**Department of Energy**
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

JUN 1 1 2019

Ms. Susan B. Fulmer, P. G., Manager
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Acting Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Facility Decommissioning Evaluation Building 607-1F, Sewage Treatment Plant (G-FDE-F-00063, Revision 1, 05/20/2019), Integrated Sampling Model, 607-1F VZCOMML© Contaminant Fate and Transport Modeling (ERD-EN-2019-0002, 5/13/2019), and Savannah River Site's Responses to the Regulatory Comments on the Revision 0 Documents

The U. S. Department of Energy (DOE) is submitting the subject information for your review and approval. The South Carolina Department of Health and Environmental Control (SCDHEC) and U. S. Environmental Protection Agency (EPA) concurred on the use of the Integrated Sampling Model in their respective letters dated May 9, 2019 and May 10, 2019. In their letter, the SCDHEC provided comments and requested that responses to their comments be provided prior to the commencement of any decommissioning activities. The Savannah River Site is submitting the subject information to you as requested in SCDHEC's letter.

Hard copies and compact disks are enclosed according to the agreed upon distribution. Please submit your response to the subject information within thirty (30) days of receipt. The effort and time that the SCDHEC and EPA have given on the subject facility are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 952-8365.

Sincerely,

Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division

IACD-19-158

Enclosures:
1. Facility Decommissioning Evaluation Building 607-1F, Sewage Treatment Plant (G-FDE-F-00063, Revision 1, 05/20/2019), Integrated Sampling Model
2. 607-1F VZCOMML© Contaminant Fate and Transport Modeling (ERD-EN-2019-0002, 5/13/2019)
3. SRS Responses to SCDHEC Comments on the Facility Decommissioning Evaluation (FDE): Sewage Treatment Plant, Building 607-1F (G-FDE-F-00063), Revision 0, April 1, 2019 (Cover letter dated April 9, 2019); VZCOMML Contaminant Fate & Transport Modeling (ERD-EN-2019-0002, January 31, 2019) and Human Health Risk Evaluation for the 607-1F Sewage Treatment Plant (SDD-2019-00012, February 26, 2019)

cc w/o encl:
G. K. Taylor, SCDHEC - Columbia
D. Scaturo, SCDHEC - Columbia
S. French, SCDHEC - Columbia
M. Reece, SCDHEC - Columbia
G. N. O'Quinn, SCDHEC – Aiken Environmental Affairs Office
B. Cameron, SCDHEC – Aiken Environmental Affairs Office
R. H. Pope, EPA - Atlanta

cc w/encl:
K. L. Beatty, SCDHEC – Aiken Environmental Affairs Office

**SRS Responses to SCDHEC Comments on the Facility Decommissioning Evaluation (FDE): Sewage Treatment Plant, Building 607-1F (G-FDE-F-00063), Revision 0, April 1, 2019 (Cover letter dated April 9, 2019); VZCOMML Contaminant Fate & Transport Modeling (ERD-EN-2019-0002, January 31, 2019) and Human Health Risk Evaluation for the 607-1F Sewage Treatment Plant (SDD-2019-00012, February 26, 2019)**

**Comments Received May 9, 2019**



Comments

1. FDE Page 12, sentence above the last paragraph. "Integrated Simple Model" should be changed to "Integrated Sampling Model".

**Response: Agree.**

**In the FDE, the referenced sentence will be revised to read: "The above supports selection of the Integrated Sampling ~~Simple~~ Model for 607-1F."**

**Responsible Party: Ken Blankenship, (803) 952-8612, john.blankenship@srs.gov**

2. FDE Page 13, last paragraph. The FDE doesn't mention any existing building concrete slab that is intended to be left in place; therefore, it is assumed that the concrete slab mentioned here is the final reinforced concrete cap slab to cover all below grade areas. This should be made clear. Regardless of whether it is referring to the new reinforced concrete cap slab or an existing concrete slab intended to be left in place, the visual inspection should also verify that there are no cracks, or gaps, and should address this issue if discovered.

**Response: Agree with Clarification**

**The concrete slab discussed to be inspected in the FDE is the floor slab of the structure's basement, which will be filled with grout. This slab and the new reinforced concrete cap slabs will also be inspected for cracking. Cracking of the basement floor slab, unless severe, will not be repaired, since the grout fill, with its hydraulic conductivity of $10^{-6}$ to $10^{-8}$, will effectively seal the slab. After curing, any cracking identified in the cap slabs, other than surface plastic cracking, will be repaired. The last paragraph of the FDE Process History section will be revised to read: "A visual inspection of the building's basement concrete floor slab will be performed as a part of decommissioning. If any oil stains are present, the stained spots/areas will be cleaned during decommissioning with a strong surfactant (Biosolve) to remove all oil residue. This slab and the new reinforced concrete cap slabs will also be inspected for cracking. Cracking of the basement floor slab, unless severe, will not be repaired, since the grout fill, with its hydraulic conductivity of $10^{-6}$ to $10^{-8}$, will effectively seal the slab. After curing, any cracking identified in the cap slabs, other than surface plastic cracking, will be repaired."**

**Responsible Party: Ken Blankenship, (803) 952-8612, john.blankenship@srs.gov**

3. FDE page 17. Please submit Reference #13, *Project Results Report, 607-1F Sediment Rad Data* and Reference #14. *Sample and Analysis Plan 607-1F Sewage Treatment Plant.*

**Response: Agree**

**References # 13 and #14 will be submitted with responses to SCDHEC's comments. No change to the document is proposed.**

**Responsible Party: Ken Blankenship, (803) 952-8612, john.blankenship@srs.gov**

4. Human Health Risk Evaluation Page 3, Table 1. For clarification, please explain how the values in the Result column were obtained. In specific, were the values from the analyses performed on one composite sample from combined media from two sampling events (References #11 and #12)?

**Response: Clarification**

**This characterization effort was originally scheduled as onetime sampling event that included the collection of one composite sediment sample originating from five biased locations within the concrete primary sedimentation tank. Details are described in the *Sample and Analysis Plan for the 607-1F Sewage Treatment Plant.* Sample W-18052-00001 was collected on 8-8-18. The sample was analyzed for TCLP volatiles, TCLP semi-volatiles and total metals. The TCLP volatiles and semi-volatiles analysis was in error. The sample should have been analyzed for TCL organics. Therefore, a second composite sample, Sample W-18052-RS-01 was collected for TCL organics analysis on 8-28-18. Table 1 of the Human Health Risk Evaluation shows the detected analytes from Samples W-18052-00001 (total metals) and W-18052-RS-01 (TCL organics) as indicated in footnote 1. No change to the Human Health Risk Evaluation document is proposed.**

**Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov**

5. VZCOMML Contaminant Fate and Transport Modeling, Page 8. The second bullet addressing Layer 5 states that the water table is 56 ft bgs; it should be 66 ft bgs instead.

**Response: Agree**

**The 56 ft bgs was incorrectly stated; the referenced text was corrected to 66 ft bgs as shown: "Layer 5 is loamy sand soil which extends from layer 4 to the water table (~~56~~66 ft bgs)".**

**Responsible Party: William Jolin, (803) 952-6122, william.jolin@srs.gov**

6. VZCOMML Contaminant Fate and Transport Modeling, Attachments C and D. 1,2-Dichloroethane is listed as a detected compound from the 2018 basin sludge composite sampling effort in Table 1, but is not included in the SVOC tables for these attachments. Please include.

**Response: Agree**

**In VZCOMML 1,2-Dichloroethane is considered a VOC. Attachments C and D will be revised to include 1,2-Dichloroethane (the only VOC) (see attachments to comment responses). In addition, the first sentence in the paragraph below Figure 1 will be revised as shown below to avoid further confusion.**

**"The composite concentrations of the detected constituent including metals, volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), and PCBs were used as the source zone concentrations."**

**Responsible Party: William Jolin, (803) 952-6122, william.jolin@srs.gov**

7. FDE. The document does not state that this facility will be placed on FFA Appendix C.4, as is protocol for Integrated Sampling Models. Please address.

**Response: Agree**

**The FDE Conclusion section will be revised to include the following text: "Since 607-1F will be dispositioned using the Integrated Sampling Model, Appendix C.4 of the Federal Facility Agreement (FFA) will be revised to include the 607-1F Sewage Treatment Plant upon completion of the work as part of the next revision cycle of the FFA."**

**Responsible Party: Ken Blankenship, (803) 952-8612, john.blankenship@srs.gov**

**LIMS Project ID** LW-AD-PROJ-180703-2 **Status** AUTHORIZED

**Customer Name** DOMAN, ERIC MICHAEL

**Sample Number** 10843 **User Sample ID** 607-1F Sediment

| Analysis | Rep | Description | Results (one sigma % unc) | Units |
|---|---|---|---|---|
| RAD_SCREEN | 1 | ALPHA COUNT (dpm/g) | <1.02E04 ( MDA ) | DPM/g |
| RAD_SCREEN | 1 | NONVOLATILE BETA (dpm/g) | <1.46E04 ( MDA ) | DPM/g |
| RAD_SCREEN | 2 | ALPHA COUNT (dpm/g) | 1.92E02 ( 10% ) | DPM/g |
| RAD_SCREEN | 2 | NONVOLATILE BETA (dpm/g) | <1.32E02 ( Upper Limit ) | DPM/g |
| TRITIUM_COUNTING | 1 | TRITIUM (uCi/g) | <2.89E-05 ( MDA ) | µCi/g |

# SAMPLE AND ANALYSIS PLAN
# 607-1F SEWAGE TREATMENT PLANT

**ERD-EN-2018-0018**
**April 3, 2018**

Prepared By: _____ Date: 4/3/18
S.K. Cornwell, Environmental Compliance Authority

Reviewed By: _____ Date: 4-3-18
J.V. Burch, Environmental Compliance Authority

Approved By: _____ Date: 4-4-18
Thelesia Oliver, Environmental Compliance Manager

Savannah River
NUCLEAR SOLUTIONS℠
FLUOR • NEWPORT NEWS NUCLEAR • HONEYWELL

## 1.0 INTRODUCTION

The purpose of this sampling and analysis plan is to obtain essential data to characterize the sediment in the sump located outside of 607-1F for the Deactivation and Decommissioning Model (D & D). This onetime sampling event includes the collection of one composite sample originating from five biased locations within the concrete primary sedimentation tank. The analytical results will identify any potential remaining historical constituents of concern (COCs), and to put bounds on the project scope so that initial cost and schedule estimates can be made.

## 2.0 PROJECT HISTORY

Based on the Record of Decision for the 211-FB Pu-239 Release OU (081-F) (U) (WSRC-RP-2005-4090, Revision 1, April 2006), a single release of liquid containing Pu-239 was dumped into the Building 221-F (Canyon Building) sanitary sewer system at the men's restroom in December 1954, causing contamination to the sewage treatment plant (Building 607-1F). Water and sludge in the 607-1F primary sedimentation tank was removed in 1954, as a response to this release.

During a recent site visit, it was confirmed that no sediments are in the above ground sludge digestion tank. Any remaining residual sediment contamination if present, would be associated with the primary sedimentation tank since it is the primary inflow separator. The wastewater treatment at 607-1F continued to operate as a sanitary sewer treatment plant for many years after the 1954 cleanout occurred. Based on facility drawings, 607-1F was removed from service in the early 1970's. The purpose of this sampling event is to confirm that no contaminated sediments remain from the 1954 release and removal.

## 3.0 SAMPLE AND ANALYSIS PLAN

A total of five samples will be collected from the solids and homogenized to make one composite sample (Sample SD001) (see Figure 1). Of the five samples to be composited, one sample should be collected from each corner of the rectangular primary sedimentation basin and one sample from the middle. Visible evidence indicates that sediment depth is shallow, so sample collection depth is dependent on the amount of material that can be collected. All vegetation and debris should be removed from the collection container before homogenization. A mudsucker/mucksucker syringe type sampling device or equivalent may be needed for sample collection in lieu of a Coliwasa tube depending on the consistency and depth of the sediment. A full suite of analytical parameters (TAL and TCL list) is requested to confirm existing sediments are no longer contaminated.

## 4.0 LAB REQUIREMENTS/ DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements of the quality of data needed to determine the radionuclide quantities, hazardous waste characterization and physical characteristics of the sediment. Samples will require radiation screening prior to off-site shipment

for gross alpha, gross beta, gamma spec, and tritium. Non-radiological analysis will include the TCL/TAL list which includes inorganic and organic SVOCs and VOC. Laboratory detection limits should allow for the screening against EPA Regions Screening Levels (RSLs).

**Analytical Suites**

- TCL organics (SVOCs, VOCs, PCBs)
- Metals Suite: TAL inorganics
- Radiological Suite: gross alpha, gross beta. If values exceed 20 pCi/g gross alpha or 50 pCi/g non-volatile beta, then additional analysis for alpha spectroscopy and/or gamma spectroscopy may be warranted.

## 5.0 SAMPLE MANAGEMENT AND CHAIN OF CUSTODY

Safety is the first consideration in the sample collection process and the location is identified as a radiological contamination area (CA). Sampling will be performed by Sample Data Management. All Chain-of-Custody (COC) records shall be generated and maintained by the Sample Data Management Group as well as the transportation of the samples.

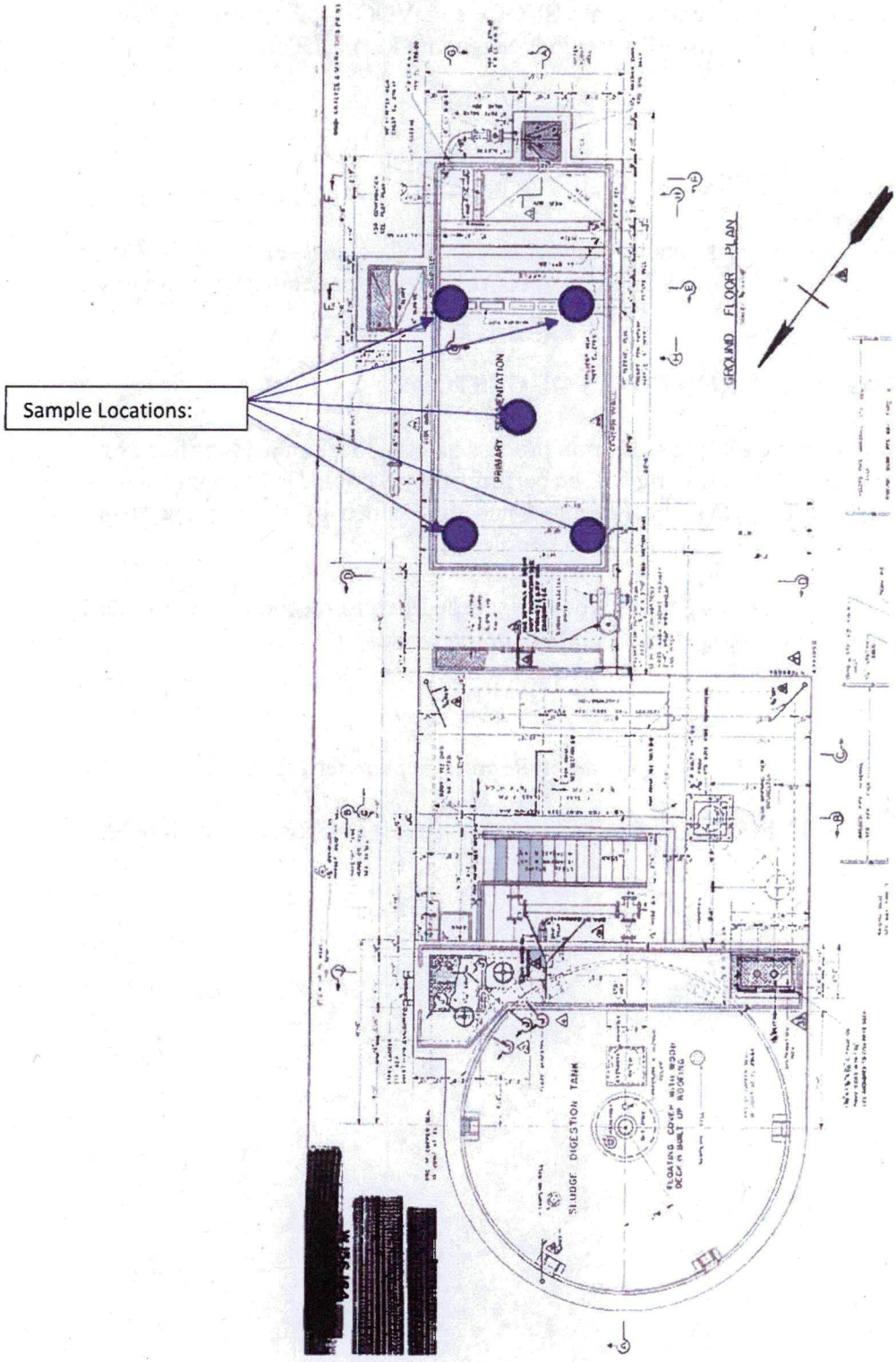
It is important to ensure laboratory holding times are not exceeded before receipt at the off-site lab; therefore, samples should be collected at the beginning of the week.

## 6.0 REFERENCES

1. SRNS-J2000-2014-00529. 607-1F Interior Evaluation Report. September 17, 2014.

2. Record of Decision for the 211-FB Pu-239 Release OU (081-F) (U) (WSRC-RP-2005-4090, Revision 1, April 2006)

Figure 1: 607-1F Primary Sedimentation Tank Sample Locations



## Attachment C: Chemical inputs and parameters for the VZCOMML© spreadsheet model.

INPUT MODULE-VOCs
Copyright 2009 Savannah River Nuclear Solutions, LLC

| Volatile Organic Analytes | Koc (VOC) L/Kg | Kd[4] (VOC) L/Kg | T1/2 (VOC) Years | H' (VOC) Dimensionless | S (VOC) mg/L | $C_t$ (VOC) mg/kg |
|---|---|---|---|---|---|---|
| 1,2-Dichloroethane | 3.80E+01 | 3.80E-03 | 5.00E-01 | 4.01E-02 | 8.52E+03 | 1.26E-01 |

INPUT MODULE-SVOCs

| Semi-Volatile Analytes | Koc (SVOC) L/Kg | Kd[21] (SVOC) L/Kg | T1/2 (SVOC) Years | H' (SVOC) Dimensionless | S (SVOC) mg/L | $C_t$ (SVOC) mg/kg |
|---|---|---|---|---|---|---|
| Benzo(a)anthracene | 3.58E+05 | 3.58E+01 | 1.86E+00 | 1.37E-04 | 9.40E-03 | 3.46E-01 |
| Benzo(a)pyrene | 9.69E+05 | 9.69E+01 | 1.45E+00 | 4.63E-05 | 1.62E-03 | 3.77E-01 |
| Benzo(b)fluoranthene | 1.23E+06 | 1.23E+02 | 1.67E+00 | 4.55E-03 | 1.50E-03 | 6.51E-01 |
| Benzo(g,h,i)perylene | 1.60E+06 | 1.60E+02 | 1.78E+00 | 5.13E-06 | 3.00E-04 | 1.92E-01 |
| Benzo(k)fluoranthene | 1.23E+06 | 1.23E+02 | 5.86E+00 | 3.40E-05 | 8.00E-04 | 2.80E-01 |
| Bis(2-ethylhexyl) phthalate | 1.11E+05 | 1.11E+01 | 6.30E-02 | 4.18E-06 | 3.40E-01 | 9.63E+00 |
| Butylbenzyl phthalate | 1.37E+04 | 1.37E+00 | 1.90E-02 | 5.17E-05 | 2.69E+00 | 9.15E-02 |
| Chrysene | 3.98E+05 | 3.98E+01 | 2.72E+00 | 3.88E-03 | 1.60E-03 | 4.88E-01 |
| Dibenz(a,h)anthracene | 1.79E+06 | 1.79E+02 | 2.58E+00 | 6.03E-07 | 2.49E-03 | 5.97E-02 |
| Di-n-butyl phthalate | 1.57E+03 | 1.57E-01 | 6.30E-02 | 3.85E-08 | 1.12E+01 | 9.82E-02 |
| Fluoranthene | 4.90E+04 | 4.90E+00 | 1.21E+00 | 6.60E-04 | 2.06E-01 | 6.95E-01 |
| Indeno(1,2,3-c,d)pyrene | 3.74E+06 | 3.74E+02 | 2.00E+00 | 6.56E-05 | 2.20E-05 | 2.40E-01 |
| Phenanthrene | 1.40E+04 | 1.40E+00 | 5.48E-01 | 1.60E-03 | 1.29E+00 | 1.98E-01 |
| Pyrene | 6.80E+04 | 6.80E+00 | 5.20E+00 | 4.51E-04 | 1.35E-01 | 5.08E-01 |

INPUT MODULE-PEST/PCBs
Copyright 2009 Savannah River Nuclear Solutions, LLC

| Pesticides/PCBs | Koc (PEST) L/Kg | Kd[41] (PEST) L/Kg | T1/2 (PEST) Years | H' (PEST) Dimensionless | S (PEST) mg/L | $C_t$ (PEST) mg/kg |
|---|---|---|---|---|---|---|
| PCB 1260 | 3.09E+05 | 3.09E+01 | 3.42E+04 | 1.03E-02 | 1.44E-02 | 3.31E-01 |

## Attachment D: VZCOMML© Tier 1 Screening

SOIL SCREENING AND SOIL SATURATION LIMIT SCREENING MODULE
Copyright 2009 Savannah River Nuclear Solutions, LLC

| ANALYTE | SOURCE ZONE CONCENTRATION Ct (mg/kg) | Tier I SOURCE-SPECIFIC SSL (mg/kg) | Tier I MASS LIMIT SSL (mg/kg) | ANALYTES >=SSL | SOIL SATURATION LIMIT (Csat)[33] (mg/L) | ANALYTES >=Csat |
|---|---|---|---|---|---|---|
| 1,2-Dichloroethane | 1.26E-01 | 1.30E-03 | 3.81E+00 | | 1.36E+03 | |

SOIL SCREENING AND SOIL SATURATION LIMIT SCREENING MODULE
Copyright 2009 Savannah River Nuclear Solutions, LLC

| ANALYTE | SOURCE ZONE CONCENTRATION Ct (mg/kg) | Tier I SOURCE-SPECIFIC SSL (mg/kg) | Tier I MASS LIMIT SSL (mg/kg) | ANALYTES >=SSL | SOIL SATURATION LIMIT (Csat)[33] (mg/L) | ANALYTES >=Csat |
|---|---|---|---|---|---|---|
| Benzo(a)anthracene | 3.46E-01 | 1.76E-03 | 2.29E-02 | Benzo(a)anthracene | 3.36E-01 | Benzo(a)anthracene |
| Benzo(a)pyrene | 3.77E-01 | 3.16E-02 | 1.52E-01 | Benzo(a)pyrene | 1.57E-01 | Benzo(a)pyrene |
| Benzo(b)fluoranthene | 6.51E-01 | 5.02E-02 | 1.91E-01 | Benzo(b)fluoranthene | 1.85E-01 | Benzo(b)fluoranthene |
| Benzo(g,h,i)perylene | 1.92E-01 | NA | NA | | 4.80E-02 | NA |
| Benzo(k)fluoranthene | 2.80E-01 | 5.02E-01 | 1.91E+00 | | 9.85E-02 | Benzo(k)fluoranthene |
| Bis(2-ethylhexyl) phthalate | 9.63E+00 | 1.10E-01 | 4.57E+00 | Bis(2-ethylhexyl) phthalate | 3.83E+00 | Bis(2-ethylhexyl) phthalate |
| Butylbenzyl phthalate | 9.15E-02 | 3.97E-02 | 1.22E+01 | | 4.09E+00 | |
| Chrysene | 4.88E-01 | 1.63E+00 | 1.91E+01 | | 6.39E-02 | Chrysene |
| Dibenz(a,h)anthracene | 5.97E-02 | 7.30E-03 | 1.91E-02 | Dibenz(a,h)anthracene | 4.46E-01 | |
| Di-n-butyl phthalate | 9.82E-02 | 4.53E-01 | 6.86E+02 | | 3.46E+00 | |
| Fluoranthene | 6.95E-01 | 6.59E+00 | 6.10E+02 | | 1.04E+00 | |
| Indeno(1,2,3-c,d)pyrene | 2.40E-01 | 1.77E-02 | 2.21E-02 | Indeno(1,2,3-c,d)pyrene | 8.23E-03 | Indeno(1,2,3-c,d)pyrene |
| Phenanthrene | 1.98E-01 | NA | NA | | 2.00E+00 | NA |
| Pyrene | 5.08E-01 | 1.36E+00 | 9.15E+01 | | 9.39E-01 | |

1/23/2019 9:54