

## Health Physics Sample Records

**Sample ID:** 142442

**Type:** RLSSS

**Type Detail:** SAND

**Status:** APPROVED

**Rasterized:** ☒

**Description:** 140528BD 12 STAR 12-20 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 08:07

**Comments:**

### Origin

**Mat. Size/Volume:** 1589 GRAMS

**Docmnt/MO/Act #:**

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

**Description:** STAR 12 SOIL SAMPLE

### Collection

**Sample Tech:** DYNES, WILLIAM J

**Sample Date:** 05/29/14 07:17

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

**Tritium Req:** No

**Sample Size/Volume:** 1589 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: 142442

Type: RLSSS

















Type Detail: SAND

Status: APPROVED

Rasterized: 

Description: 140528BD 12 STAR 12-20 Dirt Sample

## Analysis

| Geometry             | MCA ID | Quant.     | Units            | Method   | FP/AP    | Lab       | Analysis By      | Date           | Mod ID | Mod Date |
|----------------------|--------|------------|------------------|--|----------|-----------|------------------|----------------|--------|----------|
| B_1L_marinelli_sand_ | 30279  | 1589       | GR               |  | .000     |           | HENDERSON, JOE C | 05/30/14 12:48 |        |          |
| Isotope              | Mode   | Activity   | Activity Uncert. | LLD/MDA  | % Abund. | Atom. No. | Comments         |                | Mod Id | Mod Date |
| 0 K-40               | NT     | 0.00001095 | 1.51E-6          |   | 77.728%  | 40        |                  |                |        |          |
| 0 TL-208             | NT     | 4.293E-7   | 9.79E-8          |   | 3.047%   | 208       |                  |                |        |          |
| 0 PB-212             | NT     | 5.279E-7   | 1.277E-7         |   | 3.747%   | 212       |                  |                |        |          |
| 0 BI-214             | NT     | 6.829E-7   | 1.45E-7          |   | 4.848%   | 214       |                  |                |        |          |
| 0 PB-214             | NT     | 6.208E-7   | 2.207E-7         |   | 4.407%   | 214       |                  |                |        |          |
| 0 AC-228             | NT     | 8.766E-7   | 2.176E-7         |   | 6.223%   | 228       |                  |                |        |          |
| 0 BE-7               | AP     | 7.6781E-7  |                  |   | 0.000%   | 7         |                  |                |        |          |
| 0 MN-54              | AP     | 3.9031E-8  |                  |   | 0.000%   | 54        |                  |                |        |          |
| 0 MN-56              | AP     | 1.0994E-7  |                  |   | 0.000%   | 56        |                  |                |        |          |
| 0 CO-57              | AP     | 8.2734E-8  |                  |   | 0.000%   | 57        |                  |                |        |          |
| 0 CO-58              | AP     | 1.9876E-7  |                  |   | 0.000%   | 58        |                  |                |        |          |
| 0 CO-60              | AP     | 5.7877E-8  |                  |   | 0.000%   | 60        |                  |                |        |          |
| 0 SB-124             | AP     | 2.9197E-8  |                  |   | 0.000%   | 124       |                  |                |        |          |
| 0 SB-125             | FP     | 2.4783E-7  |                  |   | 0.000%   | 125       |                  |                |        |          |
| 0 CS-134             | FP     | 7.0915E-8  |                  |   | 0.000%   | 134       |                  |                |        |          |
| 0 CS-137             | FP     | 1.4556E-7  |                  |  | 0.000%   | 137       |                  |                |        |          |

## Analysis Review

Re-Analyze: No

Lic Rad Mat Present: No

Reviewed: COOPER, TERRY L

Date: 06/10/14 09:58

Hp Eng Rvw Req'd: Yes

Rad Mat Present: Yes

HP Notified Name:

Comments:

## Health Physics Sample Records

Sample ID: 142442

Type: RLSSS

Type Detail: SAND

Status: APPROVED

Rasterized: 

Description: 140528BD 12 STAR 12-20 Dirt Sample

### Review/Approve

#### HP Eng Review

Reviewed: COOPER, TERRY L

Date: 06/10/14 09:58

Comments:

#### Disposition

Disposition: OTHER

Result: Sample contains only natural isotopes

Remarks:

#### Final Approval

Approved: COOPER, TERRY L

Date: 06/10/14 09:58

Comments:

```

*****
*          SONGS                      HEALTH PHYSICS REPORT          30-MAY-2014 12:46  *
*-----*
*          >>>> SAMPLE  PARAMETERS <<<<          *
*          *
* Title      : 140528BD 12 STAR 12-20 DIRT SAMPLE          *
*          *
* ID         : 30279                      Acquisition date: 30-MAY-2014 12:43:46  *
* Start Time: 30-MAY-2014 12:43:00          *
* Stop Time : 30-MAY-2014 12:43:00          Counting System   : U2GSP          *
* Quantity  : 1.58900E+03 GR                IHPS Sample Number: 142442          *
* Geometry  : B_1L_marinelli_sand_1        Analysis Library  : HP_NATURAL          *
*          :                               Operator: JOE HENDERSON          *
*-----*
*          >>>> B #42-TP11663A  PARAMETERS <<<<          *
*          *
* Elapsed Live Time   : 0 00:03:00.45      Calibration       : 29-MAY-2014 21:44  *
* Elapsed Real Time   : 0 00:03:00.48      Energy Offset      : -1.81343E-02    *
* Deadtime            : 0.0%                Energy Slope       : 4.99764E-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  | 238.65  | 44   | 22    | 1.39 | 477.58  | 473  | 10 | 24.2 | 3.55E+00 | PB-212   |
| 1  | 241.78  | 16   | 1     | 1.20 | 483.83  | 482  | 6  | 26.9 | 4.11E-01 | PB-214   |
| 1  | 295.54  | 19   | 8     | 2.12 | 591.41  | 585  | 10 | 35.6 | 5.33E-01 | PB-214   |
| 1  | 351.98  | 35   | 6     | 1.79 | 704.34  | 699  | 12 | 23.0 | 1.03E+00 | PB-214   |
| 1  | 583.08  | 22   | 0     | 1.87 | 1166.76 | 1160 | 11 | 22.8 | 1.07E+00 | TL-208   |
| 1  | 609.08  | 27   | 3     | 2.66 | 1218.79 | 1214 | 11 | 21.2 | 7.79E-01 | BI-214   |
| 1  | 911.08  | 16   | 0     | 1.80 | 1823.12 | 1817 | 10 | 24.8 | 4.48E-01 | AC-228   |
| 1  | 1460.64 | 52   | 0     | 2.51 | 2922.84 | 2916 | 12 | 13.8 | 1.47E+00 | K-40     |

Summary of Nuclide Activity  
Sample ID : 30279

Page : 2  
Acquisition date : 30-MAY-2014 12:43:46

Total number of lines in spectrum 8  
Number of unidentified lines 0  
Number of lines tentatively identified by NID 8 100.00%

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  | 1.095E-05             | 1.095E-05            | 0.151E-05                   | 13.81             | A     |
| TL-208           | 3.05M     | 1.64  | 2.612E-07             | 4.293E-07            | 0.979E-07                   | 22.81             | A     |
| PB-212           | 10.64H    | 1.00  | 5.266E-07             | 5.279E-07            | 1.277E-07                   | 24.18             | A     |
| BI-214           | 19.90M    | 1.08  | 6.312E-07             | 6.829E-07            | 1.450E-07                   | 21.24             | A     |
| PB-214           | 26.80M    | 1.06  | 5.855E-07             | 6.208E-07            | 2.207E-07                   | 35.56             | A     |
| AC-228           | 6.13H     | 1.00  | 8.728E-07             | 8.766E-07            | 2.176E-07                   | 24.82             | A     |
| Total Activity : |           |       | 1.383E-05             | 1.409E-05            |                             |                   |       |

Grand Total Activity : 1.383E-05 1.409E-05

Flags: "K" = Keyline not found  
"E" = Manually edited

"M" = Manually accepted  
"A" = Nuclide specific abn. limit

Unidentified Energy Lines  
Sample ID : 30279

Page : 3  
Acquisition date : 30-MAY-2014 12:43:46

None

Flags: "T" = Tentatively associated

Interference Report  
Sample ID : 30279

Page : 4  
Acquisition date : 30-MAY-2014 12:43:46

No interference correction performed

Nuclide Type: natural

| Nuclide | Energy  | Area  | %Abn   | %Eff      | Uncorrected Decay Corr |                | 1-Sigma |
|---------|---------|-------|--------|-----------|------------------------|----------------|---------|
|         |         |       |        |           | uCi/GR                 | uCi/GR         |         |
| K-40    | 1460.83 | 52    | 10.67* | 4.212E-01 | 1.095E-05              | 1.095E-05      | 13.81   |
| TL-208  | 72.80   | ----- | 2.14   | 1.070E+00 | -----                  | Line Not Found | -----   |
|         | 74.97   | ----- | 3.60   | 1.156E+00 | -----                  | Line Not Found | -----   |
|         | 84.79   | ----- | 1.27   | 1.506E+00 | -----                  | Line Not Found | -----   |
|         | 252.45  | ----- | 0.80   | 1.745E+00 | -----                  | Line Not Found | -----   |
|         | 277.28  | ----- | 6.80   | 1.645E+00 | -----                  | Line Not Found | -----   |
|         | 510.61  | ----- | 21.60  | 1.035E+00 | -----                  | Line Not Found | -----   |
|         | 583.02  | 22    | 86.00* | 9.198E-01 | 2.612E-07              | 4.293E-07      | 22.81   |
|         | 763.06  | ----- | 1.64   | 7.126E-01 | -----                  | Line Not Found | -----   |
|         | 860.30  | ----- | 12.00  | 6.341E-01 | -----                  | Line Not Found | -----   |
|         | 74.81   | ----- | 10.50  | 1.150E+00 | -----                  | Line Not Found | -----   |
| PB-212  | 77.11   | ----- | 17.70  | 1.239E+00 | -----                  | Line Not Found | -----   |
|         | 87.19   | ----- | 6.27   | 1.579E+00 | -----                  | Line Not Found | -----   |
|         | 90.13   | ----- | 1.86   | 1.662E+00 | -----                  | Line Not Found | -----   |
|         | 115.12  | ----- | 0.59   | 2.085E+00 | -----                  | Line Not Found | -----   |
|         | 238.58  | 44    | 43.60* | 1.804E+00 | 5.266E-07              | 5.279E-07      | 24.18   |
| BI-214  | 300.03  | ----- | 3.34   | 1.562E+00 | -----                  | Line Not Found | -----   |
|         | 76.86   | ----- | 0.58   | 1.229E+00 | -----                  | Line Not Found | -----   |
|         | 79.29   | ----- | 0.97   | 1.320E+00 | -----                  | Line Not Found | -----   |
|         | 609.31  | 27    | 46.10* | 8.836E-01 | 6.312E-07              | 6.829E-07      | 21.24   |
|         | 665.44  | ----- | 1.56   | 8.131E-01 | -----                  | Line Not Found | -----   |
|         | 768.35  | ----- | 4.88   | 7.078E-01 | -----                  | Line Not Found | -----   |
|         | 806.16  | ----- | 1.23   | 6.754E-01 | -----                  | Line Not Found | -----   |
|         | 934.04  | ----- | 3.16   | 5.861E-01 | -----                  | Line Not Found | -----   |
|         | 1120.27 | ----- | 15.00  | 4.982E-01 | -----                  | Line Not Found | -----   |
|         | 1155.18 | ----- | 1.69   | 4.860E-01 | -----                  | Line Not Found | -----   |
| PB-214  | 1238.11 | ----- | 5.92   | 4.615E-01 | -----                  | Line Not Found | -----   |
|         | 1280.95 | ----- | 1.47   | 4.510E-01 | -----                  | Line Not Found | -----   |
|         | 1377.66 | ----- | 4.02   | 4.323E-01 | -----                  | Line Not Found | -----   |
|         | 1385.30 | ----- | 0.78   | 4.311E-01 | -----                  | Line Not Found | -----   |
|         | 1401.48 | ----- | 1.39   | 4.287E-01 | -----                  | Line Not Found | -----   |
|         | 1407.97 | ----- | 2.48   | 4.277E-01 | -----                  | Line Not Found | -----   |
|         | 1509.22 | ----- | 2.19   | 4.165E-01 | -----                  | Line Not Found | -----   |
|         | 1583.22 | ----- | 0.72   | 4.120E-01 | -----                  | Line Not Found | -----   |
|         | 1661.26 | ----- | 1.15   | 4.103E-01 | -----                  | Line Not Found | -----   |
|         | 1729.58 | ----- | 3.05   | 4.114E-01 | -----                  | Line Not Found | -----   |
|         | 1764.49 | ----- | 15.90  | 4.128E-01 | -----                  | Line Not Found | -----   |
|         | 1847.41 | ----- | 2.12   | 4.187E-01 | -----                  | Line Not Found | -----   |
|         | 53.17   | ----- | 1.10   | 2.929E-01 | -----                  | Line Not Found | -----   |
|         | 74.81   | ----- | 6.52   | 1.150E+00 | -----                  | Line Not Found | -----   |
|         | 77.11   | ----- | 11.00  | 1.239E+00 | -----                  | Line Not Found | -----   |
|         | 87.19   | ----- | 3.88   | 1.579E+00 | -----                  | Line Not Found | -----   |
|         | 90.13   | ----- | 1.15   | 1.662E+00 | -----                  | Line Not Found | -----   |
|         | 241.92  | 16    | 7.46   | 1.791E+00 | 1.123E-06              | 1.190E-06      | 26.85   |
|         | 258.94  | ----- | 0.55   | 1.718E+00 | -----                  | Line Not Found | -----   |
|         | 295.09  | 19    | 19.20* | 1.578E+00 | 5.855E-07              | 6.208E-07      | 35.56   |
|         | 351.87  | 35    | 37.10  | 1.395E+00 | 6.397E-07              | 6.783E-07      | 22.95   |
|         | 785.83  | ----- | 1.09   | 6.925E-01 | -----                  | Line Not Found | -----   |
|         | 839.00  | ----- | 0.59   | 6.497E-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 |
|---------|---------|-------|--------|-----------|-----------------------|----------------------|-------------------|
| AC-228  | 89.96   | ----- | 3.40   | 1.657E+00 | -----                 | Line Not Found       | -----             |
|         | 93.35   | ----- | 5.60   | 1.743E+00 | -----                 | Line Not Found       | -----             |
|         | 99.55   | ----- | 1.30   | 1.876E+00 | -----                 | Line Not Found       | -----             |
|         | 105.36  | ----- | 2.00   | 1.973E+00 | -----                 | Line Not Found       | -----             |
|         | 108.99  | ----- | 0.67   | 2.021E+00 | -----                 | Line Not Found       | -----             |
|         | 129.03  | ----- | 2.90   | 2.163E+00 | -----                 | Line Not Found       | -----             |
|         | 153.89  | ----- | 0.84   | 2.160E+00 | -----                 | Line Not Found       | -----             |
|         | 209.39  | ----- | 4.10   | 1.937E+00 | -----                 | Line Not Found       | -----             |
|         | 216.24  | ----- | 0.80   | 1.905E+00 | -----                 | Line Not Found       | -----             |
|         | 270.26  | ----- | 3.80   | 1.673E+00 | -----                 | Line Not Found       | -----             |
|         | 328.07  | ----- | 3.50   | 1.468E+00 | -----                 | Line Not Found       | -----             |
|         | 338.42  | ----- | 12.40  | 1.435E+00 | -----                 | Line Not Found       | -----             |
|         | 340.94  | ----- | 0.52   | 1.428E+00 | -----                 | Line Not Found       | -----             |
|         | 409.62  | ----- | 2.20   | 1.243E+00 | -----                 | Line Not Found       | -----             |
|         | 463.10  | ----- | 4.60   | 1.125E+00 | -----                 | Line Not Found       | -----             |
|         | 562.65  | ----- | 1.01   | 9.501E-01 | -----                 | Line Not Found       | -----             |
|         | 581.52  | ----- | 3.00   | 9.221E-01 | -----                 | Line Not Found       | -----             |
|         | 726.63  | ----- | 0.87   | 7.472E-01 | -----                 | Line Not Found       | -----             |
|         | 755.28  | ----- | 1.32   | 7.197E-01 | -----                 | Line Not Found       | -----             |
|         | 772.28  | ----- | 1.09   | 7.043E-01 | -----                 | Line Not Found       | -----             |
|         | 782.12  | ----- | 0.59   | 6.956E-01 | -----                 | Line Not Found       | -----             |
|         | 794.79  | ----- | 4.60   | 6.848E-01 | -----                 | Line Not Found       | -----             |
|         | 830.59  | ----- | 0.63   | 6.561E-01 | -----                 | Line Not Found       | -----             |
|         | 835.60  | ----- | 1.71   | 6.523E-01 | -----                 | Line Not Found       | -----             |
|         | 840.44  | ----- | 0.94   | 6.486E-01 | -----                 | Line Not Found       | -----             |
|         | 904.29  | ----- | 0.89   | 6.044E-01 | -----                 | Line Not Found       | -----             |
|         | 911.16  | 16    | 29.00* | 6.001E-01 | 8.728E-07             | 8.766E-07            | 24.82             |
|         | 964.64  | ----- | 5.80   | 5.686E-01 | -----                 | Line Not Found       | -----             |
|         | 968.97  | ----- | 17.40  | 5.663E-01 | -----                 | Line Not Found       | -----             |
|         | 1246.60 | ----- | 0.57   | 4.593E-01 | -----                 | Line Not Found       | -----             |
|         | 1459.19 | ----- | 1.06   | 4.213E-01 | -----                 | Line Not Found       | -----             |
|         | 1496.00 | ----- | 1.05   | 4.176E-01 | -----                 | Line Not Found       | -----             |
|         | 1501.44 | ----- | 0.58   | 4.172E-01 | -----                 | Line Not Found       | -----             |
|         | 1580.30 | ----- | 0.71   | 4.121E-01 | -----                 | Line Not Found       | -----             |
|         | 1588.23 | ----- | 3.60   | 4.118E-01 | -----                 | Line Not Found       | -----             |
|         | 1630.47 | ----- | 1.95   | 4.106E-01 | -----                 | Line Not Found       | -----             |
|         | 1638.10 | ----- | 0.54   | 4.105E-01 | -----                 | Line Not Found       | -----             |

Flag: "\*" = Keyline

Minimum Detectable Activity Report  
Sample ID : 30279

Page : 7  
Acquisition date : 30-MAY-2014 12:43:46

| Nuclide | Bckgnd<br>Sum | Energy<br>(keV) | MDA<br>(uCi/GR) |
|---------|---------------|-----------------|-----------------|
| BE-7    | 2.            | 477.61          | 7.6781E-07      |
| MN-54   | 0.            | 834.83          | 3.9031E-08      |
| MN-56   | 1.            | 846.81          | 1.0994E-07      |
| CO-57   | 8.            | 122.06          | 8.2734E-08      |
| CO-58   | 6.            | 810.79          | 1.9876E-07      |
| CO-60   | 0.            | 1332.50         | 5.7877E-08      |
| SB-124  | 0.            | 602.73          | 2.9197E-08      |
| SB-125  | 2.            | 427.88          | 2.4783E-07      |
| CS-134  | 1.            | 604.71          | 7.0915E-08      |
| CS-137  | 3.            | 661.66          | 1.4556E-07      |