



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

November 2, 2015

Tracey Duncan
Federal Facility Agreement Manager
United States Department of Energy
Portsmouth/Paducah Project Site Office
5501 Hobbs Rd.
Kevil, KY 42053

RE: EPA Conditional Concurrence: **Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, KY (DOE/LX/07-1280&D2/R1, August 2015)**, Submitted August 31, 2015 (PPPO-02-3100686-15), EPA ID KY8890008982, McCracken County, KY

Dear Ms. Duncan,

The U. S. Environmental Protection Agency (EPA) Region 4 has reviewed the D2/R1 Remedial Action Work Plan (RAWP) for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant and is providing General Comments and Specific Comments to the Department of Energy (DOE) as an enclosure to this letter in support of document revision. A Memorandum of Agreement (MOA) for Resolution (PPPO-02-3079083-15) of the formal dispute regarding optimization of the Northeast Plume Interim Remedial Action was executed on July 31, 2015. The enclosed comments focus on inconsistencies between the MOA and the revised (D2/R1) RAWP text and (ii) unsolicited changes by the DOE, not related to the MOA, in the revised RAWP.

The revised RAWP is substantively incomplete. The D2/R1 RAWP includes a broad series of unsolicited changes from the D2 RAWP in which the DOE has eliminated the key components of the NE Plume optimization and the near-term and out-year timetables and deadlines, including enforceable commitments, associated with the optimization response action activities. The 2015 MOA resolving the NE Plume optimization dispute did not contemplate these changes: in particular, the 2015 MOA did not contemplate a delay in the *construction* of the optimized extractions wells and the performance monitoring well network. The 2015 MOA only requires (in Section 2) that transect monitoring wells will be monitored for four quarters to establish baseline contaminant concentrations before the two newly relocated extraction wells *begin operation*. The RAWP will require revision to include the timetable and deadlines for the work and actions that must be completed to implement the full NE Plume optimization response action and to populate the Fiscal Year 2016 draft annual update of the PGDP Site Management Plan.

The due date for DOE submission of a revised ESD that satisfies the enclosed conditions is 30 days from receipt of this conditional concurrence letter. If you have any questions about this correspondence, please do not hesitate to contact me at (404) 562-8547 or via electronic mail at corkran.julie@epa.gov.

Sincerely,



Julie L. Corkran, Ph.D.
Federal Facility Agreement Manager
Superfund Division

Enclosure

ec:

April Webb – Webb.April@ky.gov
Jon Richards, US EPA – Region 4; Richards.jon@epa.gov
David Dollins, DOE – Paducah, dave.dollins@lex.doe.gov
Jennifer Woodard, DOE – Paducah, Jennifer.Woodard@lex.doe.gov
Myrna Redfield, Fluor Federal Services – Kevil; Myrna.redfield@FFSpaducah.com
Jana White, Fluor Federal Services – Kevil; jana.white@FFSpaducah.com
Karen Walker, Fluor Federal Services – Kevil; Karen.walker@FFSpaducah.com
Stephanie Brock, CHFS – Frankfort, StephanieC.Brock@ky.gov
Nathan Garner, CHFS – Frankfort; Nathan.garner@ky.gov
Brian Begley, KDWM – Frankfort; brian.begley@ky.gov
Gaye Brewer, KDWM – Paducah, gaye.brewer@ky.gov
Mike Guffey, KDWM – Frankfort; mike.guffey@ky.gov
Leo Williamson, KDWM – Frankfort, Leo.Williamson@ky.gov

**U.S. Environmental Protection Agency (EPA) Region 4
Comments (November 2, 2015) on:**

**Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial
Action at the Paducah Gaseous Diffusion Plant, Paducah, KY, DOE/LX/07-1280&D2/R1
(August 31, 2015)**

**Paducah Gaseous Diffusion Plant, McCracken County, KY
EPA ID KY88900008982**

General Comments

1. EPA's review determined that *Remedial Action Work Plan (RAWP) for Optimization of the Northeast Plume Interim Remedial Action (D2/R1)*, the "revised" RAWP", is not fully consistent with the *Memorandum of Agreement for Resolution of the Formal Dispute* for the Explanation of Significant Differences and the RAWP for the Northeast Plume optimization effort, hereafter "the 2015 MOA", signed by the Federal Facility Agreement parties on July 31, 2015. A summary of the content of the 2015 MOA, and identification of a few of the inconsistencies between the MOA and the revised RAWP, are provided in the bullets that follow.

- a. In the 2015 MOA, the FFA Parties agreed to the following remedial action objective (RAO) to manage migration of the Technetium-99 due to operation of the optimized extraction wells. The RAWP will require revision to include this RAO.

The optimized extraction wells installed under the NE Plume Explanation of Significant Differences should not cause or contribute to the undesired migration of Technetium -99 (Tc-99) contamination from the source areas(s) (e.g., C-400 Building and Northwest (NW) Plume).

- b. The MOA requires the installation of a minimum of five (5) transect wells between the source areas and the planned location of the optimized extraction wells. However, the MOA does not specify the installation of 18 monitoring wells, nor does the MOA specify that the five (or more) transect wells are a subset of the 18 monitoring wells. (i) Text of this nature requires removal throughout the RAWP. (ii) In the next revision of the RAWP, include a presentation of the lines of evidence for, and a figure illustrating the proposed number and locations of, the transect wells. (See, for example, Section 2.3.3, North-South Monitoring Well Transect; Figure 3). The lines of evidence and the figure should be consistent with the transect well tri-party scoping discussions regarding the supplemental information and maps that have been provided by the DOE to EPA and KY since the D2/R1 RAWP was submitted for Agency review. (iii) In the RAWP, include a presentation of the lines of evidence for, and a figure illustrating, the initial number and locations of wells that should comprise the performance monitoring well network when the optimized extraction wells begin pumping. Although 18 monitoring wells were used in the 2013 modeling effort, the basis is not discussed in the RAWP. (iv) In the RAWP, state that the FFA parties may determine that additional monitoring wells may be needed based on performance monitoring of the optimized interim remedial action once the new extraction wells begin pumping. (See, for example, *Section 2.2.2, Key Design Assumptions*).

- c. In order to manage uncertainty regarding undesired mobilization of Tc-99 from the source areas, the 2015 MOA requires monitoring of the transect wells prior to, and during, operation of the optimized extraction wells. Based on the assumption that the expected baseline contaminant concentrations of Tc-99 and TCE in the transect monitoring wells prior to bringing the new EWs on-line are expected to be no higher than 200 pCi/L and 600 ug/L, respectively, the 2015 MOA presents a series of decision rules that will drive tri-party discussion and specific actions regarding operation of the of the optimized NE Plume interim action. Two (2) sets of decision rules were identified for use by the Parties prior to starting pumping of the optimized wells, and three (3) sets of decision rules were identified for use by the Parties once the new extraction wells are on-line (see Attachment 1 to this letter). Revise the RAWP to clearly present the 2015 MOA decision rules.
- d. The 2015 MOA requires that the two wells from the 1995 NE Plume IROD, EW331 and EW232, will be maintained in good working condition until the FFA parties agree that maintenance of the wells in no longer necessary. *DOE's revisions to the RAWP have addressed this requirement of the 2015 MOA.*
- e. Finally, the 2015 MOA eliminates from the revised MOA the NRC regulation specifying a facility-wide annual effluent limit of 60,000 pCi/L for discharges of Tc-99 into surface water. *DOE's revisions to the RAWP have addressed this requirement of the 2015 MOA.*

2. The revised RAWP includes an unsolicited change, not addressed by the 2015 MOA, in which the DOE identifies discharge of treated groundwater from the optimized wells to “a KPDES outfall” as an alternative to creation of up to two (2) CERCLA outfalls to Little Bayou Creek. The DOE use of an existing KPDES Outfall for discharge of treated groundwater from the CERCLA treatment units (TUs) can be included as a possible option for management of this wastewater and would be in addition to the option of discharge through a CERCLA outfall. However, the RAWP must be revised to include language in the appropriate Section(s) of the document that specifies the effluent from the TUs will be monitored before entering a ditch that conveys other wastewaters to the KPDES permitted Outfall to ensure compliance with effluent limits that are established by ARARs.

(Monitoring the effluent from the TUs at the KPDES permitted Outfall is not indicative of the concentrations of treated pollutants because of comingling with other wastewaters and likely dilution. Also, due to the fact that the TCE contaminated groundwater contains RCRA listed hazardous waste, the treated effluent must be determined upon exit from the TUs to “no longer contain” the RCRA listed waste consistent with EPA policy and the exemption under RCRA for treatment of RCRA wastewaters in a Clean Water Act NPDES permitted Waste Water Treatment Facility (WWTF) that is located on-site and utilizes a tank. Language in the draft Explanation of Significant Differences for the NE Plume optimization already addresses this point.)

The RAWP makes reference to CERCLA and KPDES Outfalls; however, as presented, the effluent discharge path, effluent compliance monitoring point, and reporting for (i) the current operation of the NE Plume interim action and (ii) the proposed optimization of the NE Plume interim response action is not clear to the reader. Revise the RAWP to clearly describe, and illustrate in a figure, the proposed path of a drop of treated wastewater effluent from the proposed

NE Plume TU(s) as it flows to Little Bayou Creek and/or Bayou Creek, showing the location of the NE Plume wastewater discharge compliance monitoring point, specific CERCLA and KPDES Outfalls, and the point of entry for all other wastewater discharges along the route. To support tri-party resolution of this comment, provide the same figure at the same level of detail for the current operation of the NE Plume interim action. In support of revising the RAWP, DOE is should consult Conditions 7 and 8 of the Southwest Plume VOC Sources Feasibility Study Dispute Resolution MOA (see Attachment 2 to this letter).

3. The revised RAWP is substantively incomplete. The revised document includes a broad series of unsolicited changes, not addressed by the 2015 MOA, in which the DOE has eliminated the key components of the NE Plume optimization response action as well as the the near-term and out-year timetables and deadlines, including enforceable commitments, associated with the optimization response action activities. The 2015 MOA resolving the NE Plume optimization dispute did not contemplate a delay in the *construction* of the optimized extractions wells. Rather, Section 2 of the MOA describes baseline contaminant conditions that may delay *operation* of the optimized extraction well system pending FFA party coordination to consider actions, if needed, to mitigate mobilization of source material from the C-400 area as illustrated below (*emphasis added*):

“The transect monitoring wells will be monitored for 4 consecutive quarters to establish baseline contaminant concentrations before the two newly relocated extraction wells begin operation.”

and

“If baseline contaminant concentrations in any of the transect monitoring wells during the initial quarterly sampling are detected at twice the anticipate contaminant concentration, the FFA parties agree to temporarily suspend start-up of the extraction wells....”

- a. Revise all relevant sections of the RAWP to reflect that the new Extraction Wells, Treatment Unit, and remaining monitoring wells will be constructed concurrent with the installation and quarterly sampling of the transect wells, such that the optimized extraction well system is ready to begin operation upon receipt by the DOE, and discussion among the FFA Parties, of the fourth quarter of transect well sampling. (See, for example, the new introductory text to Section 4, Project Schedule, and the new text added to Section 6.1, Withdrawal of Public Waters, where the new text is inconsistent with the 2015 MOA).
- b. “All relevant sections of the RAWP” in Condition (a), above, includes (but is not limited to) *Section 4, Project Schedule*. Integrate Table 2 from the D2 RAWP (DOE/LX/07 – 1280&D2 (August 2013) with Table 2 in the D2/R1 RAWP (*the Integrated Project Schedule*) to meet the expectations of Condition (a), above. See Attachment 3 to this letter.
- c. The Integrated Project Schedule described in Condition (b), above, shall include target dates and enforceable milestone dates expressed as month/day/year for fiscal years (FY) 2016, 2017, and 2018 based on the assumption that EPA and KY approval of the D2/R1 will occur by 12/30/2015. Later dates may be expressed as a projection for quarter and fiscal year (Q/FY).

- d. For planning purposes, the Integrated Project Schedule should assume that operation of the NE Plume optimization interim response action will be successful (will not result in mobilization of contaminants from source areas). Accordingly, it is EPA's expectation that the time intervals between activities (for example, *Approval of the RAWP and Construction Complete*, and between *Construction Complete* and *System Start-up and Testing Complete*, and between *Construction Complete* and *submission of the D1 Post-construction Report*) in the Integrated Project Schedule will be similar or identical to the time intervals presented in the Table 2 of the D2 RAWP.
- e. Adjustments to the Project Planning Schedule by the FFA Parties will be made based on the actual date of regulatory agency approval and the FY2016 draft and final versions of the annual update to the Paducah Gaseous Diffusion Plant Site Management Plan amended in accordance with the requirements of the FFA.
- f. For planning purposes, the Integrated Project Schedule may assume that a subset of the wells comprising the performance monitoring well network will have been installed and will be operational concurrent with the start of operation of the new extraction wells (see Condition a), and additional performance monitoring wells may be installed based on system performance monitoring results and groundwater modeling (if necessary) after the optimized extraction wells begin operation.
- g. "All relevant sections of the RAWP" in Condition (a), above, includes (but is not limited to) *Appendix A, Construction Figures*. Ensure that the RAWP includes all necessary construction figures to support implementation of the Integrated Project Schedule.

4. *Section 8, Quality Assurance and Construction Quality Control Plan; Section 10, References.* Section 8 of the RAWP has been revised to state that the Northeast Plume IRA optimization sampling, both monitoring well and EW sampling (and presumably transect well sampling), will be performed pursuant to the PGDP Environmental Monitoring Plan (blue-sheeted to CP2-ES-0055; LATA Kentucky 2015). Environmental media sampling for the NE Plume optimization project should be conducted under a site-specific QAPP for this response action that is consistent with the Uniform Federal Policy QAPP and approved by the regulatory agencies for this response, with periodic reporting under the FFA. Revise the introductory paragraph for consistency with the terms of the PGDP FFA. Similarly, remove the related citation from *Section 10, References*.

5. The DOE identifies various documents, as well as cessation of the enrichment activities at the PGDP, as the basis for optimization of the NE Plume interim action. To ensure that the list of documents is complete and correct, review the RAWP as needed for consistency with the tri-party resolution to EPA comments on the D2/R1 Explanation of Significant Differences for this action.

6. 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*, requires that Health and Safety (H&S) Plans for clean-up operations at a National Priority List site identify *specific site hazards* to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards. In Section 5, *Health and Safety*, of the D2/R1 RAWP, the DOE has replaced references to the C-400 H&S Plan with references to the Southwest Plume Remedial Action H&S Plan. Restore the references to C-400 in *Section 5* of the RAWP, or provide a defensible rationale for the substitution, including whether Tc-99 is identified as site-specific contaminant in the Southwest Plume H&S Plan.

Specific Comments

1. Section 2, Table 1. Remedial Action Approach. It is not clear whether the notation changes in this table reflect titling changes only, or also indicate a change in content that may warrant review by EPA and KY. For example, a change in the protocol by FLUOR for *Collection of Samples/Groundwater Sampling* from the protocol that has been used in the past for groundwater sampling at the PGDP would warrant review by the regulatory agencies. Please advise whether any of the change notations in Table 1 indicate a change in procedure content.

2. Section 2.1, Wellfield Optimization Modeling. The DOE has revised the text in this section to advise the reader that, although wellfield optimization modeling demonstrated that mass capture would be in excess of 90% using a well configuration that included an extraction well in the vicinity of C-400, “*No EW at C-400 is planned as part of this optimization project*”. Add additional text explaining why no EW at C-400 is planned and how the decision rules in the 2015 MOA manage the uncertainty associated with the potential source mobilization/migration from the C-400 area. Section 2.1 of Section 6.3.3. would be reasonable locations in the RAWP to present the 2015 MOA decision rules text (See General Condition 1(c)).

3. Section 2.2.2, Key Design Assumptions, 7th bullet. Unsolicited change – delete “Extraction” and restore the bullet to state “Wellfield design...”. This revision will also restore consistency with Section 2.2.4, Wellfield Design.

4. Section 2.4, Operations and Maintenance. Revise the second bullet for consistency with the 2015 MOA language or delete the bullet altogether.

5. Section 6.3.3, Interim Remedial Action Metrics and Performance Monitoring, 1st bullet. Restore the deleted language “Wellfield design process evaluated...” through “redirect trajectory of dissolved phase mass at C-400” to the first bullet of this Section. Revise the last half of the deleted text, and integrate it with the new text, to explain how the NE Plume optimization decision rules will mitigate the potential impact of a change in source material trajectory.

6. Section 6.3.3, 6th bullet. Amend the new text generally as follows for consistency with the 2015 MOA: “...C-400 building to establish baseline TCE and Tc-99 concentrations in groundwater between the source area and the optimized EWs, to assess...”.

7. Section 8.2, Site Description. The revised text in this section is no longer a sentence. Evaluate and propose a revision for clarity.

8. Section 10, References. The DOE 2015b reference will require revision to reflect the version and date of EPA and KY ESD approval/concurrence.

9. Appendix B: Air Dispersion Analysis. Based on the DOE revisions in the D2/R1 RAWP, it appears that the air dispersion analysis presented in both the D2 and the D2/R1 RAWPs was performed in May of 2013 using November 2012 Regional Screening Levels. (i) Revise Section B.1.3.1 and Table B.1 for factual accuracy regarding the actual RSL update that was used. (ii) The RSL table has undergone multiple updates since November 2012 (See <http://www2.epa.gov/risk/regional-screening-table-whats-new>). Therefore, revise the RAWP to advise the reader whether any, and which, of the RSLs used in the air dispersion modeling have been updated since November 2012. If one or more relevant RSLs have changed since November 2012, explain to the reader why DOE did not update the dispersion modeling, and describe the likely scope and magnitude of the impact of the RSL change (if applicable) to the results of the modeling effort.

10. Figure 1; elsewhere. It is not clear to this reader that the figures in the RAWP have been updated in the D2/R1 to reflect the outcomes of the *September 4, 2013, Northeast Plume Optimization: EW 235 Constructability Review* that identified an alternate location for EW 235 along the axis of the southern 100 ug/L TCE isopleth. Evaluate, and revise as necessary, all figures in the RAWP to reflect the alternate location identified for EW 235.

11. Figure 2. Between the D2 and D2/R1 versions of the RAWP, Figure 2 has been revised to eliminate important details regarding the monitoring wells and the data used to construct the plume maps. Restore to Figure 2 the details that were removed in the D2/R1.

12. Figure 3. Revise Figure 3 consistent with Condition 1 (b); use the restored Figure 2 as the base map for Figure 3, but enlarge the scale of the figure such that the reviewer can see the individual transect wells relative to one another and relative to the building footprints, plume contours, and existing monitoring wells between C-400 and the optimized EWs. The proposed numbers and locations of the transect wells reflect the supplemental information provided by the DOE after submittal of the D2/R1 RAWP and the outcome of tri-party scoping discussions regarding that supplemental information.

Attachments

1. MOA Northeast Plume IRA Optimization (2015) RAOs and Decision Rules
2. MOA Southwest Plume Sources (2010)
3. D2 RAWP and D2/R1 RAWP: Table 2 - Project Schedule

MEMORANDUM OF AGREEMENT FOR RESOLUTION

of Formal Dispute of the Explanation of Significant Differences to the Record of Decision for the Interim Remedial Action of the Northeast Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1291&D2), and Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1280&D2)

The undersigned agree that the Formal Dispute invoked by the U.S. Department of Energy (DOE) in the letter to the U.S. Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KDEP), dated February 25, 2015, is hereby resolved and the Federal Facility Agreement (FFA) parties' agreement includes the conditions detailed below. The resolution documents the Parties' agreement that

Remedial Action Objectives:

RAO 1: an optimization of the existing Northeast (NE) Plume Interim Action (namely relocation of the two extraction wells up-gradient and operation of two treatment units) is warranted to increase trichloroethylene (TCE) mass removal and

RAO 2: to enhance control of NE Plume migration at the eastern edge of the PGDP industrial facility.

The Parties have reached consensus that

RAO 3: the optimized extraction wells installed under the NE Plume Explanation of Significant Differences (ESD) should not cause or contribute to the undesired migration of Technetium-99 (Tc-99) contamination from the source area(s) (e.g., C-400 Building and Northwest (NW) Plume) and that

Uncertainty management expectations regarding mobilization of Tc-99 from the NW Plume actions (as further described below) may be undertaken to prevent any undesirable expansion of Tc-99 and TCE within the NE Plume.

Uncertainty statement related to RAO 3/unacceptable condition and location of template language

1. The NE Plume ESD and Remedial Action Work Plan (RAWP) will be revised to include language similar to that found in the 1995 IROD and Draft Final (D2) RAWP for the NE Plume stating that pumping at the optimized extraction wells may result in changes to groundwater flow direction that may impact contaminant (i.e. TCE and/or Tc-99) migration from source areas (e.g. C-400 Building).

Action to manage uncertainty – installation and quarterly sampling of transect wells prior to and after bringing optimized EWs on-line.

The NE Plume ESD and RAWP will state that the modified NE Plume interim remedial action will include installation (at a minimum) of five new RGA monitoring wells in a north-south transect approximately 600 feet east of C-400 Building (exact locations to be determined by the FFA parties as part of the finalization of the RAWP). These transect monitoring wells will be used to assess the impact of groundwater extraction wells on contaminant migration from source

Notes in red (and underlines) added by J. Corkran (EPA, R4) to this mark-up/reference copy of the NE Plume 2015 MOA.

areas, including impacts to the groundwater divide east of C-400 Building.

UNCERTAINTY MANAGEMENT BEFORE THE NEW EWS ARE ON-LINE

Uncertainty Management – Establishing baseline concentrations prior to new EW on-line

2. The transect monitoring wells will be monitored for 4 consecutive quarters to establish baseline contaminant concentrations before the two newly relocated extraction wells begin operation.

Expected Conditions and Decision Rules.

The anticipated contaminant concentrations of Tc-99 and TCE in the transect monitoring wells are expected to be no higher than 200 pCi/L and 600 ug/L, respectively.

Decision Rule 1

If baseline contaminant concentrations in any of the transect monitoring wells during the initial quarterly sampling are detected at twice the anticipated contaminant concentrations, then

(a) the FFA parties agree to temporarily suspend start-up of the extraction wells until the parties meet to evaluate the identified discrepancy, its potential impact on the NW Plume source actions and the planned NE Plume optimization project.

(b) The FFA parties will conduct an evaluation of the planned action and develop recommendations and a schedule for modifications of the optimized action to address the unanticipated contaminant concentrations.

Decision Rule 2

If In the event the FFA parties decide that significant changes to the scope of the action under the ESD are necessary to continue with the optimization, then

(a) DOE shall continue implementing the current NE Plume Interim Remedial Action (Interim ROD 1995) and

(b) shall propose modification to the Interim Remedial Action through another ESD and RAWP Addendum.

(c) The PGDP Site Management Plan will be updated to reflect establishment of any enforceable milestones under the FFA such as due dates for the aforementioned Primary documents.

UNCERTAINTY MANAGEMENT AFTER THE NEW EWS ARE ON-LINE)

Monitoring contaminant concentrations after EWs on-line – Action

3. Once the two optimized extraction wells are online, contaminant concentrations in samples from the transect wells will be collected on a quarterly basis and reported to EPA and KDEP.

Decision Rule 1

If contaminant concentrations in any transect well's quarterly samples are determined to be increasing and may double above the established baseline within a year of the quarterly samples showing an increase, then

- (a) potential changes in groundwater flow or source impacts (e.g. rising contaminant concentrations in the NE Plume, source migration, etc.) will be further examined and
- (b) the FFA parties will consider adjustments (e.g. adjusting extraction well pumping rates) for the optimized NE Plume interim action to minimize these potential impacts.

NOTE: These adjustments are considered within the scope of the optimization under the ESD.

Decision Rule 2

4. If (a) the measures taken by the FFA parties (e.g. adjusting extraction well pumping rates) do not result in decreased or stabilized concentrations at the transect monitoring wells, or if (b) such adjustments reduce the effectiveness of the optimized extraction wells or if (c) Tc-99 concentrations continue to increase and are detected at twice their baseline concentration in any one (or more) of the transect wells for two consecutive quarters,

then

- (a) DOE must notify EPA and KDEP within 30 days of receiving sampling results or one of the other aforementioned conditions occurring.
- (b) After EPA and KDEP have been notified, the FFA parties will discuss and evaluate options to address continued increase of groundwater concentrations and plume expansion.
- (c) Within 1 year from the notification, DOE shall submit an ESD and RAWP Addendum as the Primary documents to undertake modification to the existing CERCLA Interim Remedial Action pursuant to the FFA to address the contaminated groundwater plume expansion and to prevent Tc-99 at levels above the MCL from further being pulled within the NE Plume.

Decision Rule 3 (nested within DR 2 (b)) – discussing mitigation options

The FFA parties will discuss whether to temporarily suspend operation of one or both of the extraction wells while determining the modifications to the CERCLA Interim Remedial Action to prevent further plume expansion.

If FFA parties decide to implement a modification to the Interim Remedial Action to address the NE Plume contamination (including the expansion), then depending on the scope of the modifications then it is possible that the FFA parties will decide to shut-down the optimized pump and treat system in part or in its entirety.

If a determination is made to shut down the optimized pump and treat system either before a modification to the Interim Remedial Action or as part of a modification to the Interim Action,

Notes in red (and underlines) added by J. Corkran (EPA, R4) to this mark-up/reference copy of the NE Plume 2015 MOA.

then DOE shall reinstate implementation of the NE Plume Interim Remedial Action (Interim ROD 1995).

Pre-requisite: DOE shall keep the extraction wells associated with the NE Plume Interim Remedial Action in good working condition until the FFA parties agree the maintenance is no longer necessary.

ARARs

5. The Nuclear Regulatory Commission regulation [10 CFR Part 20, Appendix B, 902 KAR 100:019 Section 44(7)(a)] specifying a facility-wide annual effluent limit of 60,000 pCi/L for discharges of Tc-99 into surface water that was included in the D2 NE Plume ESD ARARs table will not be included as an ARAR in the D2 (Rev.1) NE Plume ESD.

Timetable for submittal of revised ESD and RAWP (ED MOA = 07/31/2015)

6. This dispute resolution agreement by the SEC (including the terms and conditions described above) resolves the formal dispute invoked by DOE and the EPA and Kentucky Conditions for approval of the NE Plume ESD and RAWP (Reference November 12, 2013 letter and November 13, 2013 letter respectively) are superseded by this dispute resolution agreement's terms and conditions. A D2 (Rev.1) NE Plume ESD and RAWP incorporating the terms and conditions of this SEC dispute resolution agreement will be submitted to EPA and KY for review/approval within 30 days of the date of the last FFA party signature on this agreement.

Nothing in this Memorandum of Agreement modifies the FFA Conditions (e.g. related to review and comment on Primary Documents, Extension Requests, and Dispute Resolution) except as specifically stated above. Failure to abide by the terms of this Agreement may result in one or more of the parties taking any action authorized under the FFA.

Heather McTeer Toney
Regional Administrator
U.S. Environmental Protection Agency, Region 4

Date

R. Bruce Scott
Commissioner
Kentucky Department of Environmental Protection

Date

William E. Murphie
Manager
U.S. Department of Energy, Portsmouth/Paducah Project Office

Date

**MEMORANDUM OF AGREEMENT
FOR RESOLUTION
of Informal Dispute for the Focused Feasibility Study for the Southwest Plume Volatile
Organic Compound Sources Oil Landfarm and C-720 Northeast and Southeast Sites) at
the Paducah Gaseous Diffusion Plant, Paducah, KY (DOE/LX/07-0186&D2)**

The undersigned agree that the Informal Dispute invoked by the U.S. Department of Energy (DOE) in the letter to the U.S. Environmental Protection Agency, Region 4 (EPA) and Kentucky Department for Environmental Protection (KDEP) dated April 12, 2010, is hereby resolved and includes the following Conditions:

Kentucky Radionuclide Effluent Standards

- 1) The effluent limits for radionuclides including Tc-99 listed in 902 Kentucky Administrative Regulation (KAR) 100:019 (44) Table II will be identified as 'relevant and appropriate' requirements¹ for the discharge of wastewater containing radionuclides from the Southwest Plume Volatile Organic (VOC) Sources CERCLA project into surface water of the Commonwealth of Kentucky. Accordingly, the entry provided by EPA Region 4 as part of its Conditional Concurrence on the Focused Feasibility Study (FFS) will be included on the ARARs/TBC table except as provided in Condition 3 below. These effluent limits do not apply to wastewater discharges from any non-CERCLA activities conducted by DOE at PGDP that are subject to requirements under other authorities such as the Atomic Energy Act.
- 2) For the Southwest Plume VOC Sources remedial action, the DOE will monitor for Tc-99 at the point the Southwest Plume project effluent is discharged into the internal ditch at PGDP that conveys wastewaters to the KPDES permitted outfall. The total concentration of Tc-99 in wastewater from the Southwest Plume project and any other DOE CERCLA project(s), where 902 KAR 100:019 (44) Table II was selected as an ARAR, shall not exceed the Table II effluent limits at the plant's Kentucky Pollution Discharge Elimination System (KPDES) permitted outfall(s), or at the point(s) of discharge into surface water in the event the wastewaters from a CERCLA project(s) do not pass through a permitted outfall. [See Condition 8 below] The method for calculating the annual average discharge of Tc-99 shall be detailed in either the Remedial Design Report or Remedial Action Work Plan. The radionuclide effluent limits in Table II are not under the KPDES permit for the referenced outfall(s).
- 3) The footnote to the 902 KAR:019(44) entry on the ARARs/TBC table was recommended by EPA and KDEP to provide an example of the expected concentration of Tc-99 in effluent with the application treatment and/or engineering controls through the As Low As Reasonably Achievable (ALARA) process. The footnote will be removed from the ARARs/TBC table since it does not provide any requirements that would be considered ARARs.
- 4) The entries on the Action-specific ARARs/TBC table for both the Kentucky and DOE 100 mrem radiation dose limits for protection of members of the public and the ALARA requirements will be removed from the ARARs/TBC table. Application of the ALARA process for all DOE activities at the PGDP will be outside the CERCLA process and will be under DOE's control.

¹ See 40 CFR § 300.5 Definitions.

Monitoring & Reporting

- 5) The requirement to report effluent monitoring results as specified in 40 CFR § 122.44(i)(2) will be removed from the ARARs/TBC table since it is an 'administrative' requirement for which CERCLA projects are not required to comply while conducting response actions on-site as defined in the NCP at 40 CFR § 300.5. However, the monitoring results must be reported to the FFA parties as part of the CERCLA process in order to evaluate whether specified effluent meets the limits and thereby complies with identified ARARs. Accordingly, language will be added to the Southwest Plume VOC Sources FFS that reflects the requirement for DOE to report effluent monitoring results through existing CERCLA documents/databases that are provided to EPA and KDEP. The content and frequency of the reporting will be specified in the Remedial Design, Remedial Action Work Plan or other appropriate FFA CERCLA document.
- 6) The FFS for the Southwest Plume VOC Sources includes alternatives for the remediation of VOCs, including extraction and treatment of VOCs, as well as potential discharge of the wastewaters from the CERCLA treatment unit. The numeric water quality criteria for fish consumption specified in Table I of 401 KAR 10:031 Section 6(1) have been identified as an ARAR and are included in the ARARs/TBC table. The Parties reasonably expect that the Southwest Plume project effluent will meet all ambient water quality criteria (AWQC) in the receiving stream if the concentration of TCE and the specified degradation products are at or below the Kentucky numeric water quality criteria for fish consumption specified in Table I of 401 KAR 10:031 Section 6(1). Therefore, ARAR entries related to water quality criteria, as well as the use of a mixing zone, are deemed unnecessary for this project and will be removed from the ARARs/TBC table.
- 7) For purpose of demonstrating compliance with ARARs related to effluent limits for wastewater discharges containing VOCs, DOE will sample for trichloroethylene (TCE) and its degradation products (1,1-dichloroethylene, 1,2-trans-dichloroethylene, and vinyl chloride) at the point the Southwest Plume effluent is discharged into the internal ditch at PGDP that conveys wastewaters to the KPDES permitted outfall. Although the Southwest Plume effluent is not per se subject to the KPDES permit requirements, monitoring in the receiving stream to assess compliance with AWQC and monitoring effluent at the permitted outfall would be covered by the KPDES permit. If there is an instream exceedance of AWQC under the permit, the parties assume that the cause of the exceedance is not the Southwest Plume provided the effluent meets the Kentucky numeric AWQC for fish consumption in Table I of 401 KAR 10:031 Section 6(1).
- 8) For future CERCLA projects involving a discharge of wastewater, DOE may follow an approach for monitoring effluent consistent with above Conditions 6, 7, and 8, or it could pursue other options, including two options that have been identified during dispute resolution meetings. The first option is to include the CERCLA discharge under the facility's KPDES permit, provided the wastewater meets any pre-treatment requirements that might be required under the permit. Under this option, the wastewaters are discharged into a ditch that also conveys other wastewaters generated from non-CERCLA projects, all of which are discharged thru a KPDES permitted outfall. ARARs for the discharge of wastewater would be limited and include, for example the requirements of 40 CFR 122.41(d) and (e). The discharge through the KPDES permitted outfall which includes CERCLA wastewaters would be subject to all administrative requirements of the permit. The second option is to establish a separate outfall for a discharge of wastewaters generated only from CERCLA projects. This discharge to surface water would be considered 'on-

site' and therefore be required to comply only with any substantive requirements of any identified ARARs for effluent limits and Kentucky water quality standards including instream AWQC.

Land Use Controls

- 9) Signage that provides notice and warning of environmental contamination, along with the excavation penetration permit program, will be identified in the FFS as an interim land use control (LUC) for the Southwest Plume VOC Sources remedy pending final remedy selection as part of a subsequent Operable Unit (OU) that addresses the relevant media. Such controls are necessary for any residual or remaining VOC and non-VOC contamination that is not treated by this remedial action and whose concentrations prevent unrestricted use/unlimited exposure in the Southwest Plume Source areas. Existing security/access controls at the PGDP that are established and maintained outside of the CERCLA process will not be identified as a LUC for this remedial action. However, the DOE will include language in the Southwest Plume VOC Sources FFS and ROD that acknowledges that these access controls exist at the PGDP and are effective at preventing public access and unwanted trespassers to contaminated areas of the facility.
- 10) The Southwest Plume VOC Sources ROD will specify that warning signs will be posted for the Southwest Plume VOC Source areas before beginning field activities that involve worker exposure to contaminated groundwater or soils. Details on implementation of the LUCs, including timing and approximate location for posting the warning signs shall be included in the ROD or a post-ROD document such as the Remedial Design. The signs shall: 1) include lettering that is legible from a distance of least 25 feet; 2) contain contact information for DOE and/or contractor personnel; and 3) be visible from surrounding areas and at potential routes of entry into the Southwest Plume VOC Sources area. The warning signs shall contain language similar to the following:

WARNING: CONTAMINATED AREA
Hazardous Substances in Soil and Groundwater
Authorized Access Only
Contact: [Insert phone number]

- 11) Consistent with Federal Facility Agreement for the Paducah Gaseous Diffusion Plant Section XXV.B.11, the Parties agree that the submittal date for the following documents has been affected by this dispute and shall be extended as follows:

D2 R1 Focused Feasibility Study	27-Jun-10
D2 Proposed Plan	27-Jun-10
D1 ROD	24-Oct-10
D1 Remedial Design Work Plan	02-Jan-11
D1 Remedial Design Report	28-Mar-12
D1 Remedial Action Work Plan	26-Apr-12
D1 Remedial Action Completion Report	05-Aug-15

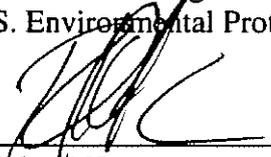
Subsequent changes to these submittal dates are subject to the Federal Facility Agreement for the Paducah Gaseous Diffusion Plant (FFA).

Nothing in this resolution shall prevent any of the Parties from disputing, under the FFA, any other matters related to aforementioned projects. The Parties also agree that the DOE's failure to perform or abide by any of the aforementioned actions or conditions may be viewed as a nullification of the Parties' agreement herein. Such failure could result in the initiation of the formal dispute process in accordance with the FFA Section XXV.B with respect to the originally disputed Southwest Plume issues.



Turpin Ballard
PGDP FFA Manager
U.S. Environmental Protection Agency, Region 4

May 20, 2010
Date



Reinhard Knerr
PGDP FFA Manager
Paducah Site Lead
DOE Portsmouth/Paducah Project Office

5/20/10
Date



Edward Winner
PGDP FFA Manager
Division of Waste Management
Kentucky Department for Environmental Protection

5-20-10
Date

SOURCE: NE Plume Opt RAWP 2013 (DOE/LX/07-1280 & D2)

Table 2. Project Planning Schedule

Activity	Date
Regulatory Concurrence of Wellfield Design Model Results	9/19/2013
Final Design Complete RAWP	11/6/2013
Submittal of Draft D1 to EPA/KY	3/28/2013
Submittal of D2 RAWP to EPA/KY	8/19/2013
Approval of D2 RAWP	9/19/2013
Explanation of Significant Difference (ESD) ²	
Submittal of D1 ESD to EPA/KY	6/21/2013
Submittal of D2 ESD	8/2/2013
Regulatory Approval of D2	9/1/2013
Issue Public Notice of Availability	9/11/2013
Construction Mobilization	12/6/2013
Drilling/Construction Start	12/16/2013
Construction Complete	10/29/2014
O&M Plan	
Submittal of the D1 O&M plan to EPA/KY	5/6/2014
Submit D2 O&M plan to EPA/KY	10/3/2014
Approval of D2 O&M plan	11/3/2014
System Start-Up and Testing Complete	12/2/2014
System Turnover to O&M Personnel	12/3/2014
Postconstruction Report	
Submittal of the D1 Postconstruction Report to EPA/KY	2/27/2015
Submittal of the D2 Postconstruction Report to EPA/KY	7/27/2015
Approval of D2 Postconstruction Report	8/25/2015

5. HEALTH AND SAFETY PLAN

The Northeast Plume IRA optimization project will incorporate by reference the H&S plan requirements from the RAWP (DOE 2008b). The C-400 RAWP H&S plan will be applicable, as written, with the following exception: replace references to the C-400 IRA with Northeast Plume IRA optimization project.

6. ENVIRONMENTAL COMPLIANCE PLAN

Environmental regulatory compliance will be facilitated during the implementation of this optimization project by adhering to ARARs. The modified interim remedy, which continues to capture and remove TCE and 1,1-DCE from within the high concentration area of the Northeast Plume, meets the threshold criteria of CERCLA Section 121 and the National Contingency Plan. The remedy continues to be protective of human health and the environment and complies with ARARs. As part of optimization of this IRA, ARARs included in the ROD pertaining to discharge through a KPDES-permitted outfall (i.e., 401 KAR 5:005 § 7, 5:029 § 2, 5:029 § 3, 5:031, 5:055, and 5:080 § 1) are being replaced with ARARs to allow the utilization of up to two CERCLA outfalls for treated water discharge, as defined by the approved ESD (DOE 2013). The identified ARARs address requirements necessary to ensure the

² An ESD will be used to document that up to two new CERCLA discharge points will be created. See Section 6.3 for additional details.

Table 2. Project Planning Schedule

Activity	Date
Signed Memorandum of Agreement for Resolution of Formal Dispute	7/31/2015
RAWP	
Submittal of Draft D2/R1 to EPA/KY	8/31/2015
Completion of EPA/KY D2/R1 Review Period	9/30/2015
Approval of D2/R1 RAWP	To be determined
ESD	
Submittal of D2/R1 ESD to EPA/KY	8/31/2015
Completion of EPA/KY D2/R1 Review Period	9/30/2015
Regulatory Approval of D2/R1	To be determined
Issue Public Notice of Availability	5 calendar days after Regulatory Approval of D2/R1 ESD
Transect Well Field Work Start	120 calendar days after regulatory approval of D2/R1 ESD and RAWP
Transect Well Field Work Complete	85 calendar days after transect field work start
Initiate Quarterly Sampling of Transect Wells	8 calendar days after transect well field work is complete

5. HEALTH AND SAFETY PLAN

The Northeast Plume IRA optimization project will incorporate by reference the H&S plan requirements from CP2-ER-0140, Health and Safety Plan for the Southwest Plume Remedial Action at PGDP for performance of this optimization effort. The CP2-ER-0140 Southwest Plume Remedial Action H&S plan will be applicable, as written, with the following exception: replace references to the Southwest Plume with Northeast Plume IRA optimization project.

6. ENVIRONMENTAL COMPLIANCE PLAN

Environmental regulatory compliance will be facilitated during the implementation of this optimization project by adhering to ARARs. The modified interim remedy, which continues to capture and remove TCE and 1,1-DCE from within the high concentration area of the Northeast Plume, meets the threshold criteria of CERCLA Section 121 and the National Contingency Plan. The remedy continues to be protective of human health and the environment and complies with ARARs. As part of optimization of this IRA, ARARs included in the ROD pertaining to discharge through a KPDES-permitted outfall are being supplemented with ARARs to allow the utilization of up to two CERCLA outfalls for treated water discharge, as defined by the approved ESD (DOE 2015b). The ARARs address requirements necessary to ensure the protection of the waters of the Commonwealth for the discharge of effluent through up to two CERCLA outfalls or a KPDES outfall, as necessary.

6.1 WITHDRAWAL OF PUBLIC WATERS

In accordance with Section XXI of the FFA, which requires that DOE identify permits that otherwise would have been required in the absence of CERCLA Section 121(e) (1) and the National Contingency