | Line Not Found | -----   |
|         | 860.30  | ----- | 12.00  | 7.922E-01 | -----                  | Line Not Found | -----   |
|         | 74.81   | ----- | 10.50  | 1.570E+00 | -----                  | Line Not Found | -----   |
| PB-212  | 77.11   | 35    | 17.70  | 1.666E+00 | 7.949E-07              | 7.968E-07      | 43.18   |
|         | 87.19   | ----- | 6.27   | 1.983E+00 | -----                  | Line Not Found | -----   |
|         | 90.13   | ----- | 1.86   | 2.055E+00 | -----                  | Line Not Found | -----   |
|         | 115.12  | ----- | 0.59   | 2.376E+00 | -----                  | Line Not Found | -----   |
|         | 238.58  | 106   | 43.60* | 2.055E+00 | 8.006E-07              | 8.025E-07      | 11.22   |
|         | 300.03  | ----- | 3.34   | 1.843E+00 | -----                  | Line Not Found | -----   |
| BI-214  | 76.86   | 35    | 0.58   | 1.666E+00 | 2.426E-05              | 2.611E-05      | 43.18   |
|         | 79.29   | ----- | 0.97   | 1.741E+00 | -----                  | Line Not Found | -----   |
|         | 609.31  | 15    | 46.10* | 1.112E+00 | 1.989E-07              | 2.140E-07      | 48.17   |
|         | 665.44  | ----- | 1.56   | 1.023E+00 | -----                  | Line Not Found | -----   |
|         | 768.35  | ----- | 4.88   | 8.873E-01 | -----                  | Line Not Found | -----   |
|         | 806.16  | ----- | 1.23   | 8.454E-01 | -----                  | Line Not Found | -----   |
|         | 934.04  | ----- | 3.16   | 7.310E-01 | -----                  | Line Not Found | -----   |
|         | 1120.27 | ----- | 15.00  | 6.242E-01 | -----                  | Line Not Found | -----   |
|         | 1155.18 | ----- | 1.69   | 6.105E-01 | -----                  | Line Not Found | -----   |
|         | 1238.11 | ----- | 5.92   | 5.846E-01 | -----                  | Line Not Found | -----   |
| PB-214  | 1280.95 | ----- | 1.47   | 5.747E-01 | -----                  | Line Not Found | -----   |
|         | 1377.66 | ----- | 4.02   | 5.602E-01 | -----                  | Line Not Found | -----   |
|         | 1385.30 | ----- | 0.78   | 5.595E-01 | -----                  | Line Not Found | -----   |
|         | 1401.48 | ----- | 1.39   | 5.583E-01 | -----                  | Line Not Found | -----   |
|         | 1407.97 | ----- | 2.48   | 5.578E-01 | -----                  | Line Not Found | -----   |
|         | 1509.22 | ----- | 2.19   | 5.568E-01 | -----                  | Line Not Found | -----   |
|         | 1583.22 | ----- | 0.72   | 5.628E-01 | -----                  | Line Not Found | -----   |
|         | 1661.26 | ----- | 1.15   | 5.753E-01 | -----                  | Line Not Found | -----   |
|         | 1729.58 | ----- | 3.05   | 5.918E-01 | -----                  | Line Not Found | -----   |
|         | 1764.49 | ----- | 15.90  | 6.023E-01 | -----                  | Line Not Found | -----   |
|         | 1847.41 | ----- | 2.12   | 6.331E-01 | -----                  | Line Not Found | -----   |
|         | 53.17   | ----- | 1.10   | 5.203E-01 | -----                  | Line Not Found | -----   |
|         | 74.81   | ----- | 6.52   | 1.570E+00 | -----                  | Line Not Found | -----   |
|         | 77.11   | 35    | 11.00  | 1.666E+00 | 1.279E-06              | 1.351E-06      | 43.18   |
|         | 87.19   | ----- | 3.88   | 1.983E+00 | -----                  | Line Not Found | -----   |
|         | 90.13   | ----- | 1.15   | 2.055E+00 | -----                  | Line Not Found | -----   |
|         | 241.92  | 24    | 7.46   | 2.044E+00 | 1.064E-06              | 1.124E-06      | 39.75   |
|         | 258.94  | ----- | 0.55   | 1.981E+00 | -----                  | Line Not Found | -----   |
|         | 295.09  | 35    | 19.20* | 1.858E+00 | 6.679E-07              | 7.054E-07      | 32.90   |
|         | 351.87  | 38    | 37.10  | 1.686E+00 | 4.124E-07              | 4.356E-07      | 26.63   |
|         | 785.83  | ----- | 1.09   | 8.674E-01 | -----                  | Line Not Found | -----   |
|         | 839.00  | ----- | 0.59   | 8.122E-01 | -----                  | Line Not Found | -----   |

Nuclide Type: natural

| Nuclide | Energy  | Area  | %Abn   | %Eff      | Uncorrected<br>uCi/GR | Decay Corr<br>uCi/GR | 1-Sigma<br>%Error |
|---------|---------|-------|--------|-----------|-----------------------|----------------------|-------------------|
| RA-224  | 83.79   | ----- | 0.20   | 1.887E+00 | -----                 | Line Not Found       | -----             |
|         | 240.76  | 24    | 3.90*  | 2.044E+00 | 2.036E-06             | 2.036E-06            | 39.75             |
| AC-228  | 89.96   | ----- | 3.40   | 2.051E+00 | -----                 | Line Not Found       | -----             |
|         | 93.35   | ----- | 5.60   | 2.124E+00 | -----                 | Line Not Found       | -----             |
|         | 99.55   | ----- | 1.30   | 2.229E+00 | -----                 | Line Not Found       | -----             |
|         | 105.36  | ----- | 2.00   | 2.301E+00 | -----                 | Line Not Found       | -----             |
|         | 108.99  | ----- | 0.67   | 2.335E+00 | -----                 | Line Not Found       | -----             |
|         | 129.03  | ----- | 2.90   | 2.414E+00 | -----                 | Line Not Found       | -----             |
|         | 153.89  | ----- | 0.84   | 2.377E+00 | -----                 | Line Not Found       | -----             |
|         | 209.39  | ----- | 4.10   | 2.168E+00 | -----                 | Line Not Found       | -----             |
|         | 216.24  | ----- | 0.80   | 2.141E+00 | -----                 | Line Not Found       | -----             |
|         | 270.26  | ----- | 3.80   | 1.941E+00 | -----                 | Line Not Found       | -----             |
|         | 328.07  | ----- | 3.50   | 1.756E+00 | -----                 | Line Not Found       | -----             |
|         | 338.42  | 27    | 12.40  | 1.725E+00 | 8.486E-07             | 8.520E-07            | 22.30             |
|         | 340.94  | ----- | 0.52   | 1.718E+00 | -----                 | Line Not Found       | -----             |
|         | 409.62  | ----- | 2.20   | 1.531E+00 | -----                 | Line Not Found       | -----             |
|         | 463.10  | ----- | 4.60   | 1.401E+00 | -----                 | Line Not Found       | -----             |
|         | 562.65  | ----- | 1.01   | 1.195E+00 | -----                 | Line Not Found       | -----             |
|         | 581.52  | ----- | 3.00   | 1.160E+00 | -----                 | Line Not Found       | -----             |
|         | 726.63  | ----- | 0.87   | 9.382E-01 | -----                 | Line Not Found       | -----             |
|         | 755.28  | ----- | 1.32   | 9.027E-01 | -----                 | Line Not Found       | -----             |
|         | 772.28  | ----- | 1.09   | 8.827E-01 | -----                 | Line Not Found       | -----             |
|         | 782.12  | ----- | 0.59   | 8.716E-01 | -----                 | Line Not Found       | -----             |
|         | 794.79  | ----- | 4.60   | 8.576E-01 | -----                 | Line Not Found       | -----             |
|         | 830.59  | ----- | 0.63   | 8.205E-01 | -----                 | Line Not Found       | -----             |
|         | 835.60  | ----- | 1.71   | 8.155E-01 | -----                 | Line Not Found       | -----             |
|         | 840.44  | ----- | 0.94   | 8.108E-01 | -----                 | Line Not Found       | -----             |
|         | 904.29  | ----- | 0.89   | 7.542E-01 | -----                 | Line Not Found       | -----             |
|         | 911.16  | 29    | 29.00* | 7.488E-01 | 8.906E-07             | 8.942E-07            | 18.79             |
|         | 964.64  | ----- | 5.80   | 7.091E-01 | -----                 | Line Not Found       | -----             |
|         | 968.97  | 23    | 17.40  | 7.062E-01 | 1.282E-06             | 1.288E-06            | 24.05             |
|         | 1246.60 | ----- | 0.57   | 5.825E-01 | -----                 | Line Not Found       | -----             |
|         | 1459.19 | ----- | 1.06   | 5.560E-01 | -----                 | Line Not Found       | -----             |
|         | 1496.00 | ----- | 1.05   | 5.563E-01 | -----                 | Line Not Found       | -----             |
|         | 1501.44 | ----- | 0.58   | 5.565E-01 | -----                 | Line Not Found       | -----             |
|         | 1580.30 | ----- | 0.71   | 5.624E-01 | -----                 | Line Not Found       | -----             |
|         | 1588.23 | ----- | 3.60   | 5.634E-01 | -----                 | Line Not Found       | -----             |
|         | 1630.47 | ----- | 1.95   | 5.696E-01 | -----                 | Line Not Found       | -----             |
|         | 1638.10 | ----- | 0.54   | 5.709E-01 | -----                 | Line Not Found       | -----             |

Flag: "\*" = Keyline

Minimum Detectable Activity Report  
Sample ID : 30297

Page : 7  
Acquisition date : 2-JUN-2014 09:52:37

| Nuclide | Bckgnd<br>Sum | Energy<br>(keV) | MDA<br>(uCi/GR) |
|---------|---------------|-----------------|-----------------|
| BE-7    | 5.            | 477.61          | 6.2356E-07      |
| MN-54   | 4.            | 834.83          | 9.9459E-08      |
| MN-56   | 3.            | 846.81          | 9.4870E-08      |
| CO-57   | 23.           | 122.06          | 8.1745E-08      |
| CO-58   | 3.            | 810.79          | 9.1172E-08      |
| CO-60   | 1.            | 1173.24         | 8.4669E-08      |
| SB-124  | 0.            | 1690.98         | 6.6535E-08      |
| SB-125  | 8.            | 427.88          | 2.4056E-07      |
| CS-134  | 3.            | 604.71          | 6.2965E-08      |
| CS-137  | 5.            | 661.66          | 1.0084E-07      |