*Memorandum*

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*Shannon Smith, PE, Program Manager, Veterans Health Administration*

*From:* *Nathan Smith, PMP, Senior Project Manager, CDM Federal Programs Corporation*
*Neil Smith, PE, Project Technical Leader, CDM Federal Programs Corporation*

*Date:* *March 9, 2022*

*Subject:* ***Modification #6 to the Phase 2 Remedial Investigation Work Plan, Final Quality Assurance Project Plan Revision 1***
*700 South 1600 East Tetrachloroethene Plume Superfund Site, Salt Lake City, Utah*

On behalf of the U.S. Army Corps of Engineers (USACE), CDM Federal Programs Corporation (CDM Smith) prepared this minor field modification (MFM) #6 to the Final Quality Assurance Project Plan Revision 1 (QAPP). The QAPP is an appendix to the Operable Unit 1 Remedial Investigation Work Plan (RIWP) (CDM Smith 2020) for the 700 South 1600 East Tetrachloroethene (PCE) Plume Superfund Site located near the George E. Wahlen Veterans Affairs Medical Center (VAMC) in Salt Lake City, Utah. This MFM #6 to the QAPP proposes the addition of Pace Analytical Services Laboratory (Pace) for analysis of vapor samples, and notes the anticipated use of batch-certified Summa canisters during vapor intrusion sampling.

## 1.0 Scope of Work

Due to limited canister availability from Eurofins Air Toxics, LLC (Eurofins), and to avoid rescheduling of previously-scheduled residences for the winter 2022 vapor intrusion sampling event, Pace has been identified as a laboratory capable of providing supplemental Summa canisters in the required timeframe, and sample analysis using the TO-15 and TO-15 SIM methods as indicated in the project QAPP. The following QAPP sections are modified:

### 2.1.10 Laboratory Project Managers

Ms. Daphne Richards of Pace will be the laboratory project manager and primary point of contact, and will oversee laboratory performance.

The attached table, **Table 2-7(a) Project Laboratory (Pace Analytical) – Target Analytes and Reporting Limits – Volatile Organic Compounds in Air,** includes the Pace reporting and

detection limits. Limits provided by Pace are not expected to impact the ability to make project decisions, or impact completion of the risk assessment. Data quality is not expected to be impacted, as the analytical methods (TO-15 and TO-15SIM) are not being changed, and the reporting and detection limits are adequate compared to project screening levels.

### 3.3.2 Packaging and Shipping

Due to the urgent timeframe for receipt of canisters, individually-certified Summa canisters were unable to be provided by Pace. Instead, batch-certified canisters will be used.

Following a rigorous cleaning process, Summa canisters are either individually certified using TO-15 SIM analysis, or batch certified using TO-15 SIM analysis. Batch certification involves testing ten percent of the containers, preferentially selecting the containers that previously had the highest concentrations of contaminants. Therefore, it is assumed that if post-cleaning analysis of the previously highest concentration containers indicates residual concentrations are below detection limits, then the remainder of the batch also would have similar results.

The primary potential issue with using a batch-certified container could be if a sample collected for the project has anomalous or unexpected detections of chemicals that are not site-related, these compounds would need to be carried through the risk assessment for evaluation. Additionally, if there are detections of site contaminants of concern or contaminants of potential concern that are close to an action level, more sampling may be needed to verify that result. Based on the cleaning and certification methods, there is a low probability of either of these issues occurring; therefore data quality is not expected to be affected.

Following sample analysis, the results from locations where batch-certified canisters were used will be carefully examined for potential residual contamination effects.

## 2.0 References

CDM Smith. 2020. *FINAL Phase 2 Remedial Investigation Work Plan, Operable Unit 1, 700 South 1600 East PCE Plume, Salt Lake City, Utah*. Prepared for U.S. Army Corps of Engineers.

### Tables

Table 2-7(a). Project Laboratory (Pace Analytical) – Target Analytes and Reporting Limits – Volatile Organic Compounds in Air

*Quality Assurance Project Plan, Remedial Investigation 700 South 1600 East PCE Plume, Salt Lake City, Utah*

| Analyte | CAS Number | Air Method | Screening Level[a] | Lowest Screening Level Value (µg/m$^3$)[a] | Laboratory RL (ug/m$^3$) | Laboratory MDL (ug/m$^3$) |
|---|---|---|---|---|---|---|
| ***Laboratory Analytical Parameters (SUMMA)*** | | | | | | |
| 1,1,1-Trichloroethane | 71-55-6 | TO-15 SIM | EPA RSL | 5,200 | 0.109 | 0.035 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | TO-15 SIM | EPA RSL | .048[b] | 0.137 | 0.060 |
| 1,1,2-Trichloroethane | 79-00-5 | TO-15 SIM | EPA RSL | 0.18 | 0.163 | 0.032 |
| 1,1,2-Trichlorotrifluoroethane | 76-13-1 | TO-15 | EPA RSL | 5,200 | 1.533 | 0.608 |
| 1,1-Dichloroethane | 75-34-3 | TO-15 SIM | EPA RSL | 1.8 | 0.080 | 0.036 |
| 1,1-Dichloroethene | 75-35-4 | TO-15 SIM | EPA RSL | 210 | 0.079 | 0.037 |
| 1,1-DIFLUOROETHANE | 75-37-6 | TO-15 | EPA RSL | 42,000 | 2.701 | 0.348 |
| 1,2,3-TRIMETHYLBENZENE | 526-73-8 | TO-15 | EPA RSL | 63 | 0.983 | 0.396 |
| 1,2,4-Trichlorobenzene | 120-82-1 | TO-15 | EPA RSL | 2.1[b] | 4.664 | 1.096 |
| 1,2,4-Trimethyl benzene | 95-63-6 | TO-15 | EPA RSL | 63 | 0.982 | 0.375 |
| 1,2-DIBROMO-3-CHLOROPROPANE | 96-12-8 | TO-15 | EPA RSL | 0.00017[b] | 1.933 | 0.645 |
| 1,2-Dibromoethane | 106-93-4 | TO-15 SIM | EPA RSL | 0.0047[b] | 0.154 | 0.060 |
| 1,2-Dichlorobenzene | 95-50-1 | TO-15 | EPA RSL | 210 | 1.202 | 0.770 |
| 1,2-Dichloroethane | 107-06-2 | TO-15 | EPA RSL | 0.11[b] | 0.810 | 0.283 |
| 1,2-Dichloropropane | 78-87-5 | TO-15 SIM | EPA RSL | 0.76 | 0.139 | 0.041 |
| 1,2-Dichlorotetrafluoroethane | 76-14-2 | TO-15 | EPA RSL | NA | 1.399 | 0.622 |
| 1,3,5-Trimethyl benzene | 108-67-8 | TO-15 | EPA RSL | 63 | 0.982 | 0.382 |
| 1,3-butadiene | 106-99-0 | TO-15 | EPA RSL | 0.094[b] | 4.425 | 0.230 |
| 1,3-Dichlorobenzene | 541-73-1 | TO-15 | EPA RSL | NA | 1.202 | 1.094 |
| 1,4-Dichlorobenzene | 106-46-7 | TO-15 SIM | EPA RSL | 0.26 | 0.120 | 0.042 |
| 1,4-Dioxane | 123-91-1 | TO-15 | EPA RSL | 0.56[c] | 0.721 | 0.300 |
| 2,2,4-Trimethylpentane | 540-84-1 | TO-15 | EPA RSL | NA | 0.934 | 0.621 |
| 2-Butanone | 78-93-3 | TO-15 | EPA RSL | 5,200 | 3.686 | 0.240 |
| 2-Chlorotoluene | 95-49-8 | TO-15 | EPA RSL | - | 1.031 | 0.427 |
| 2-propanol | 67-63-0 | TO-15 | EPA RSL | 210 | 3.073 | 0.649 |
| 4-Ethyltoluene | 622-96-8 | TO-15 | EPA RSL | NA | 0.982 | 0.384 |
| 4-Methyl-2-Pentanone | 108-10-1 | TO-15 | EPA RSL | 3,100 | 5.118 | 0.313 |
| Acetone | 67-64-1 | TO-15 | EPA RSL | - | 2.970 | 1.388 |
| ACETONITRILE | 75-05-8 | TO-15 | EPA RSL | 63 | 8.395 | 0.395 |
| ACROLEIN | 107-02-8 | TO-15 | EPA RSL | 0.021[b] | 2.293 | 0.720 |
| ACRYLONITRILE | 107-13-1 | TO-15 | EPA RSL | 0.041[b] | 10.85 | 0.490 |
| Allyl Chloride | 107-05-1 | TO-15 | EPA RSL | 0.47[b] | 0.626 | 0.357 |
| Benzene | 71-43-2 | TO-15 SIM | EPA RSL | 0.36 | 0.064 | 0.036 |
| Benzyl Chloride | 100-44-7 | TO-15 | EPA RSL | 0.057[b] | 1.039 | 0.311 |
| Bromodichloromethane | 75-27-4 | TO-15 | EPA RSL | 0.076[b] | 1.342 | 0.471 |
| BROMOETHANE | 74-96-4 | TO-15 | EPA RSL | NA | 22.28 | 0.961 |

Table 2-7(a). Project Laboratory (Pace Analytical) – Target Analytes and Reporting Limits – Volatile Organic Compounds in Air

*Quality Assurance Project Plan, Remedial Investigation 700 South 1600 East PCE Plume, Salt Lake City, Utah*

| Analyte | CAS Number | Air Method | Screening Level[a] | Lowest Screening Level Value (µg/m$^3$)[a] | Laboratory RL (ug/m$^3$) | Laboratory MDL (ug/m$^3$) |
|---|---|---|---|---|---|---|
| Bromoform | 75-25-2 | TO-15 | EPA RSL | 2.6[b] | 6.209 | 0.757 |
| Bromomethane | 74-83-9 | TO-15 | EPA RSL | 5.2 | 0.776 | 0.381 |
| BUTANE | 106-97-8 | TO-15 | EPA RSL | NA | 0.475 | 0.124 |
| Carbon Disulfide | 75-15-0 | TO-15 | EPA RSL | 730 | 0.622 | 0.317 |
| Carbon Tetrachloride | 56-23-5 | TO-15 SIM | EPA RSL | 0.47 | 0.126 | 0.063 |
| Chlorobenzene | 108-90-7 | TO-15 | EPA RSL | 52 | 0.924 | 0.385 |
| CHLORODIBROMOMETHANE | 124-48-1 | TO-15 | EPA RSL | - | 1.701 | 0.618 |
| CHLORODIFLUOROMETHANE | 75-45-6 | TO-15 | EPA RSL | 52,000 | 0.707 | 0.463 |
| Chloroethane | 75-00-3 | TO-15 SIM | EPA RSL | 4,200 | 0.106 | 0.025 |
| Chloroform | 67-66-3 | TO-15 SIM | EPA RSL | 0.12 | 0.097 | 0.035 |
| Chloromethane | 74-87-3 | TO-15 SIM | EPA RSL | 94 | 0.062 | 0.033 |
| Cis-1,2-Dichloroethene | 156-59-2 | TO-15 SIM | EPA RSL | - | 0.079 | 0.563 |
| Cis-1,3-Dichloropropene | 10061-01-5 | TO-15 SIM | EPA RSL | 0.7 | 0.091 | 0.033 |
| Cyclohexane | 110-82-7 | TO-15 | EPA RSL | 6,300 | 0.689 | 0.259 |
| Dichlorodifluoromethane | 75-71-8 | TO-15 | EPA RSL | 100 | 0.989 | 0.678 |
| DI-ISOPROPYL ETHER | 108-20-3 | TO-15 | EPA RSL | 730 | 0.836 | 0.351 |
| Ethanol | 64-17-5 | TO-15 | EPA RSL | NA | 1.188 | 0.500 |
| ETHYL ACETATE | 141-78-6 | TO-15 | EPA RSL | 73 | 0.721 | 0.360 |
| ETHYL TERT-BUTYL ETHER | 637-92-3 | TO-15 | EPA RSL | 35 | 0.836 | 0.336 |
| Ethylbenzene | 100-41-4 | TO-15 SIM | EPA RSL | 1.1 | 0.130 | 0.055 |
| Heptane | 142-82-5 | TO-15 | EPA RSL | 420 | 0.818 | 0.425 |
| Hexachloro-1,3-Butadiene | 87-68-3 | TO-15 | EPA RSL | 0.13[b] | 6.725 | 1.121 |
| Hexane | 110-54-3 | TO-15 | EPA RSL | 730 | 2.221 | 0.726 |
| Isopropylbenzene | 98-82-8 | TO-15 | EPA RSL | 420 | 0.983 | 0.382 |
| m&p-Xylene | 1330-20-7 | TO-15 | EPA RSL | 100 | 1.734 | 0.585 |
| METHYL ACETATE | 79-20-9 | TO-15 | EPA RSL | - | 0.606 | 0.263 |
| Methyl Butyl Ketone | 591-78-6 | TO-15 | EPA RSL | 31 | 5.112 | 0.544 |
| METHYL CYCLOHEXANE | 108-87-2 | TO-15 | EPA RSL | NA | 0.803 | 0.326 |
| Methyl Methacrylate | 80-62-6 | TO-15 | EPA RSL | 730 | 0.819 | 0.359 |
| Methylene chloride | 75-09-2 | TO-15 | EPA RSL | 100 | 0.694 | 0.340 |
| MTBE | 1634-04-4 | TO-15 | EPA RSL | 11 | 0.721 | 0.233 |
| Naphthalene | 91-20-3 | TO-15 | EPA RSL | 0.083[b] | 3.298 | 1.832 |
| N-BUTYLBENZENE | 104-51-8 | TO-15 | EPA RSL | - | 1.098 | 0.448 |
| N-DECANE | 124-18-5 | TO-15 | EPA RSL | NA | 1.164 | 0.456 |
| N-OCTANE | 111-65-9 | TO-15 | EPA RSL | NA | 0.934 | 0.420 |
| NONANE | 111-84-2 | TO-15 | EPA RSL | 21 | 1.049 | 0.190 |
| N-PROPYLBENZENE | 103-65-1 | TO-15 | EPA RSL | 1,000 | 0.983 | 0.380 |
| o-Xylene | 95-47-6 | TO-15 | EPA RSL | 100 | 0.867 | 0.359 |
| PENTANE | 109-66-0 | TO-15 | EPA RSL | 1,000 | 0.590 | 0.148 |
| P-ISOPROPYLTOLUENE | 99-87-6 | TO-15 | EPA RSL | NA | 1.098 | 0.375 |

Table 2-7(a). Project Laboratory (Pace Analytical) – Target Analytes and Reporting Limits – Volatile Organic Compounds in Air

*Quality Assurance Project Plan, Remedial Investigation 700 South 1600 East PCE Plume, Salt Lake City, Utah*

| Analyte | CAS Number | Air Method | Screening Level[a] | Lowest Screening Level Value (µg/m$^3$)[a] | Laboratory RL (ug/m$^3$) | Laboratory MDL (ug/m$^3$) |
|---|---|---|---|---|---|---|
| Propene | 115-07-1 | TO-15 | EPA RSL | 3,100 | 0.689 | 0.160 |
| SEC-BUTYLBENZENE | 135-98-8 | TO-15 | EPA RSL | - | 1.098 | 0.425 |
| Styrene | 100-42-5 | TO-15 | EPA RSL | 1,000 | 0.851 | 0.335 |
| TERT-AMYL ETHYL ETHER | 919-94-8 | TO-15 | EPA RSL | NA | 0.951 | 0.370 |
| TERT-AMYL METHYL ETHER | 994-05-8 | TO-15 | EPA RSL | NA | 0.836 | 0.410 |
| TERT-BUTYL ALCOHOL | 75-65-0 | TO-15 | EPA RSL | 5,200 | 0.606 | 0.176 |
| TERT-BUTYLBENZENE | 98.06-6 | TO-15 | EPA RSL | NA | 1.098 | 0.405 |
| Tetrachloroethylene | 127-18-4 | TO-15 SIM | EPA RSL | 11 | 0.136 | 0.086 |
| Tetrahydrofuran | 109-99-9 | TO-15 | EPA RSL | 2,100 | 0.590 | 0.216 |
| Toluene | 108-88-3 | TO-15 | EPA RSL | 5,200 | 0.753 | 0.328 |
| TPH (GC/MS) LOW FRACTION | 8006-61-9 | TO-15 | EPA RSL | NA | 826.2 | 163.996 |
| TPH-GRO (C5-C10) | 8006-61-10 | TO-15 | EPA RSL | NA | 826.2 | 163.996 |
| Trans-1,2-dichloroethene | 156-60-5 | TO-15 SIM | EPA RSL | 42 | 0.079 | 0.020 |
| Trans-1,3-Dichloropropene | 10061-02-6 | TO-15 SIM | EPA RSL | 0.7 | 0.136 | 0.032 |
| Trichloroethylene | 79-01-6 | TO-15 SIM | EPA RSL | 0.48 | 0.107 | 0.040 |
| Trichlorofluoromethane | 75-69-4 | TO-15 | EPA RSL | - | 1.124 | 0.460 |
| Vinyl Acetate | 108-05-4 | TO-15 SIM | EPA RSL | 210 | 0.070 | 0.039 |
| Vinyl Bromide | 593-60-2 | TO-15 | EPA RSL | 0.19[b] | 0.875 | 0.373 |
| Vinyl chloride | 75-01-4 | TO-15 SIM | EPA RSL | 0.17 | 0.051 | 0.020 |

[a] EPA RSL, Resident Air, November 2019, screening levels were based on a target excess lifetime cancer risk of $1 \times 10^{-6}$ and a hazard quotient of 1.

[b] Because of the low screening level for this analyte, the RL is greater than the screening level. However, this analyte is not a known COPC for the site.

[c] Because of the low screening level for this analyte, the RL is greater than the screening level. The inadequate RL will be discussed in the risk assessment.

Notes:

µg/m$^3$ = micrograms per cubic meter

COPC = constituent of potential concern

EPA = Environmental Protection Agency

MDL = method detection limit

RL= reporting limit

RSL = regional screening level