Department of Energy

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OCT 23 2013

Mr. Todd Mullins
Federal Facility Agreement Manager
Division of Waste Management
Kentucky Department for Environmental Protection
200 Fair Oaks Lane, 2nd Floor
Frankfort, Kentucky 40601

PPPO-02-2066530-13

Ms. Jennifer Tufts
Remedial Project Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Dear Mr. Mullins and Ms. Tufts:

TRANSMITTAL OF PAGE CHANGES FOR REMEDIAL ACTION WORK PLAN FOR PHASE IIa OF THE INTERIM REMEDIAL ACTION FOR THE VOLATILE ORGANIC COMPOUND CONTAMINATION AT THE C-400 CLEANING BUILDING AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY (DOE/LX/07-1271&D2/R3)

References:

1. Letter from A. Webb to R. Blumenfeld, "Certified Page Changes for the Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building (DOE/LX/07-1271&D2/R2)," dated August 30, 2013
2. Letter from J. Tufts to R. Blumenfeld, "EPA comments on Certified Page Changes for the Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1271&D2/R2)," dated September 3, 2013

Please find enclosed certified page changes to the *Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-1271&D2/R3 (RAWP). The enclosed page changes incorporate the responses detailed in the comment response summary to the comments received from the Kentucky Department for Environmental Protection received on August 30, 2013, and from the U.S. Environmental Protection Agency on September 3, 2013.

Please replace pages in the July 2012 RAWP (transmitted July 2, 2012) with the enclosed pages. A redline version of the RAWP page changes and comment response summaries also are provided to assist with your review.

If you have any questions or require additional information, please contact David Dollins at (270) 441-6819.

Sincerely,

Jennifer Woodard

Jennifer Woodard
Federal Facility Agreement Manager
Portsmouth/Paducah Project Office

Enclosures:
1. Clean Page Changes to the C-400 Phase IIa RAWP D2/R3
2. Redline Page Changes to the C-400 Phase IIa RAWP D2/R3
3. EPA Comment Response Summary
4. KDEP Comment Response Summary
5. Certification Page

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CERTIFICATION

Document Identification: ***Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-1271&D2/R3**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

LATA Environmental Services of Kentucky, LLC

Craig S. Jones, Manager of Projects — Date Signed 10/22/13

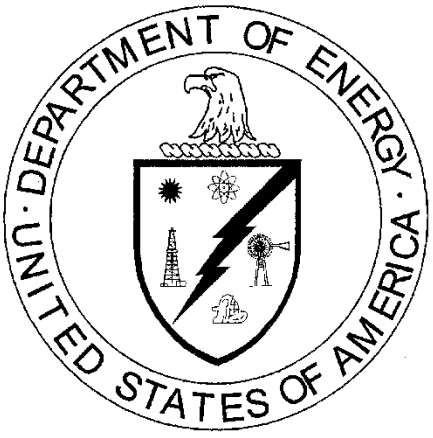
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

U.S. Department of Energy (DOE)

Rachel H. Blumenfeld, Acting Paducah Site Lead
Portsmouth/Paducah Project Office — Date Signed 10/22/13

DOE/LX/07-1271&D2/R3
Primary Document

Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky



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Primary Document

Remedial Action Work Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—October 2013

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
LATA ENVIRONMENTAL SERVICES OF KENTUCKY, LLC
managing the
Environmental Remediation Activities at the
Paducah Gaseous Diffusion Plant
under contract DE-AC30-10CC40020

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not to contain or not to be contaminated with a Resource Conservation and Recovery Act (RCRA) listed waste (based on TCE/TCA content) for the purposes of management at the site.

Table 8. Health-Based Levels for TCE and 1,1,1-TCA

Constituent	Concentration in solids (ppm)	Concentration in aqueous liquids [parts per billion (ppb)]
TCE	39.2	30
1,1,1-TCA	2080	If aqueous liquids are below health-based level for TCE, then 1,1,1-TCA is declared below contained-in levels.

Because data from previous sampling events indicate that conditions for C-746-U Landfill disposal potentially will be met, characterization for C-746-U Landfill disposal will be undertaken at the same time as the sampling for the remedial action constituents. Land disposal restrictions (LDR) generally apply to media and debris generated from this project that no longer contain or are no longer contaminated with RCRA hazardous waste. If a contained in determination is made, the LDR is satisfied.

Health-based standards of 39.2 parts per million (ppm) TCE and 2,080 ppm 1,1,1-TCA in solids will be used as the criteria for making contained-in/contaminated-with determinations for environmental media and debris designated for disposal at the C-746-U Landfill. Solid wastes disposed of at landfills other than C-746-U will be subject to a contained-in/contaminated-with determination that will be approved by the Commonwealth of Kentucky and the state in which the receiving landfill is located. KDEP has agreed to consult with DOE and the state where the off-site facility is located to reach agreement on the appropriate health-based standard for making such determinations for waste that is to be shipped to such a facility. Aqueous environmental media waste contaminated with TCE or 1,1,1-TCA that do not qualify for the exemption cited herein will use a health-based concentration of 0.030 ppm as the criterion for making contained-in determinations for media destined for on-site treatment and discharge through a KPDES-permitted outfall. This self-implementing waste characterization and RCRA status determination will be used to decide on treatment requirements, if applicable, and the appropriate waste disposal facility for the waste. Aqueous waste (including, but not limited to, well sampling, well development, well purging, and decontamination waters) that has undergone wastewater treatment and meets the KPDES discharge limits shall be considered to "no longer contain" listed hazardous waste (i.e., TCE). This treated wastewater may be directly discharged to permitted KPDES Outfalls or on-site ditches that flow to permitted KPDES Outfalls.

In lieu of providing notification to KDEP as set forth in paragraph 63 of the October 3, 2003 *Agreed Order* (KNREPC 2003) (a procedural requirement), the contained-in/contaminated-with determination and supporting data will be documented in the post-ROD file and will be made available upon request.

8.3.2 Waste Characterization

Waste characterization sampling will be performed in accordance with procedure PAD-WD-0437, *Waste Characterization and Profiling.* Based on sample analyses, existing data, or process knowledge, the waste may be classified into one of the following categories:

- RCRA-listed hazardous waste
- RCRA characteristic hazardous waste
- PCB waste
- Transuranic waste (TRU)
- Low-level waste (LLW)
- Mixed waste or
- Nonhazardous solid waste

Tables 9, 10, 11, and 12 list the analytical testing methods that will be used for analysis.

8.3.2.1 RCRA-listed hazardous waste

Based on process knowledge and existing historical sample data, the generation of RCRA-listed hazardous waste is expected on this project. The waste is listed-hazardous due to the presence of TCE in the RGA underlying the majority of the area in which the soil borings and wells are to be installed. Waste generated during soil borings (i.e., drilling cuttings, purge water, sample residuals), will be classified as RCRA-listed hazardous wastes with waste codes F001, F002, and U228 if analytical results for the associated soil samples and water samples are above the health-based levels discussed in Table 8. If the concentrations are below the levels contained in Table 8, then the waste will be deemed not to contain or not to be contaminated-with a RCRA listed waste (based on TCE/TCA content) for the purposes of on-site management. If the WAC is met, the waste will be properly disposed of in the C-746-U Landfill.

Aqueous environmental media waste contaminated with TCE or 1,1,1-TCA that does not qualify for the exemption cited herein will use a health-based concentration of 0.030 ppm as the criterion for making contained-in determinations for media destined for on-site treatment and discharge through a KPDES-permitted outfall. Aqueous waste (including, but not limited to, well sampling, well development, well purging, and decontamination waters) that has undergone wastewater treatment and meets the KPDES discharge limits shall be considered to "no longer contain" listed hazardous waste (i.e., TCE). This treated wastewater may be directly discharged to permitted KPDES Outfalls or on-site ditches that flow to permitted KPDES Outfalls.

Table 9. TCLP Parameters for Analysis of Solid Waste

Constituent	Method	TCLP Regulatory Limit (mg/L)	20 Times TCLP Regulatory Limit (mg/kg)
1,1-Dichloroethene	8240/8260	0.7	14
1,2-Dichloroethane	8240/8260	0.5	10
1,4-Dichlorobenzene	8270	7.5	150
2,4,5-TP (Silvex)	8150	1.0	20
2,4,5-Trichlorophenol	8270	400.0	8,000
2,4,6-Trichlorophenol	8270	2.0	40
2,4-D	8150	10.0	200
2,4-Dinitrotoluene	8270	0.13	2.6
Arsenic	7060/6010/6020	5.0	100
Barium	6010/6020	100.0	2,000

- 8-inch diameter
- 20-ft high
- 300 to 2,300 scfm flow rate
- 70°F exhaust gas temperature

The meteorological data from 2003 were used in the model because it will result in higher off-site concentrations than any other of the past 5 years of valid meteorological data. Because the project is adjacent to C-400 Building, building wake effects are included in the analysis.

The annual average maximum off-site concentration estimated by the air dispersion model is listed for each pollutant in Table 14.

Table 14. Estimated Off-site Concentrations for Emission Stack Design Concentrations

Chemical	Off-site limit	Annual Average Maximum Off-site Concentration		
		300 scfm	1,800 scfm	2,300 scfm
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
TCE	0.5	0.0117	0.0555	0.0677
vinyl chloride	0.11	0.00557	0.0264	0.0322
1,1-DCE	210	0.00864	0.0410	0.0500
cis-1,2-DCE	37	0.00864	0.0410	0.0500
trans-1,2-DCE	73	0.00864	0.0410	0.0500

Table 14 has been revised since the Phase I RAWP. Experience from Phase I has shown that the flow rate of the stack exhaust is based on the system vacuum blower speed. The blower speed varies as necessary to achieve the desired vacuum level at the well field. An additional effluent stream from drying and cooling the regenerated granular activated carbon also flows through the stack. This additional flow rate can vary from 300 to 1,000 scfm. The total flow rate through the stack can vary from 300 scfm during emergency operations to a maximum of 2,300 scfm during peak operations. The design flow rate is 1,800 scfm; therefore, three different off-site concentration values are shown for each chemical as compared to the discharge flow rate.

The maximum off-site concentration for each hazardous air pollutant is less than the off-site limit listed in Table 14, demonstrating compliance of the design with 401 *KAR* 63:020.

Off-gas emissions from the treatment system will be monitored by a photoacoustic analyzer. The analyzer will communicate with a control system to shut down the vapor extraction and treatment system and notify operations personnel in the event of an exceedance of discharge criteria.

11.4.4 Subsurface ERH Components

Subsurface ERH components will consist of electrodes, vapor/groundwater extraction wells, and temperature/pressure monitoring equipment. These components will be installed in boreholes created using traditional drilling techniques. The subsurface equipment will be installed to minimize the potential for the introduction of pollutants into the subsurface during construction and operations.

A portion of the groundwater extracted during operations will be reintroduced to the heated volume at the electrodes after treatment to maintain moisture levels. Section 11.4.10 provides more detail with regard to groundwater injection at the electrodes. The remainder of the treated water will be discharged and will meet KPDES-permitted Outfall 001 discharge criteria.

The multiphase extraction (MPE)-dual well borings, extraction well borings, and contingency well borings will be abandoned by extracting the casing and grouting to the surface as required for MWs by 401 *KAR* 6:310 (6).

Although removal of other subsurface system elements such as the vapor extraction wells, temperature monitoring borings, and pressure monitoring borings is not required by regulation, an attempt to abandon these components will be made by the following methods. All of these borings, except for the groundwater sampling/extraction wells listed above, will have high temperature cement grout installed to a minimum depth of 5.0 ft bgs. This is intended to minimize the potential of infiltration of surface waters along the borehole. The vacuum monitoring well borings, DigiTAM sensor well borings, and dual sensor well borings will have the sensors removed and the 2-inch fiberglass pipe perforated and then filled with grout to the surface.

Electrode borings will be abandoned as outlined in Section 11.4.10.

11.4.5 Discharge of Storm Water and Treated Groundwater

Management of aqueous wastes will include procedures to minimize the possibility of spills and releases to the environment. Berms and dikes will be constructed to minimize contact of waste with surface water run-on and run-off. Where precipitation accumulates in the diked areas that hold contaminated wastes, it will be managed as contaminated until analyses show otherwise. It will be treated, as needed, to meet the KPDES-permitted Outfall 001 discharge limits prior to discharge.

Contaminated water, including decontamination fluid, collected storm water, groundwater, and condensate from the off-gas treatment system, will be treated as need to meet discharge limits. Where these waters meet the acceptance criteria for on-site treatment facilities at the PGDP, treatment is expected to occur on-site with discharge through KPDES-permitted Outfall 001. Where these waters do not meet on-site acceptance criteria or result in exceedances of on-site treatment capacity, they will be shipped to an appropriate off-site wastewater treatment facility for treatment and subsequent discharge. Shipment to any off-site facility shall be conducted in accordance with the applicable requirements of 40 *CFR* § 300.440 *et seq.* (CERCLA Off-site Rule).

11.4.6 Hazardous Waste Management

All primary wastes (i.e., groundwater and contaminated soils) and secondary wastes (i.e., treatment residuals, and decontamination wastewaters) generated during remedial activities will be appropriately characterized as RCRA wastes (solid or hazardous); PCB waste; radioactive waste(s); and/or mixed waste(s), as appropriate, and, respectively, be managed in accordance with appropriate RCRA, Toxic Substances Control Act (TSCA), or DOE Order/Manual requirements. Wastes managed on-site must comply with the substantive requirements of the aforementioned ARARs. When wastes are transferred off-site, waste management must be conducted in compliance with all applicable laws and regulations. Shipment of CERCLA wastes to any off-site facility shall be conducted in accordance with the approval requirements of 40 *CFR* § 300.440 *et seq.* (CERCLA Off-site Rule).

For contained-in/no-longer-contaminated-with determinations for environmental media and debris, DOE will apply the contained-in/no-longer-contaminated levels of 39.2 ppm TCE in solids and 0.030 ppm TCE in aqueous wastes generated by this interim remedial action. The WMP, as part of this RAWP, is subject to regulator review and approval under the procedures outlined in the FFA. The analytical results will be compared against the contained-in, health-based levels listed above, and a determination made. LDRs apply to media and debris that no longer contain or are no longer contaminated with RCRA regulated waste.

Table 17. Summary of Action-Specific ARARs for Primary Source Area—Electrical Resistance Heating (Continued)

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	Comments
Hazardous Waste Management	40 *CFR* § 260–264 and § 268; 401 *KAR* 31–34, 36 and 37	All wastes or environmental media containing wastes must be characterized to determine whether the waste also is a hazardous waste in accordance with 40 *CFR* § 262.11 and 401 *KAR* 32:010. If it is determined that a waste is a hazardous waste or that environmental media contains a hazardous waste subject to the RCRA regulation, the substantive requirements of 40 *CFR* § 262–268 are applicable.	The substantive requirements are ARAR and will be complied with through characterization of wastes and environmental media generated as a result of implementation of the alternative. Waste management will be predicated upon the characterization and will comply with all substantive requirements associated with hazardous waste management, if identified as such. Consistent with CERCLA § 121(e)(1), no RCRA permits (e.g., treatment permits) will be required for this action. The levels of 39.2 ppm TCE in solids and 0.030 ppm TCE in water will be used for contained-in/no-longer-contaminated-with determinations. Land Disposal Restrictions apply to media and debris that no longer contain or no longer are contaminated with RCRA regulated waste.
PCB Waste Management	40 *CFR* § 761	TSCA requirements for the management of PCB wastes or items containing ≥ 50 ppm PCBs or from a source of 50 ppm or greater. Requirements include the following: Management of waste and material; Characterization of PCB-containing materials; Labeling and storage for disposal; Manifest completion for shipment off-site; Decontamination of affected equipment or items; and Disposal of PCB wastes. These requirements will be complied with in the event that PCBs are found at concentrations requiring compliance with this part.	The substantive requirements are ARAR if PCBs are found or result from items or equipment regulated under 40 *CFR* § 761. Activities necessary to comply with these ARARs shall be incorporated into the planning phase of the alternative implementation.

Table 17. Summary of Action-Specific ARARs for Primary Source Area—Electrical Resistance Heating (Continued)

Standard, Requirement, Criteria, or Limitation	Citation	Description of Requirement	Comments
National Emission Standards for Hazardous Air Pollutants	401 *KAR* 57:002	The radiological dose to the most exposed member of the public resulting from sitewide radionuclide emissions to the atmosphere must not exceed 10 mrem/year.	The substantive requirements shall be complied with through calculation of emission levels for radionuclides during design and operation of the remedial action. Consistent with CERCLA Section 121(e)(1), no air permit will be required for the emissions of radionuclides.
Environmental Radiation Protection Standards for Nuclear Power Operations	40 *CFR* § 190, Subpart B	Requires that the annual dose equivalent to the public not exceed 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and radiation from these operations.	The substantive standards are considered ARAR and are equivalent to the NRC standards.

A portion of the drill cuttings from inside the areas mapped to have free-phase DNAPL may be determined to be characteristically hazardous and will be managed on-site in accordance with substantive requirements of RCRA. Wastes determined to be hazardous will be transferred to an on-site, permitted RCRA storage facility until such time as it is transferred off-site to an approved RCRA treatment and disposal facility.

The remainder of the drill cuttings that are not from the mapped areas of free-phase DNAPL is assumed not to be characteristically hazardous. This waste will be characterized and the concentrations of listed constituents, TCE and 1,1,1-TCA, will be compared to health-based levels for a "no longer contains" determination. If the concentrations are less than health based levels, the waste will not be managed as a RCRA-listed waste. If analytical results show that this waste meets the WAC of the C-746-U Landfill, the waste will be disposed of there as nonhazardous waste.

12.2.3 Personal Protective Equipment

PPE will be worn as specified in the HASP, Chapter 7 of this work plan, by personnel performing the field tasks during the C-400 IRA. While site personnel use procedures and BMPs to minimize opportunities for contacting TCE contaminated media and equipment, it is likely that some PPE or related debris (e.g., plastic sheeting) will come into contact with TCE-contaminated materials during the remediation process. Process knowledge, visual inspections, or direct sampling will be used to characterize PPE and any related debris. Based on the results of the characterization, any PPE or the related debris determined by site personnel to be contaminated by a listed waste or exhibiting a RCRA characteristic will be managed as hazardous waste, decontaminated, or a no longer contaminated-with determination will be made pursuant to Section 8.3.1. In cases where site personnel conclude, based on the above characterization process, that the PPE or related debris has not been contaminated by a listed waste or does not exhibit a characteristic, then the materials will not be considered a RCRA hazardous waste. An estimated total 205 ft^3 of this waste is expected to be generated as nonhazardous waste.

12.2.4 Purge/Decontamination/Drilling Water

Wastewater will be generated during the installation and development of newly constructed soil borings. An estimated total of 452,000 gal of this waste is expected to be generated during approximately nine months of drilling activities.

Groundwater associated with the C-400 site is contaminated with certain VOCs that originated from the release of solvents and the disposal of spent solvents. As a result, the TCE contamination in the C-400 groundwater has been declared a RCRA listed hazardous waste (code F001, F002, U228). Additionally, 1,1,1-trichloroethane (1,1,1-TCA), also a RCRA hazardous waste constituent associated with F001 and F002, has been detected at low levels. Under the EPA "contained-in" policy, environmental media, such as groundwater, must be managed as hazardous waste if they "contain" listed hazardous waste. EPA guidance, *Management of Remediation Waste under RCRA*, recommends that "contained-in" determinations use conservative, health-based standards to develop site-specific health-based levels of hazardous constituents below which contaminated environmental media would be considered to no longer contain hazardous waste (EPA 1998). Consequently, per the EPA's contained-in policy, the groundwater is considered to contain the RCRA-listed hazardous waste. Management of such groundwater must comply with the RCRA ARARs, unless the groundwater is determined to contain TCE below the health-based levels. The site-specific health-based level for TCE in groundwater at PGDP has been established at 30 ppb, which is based on Kentucky ambient water quality criteria for protection of human health for consumption of fish [401 *KAR* 10:031 § 6(1)]. Groundwater contaminated with TCE at or below 30 ppb will be considered to no longer contain the RCRA-listed hazardous waste (F001, F002, and U228). Groundwater that meets the health-based level for TCE also shall be deemed to no longer contain

1,1,1-TCA. Degradation products (*cis*-1,2-DCE*; trans*-1,2-DCE; or vinyl chloride) associated with TCE may be present in groundwater, and any treatment process used for the TCE-contaminated groundwater also would be effective in treating/reducing the concentrations of the degradation products. Most of the contaminated groundwater extracted for treatment exceeds this site-specific health-based level; thus, it must be managed as RCRA-listed hazardous waste. The treated groundwater that is discharged into the receiving surface water body (e.g., Bayou Creek) will comply with identified Clean Water Act and Kentucky water quality standards identified as ARARs and will be below the 30 ppb TCE. Pursuant to 40 *CFR* § 261.4(a)(2) (401 *KAR* 31:010 § 4), point source discharges are excluded from regulation as a hazardous wastes. Wastewater will be accumulated and stored on-site until it can be processed through the on-site C-752-C treatment unit for removal of suspended solids, as necessary. The C-752-C treatment unit meets the definition of a wastewater treatment unit in 40 *CFR* § 260.10 and can process water at a rate of approximately 1,200 gal per day. After solids removal, the water will be collected in a manner that will minimize the possibility of spills; then it will be sampled to ensure it meets the appropriate acceptance criteria and treated at the on-site C-400 IRA water treatment facility or transported to the on-site C-612 Northwest Plume Groundwater System, the on-site C-613 Sediment Basin, or other acceptable facility for treatment and/or disposal through KPDES-permitted Outfall 001. The C-400 IRA water treatment facility and the C-612 facility both have adequate additional capacity to treat the 1,200 gal per day produced generated through C-752-C. The 452,000 gal of treated drilling, purge, and decontamination water to be discharged through Outfall 001 is a small fraction of the approximately 800,000,000 gal released annually to this outfall from current sources.

Aqueous waste (including, but not limited to, well sampling, well development, well purging, and decontamination waters) that has undergone wastewater treatment and meets the KPDES discharge limits shall be considered to "no longer contain" listed hazardous waste (i.e., TCE). This treated wastewater may be directly discharged to permitted KPDES Outfalls or on-site ditches that flow to permitted KPDES Outfalls.

The proposed target analytes for this waste are those required to meet KPDES discharge limits and include TCE, PCBs, oil and grease, total residual chlorine, total phosphorous, total metals, Tc-99, hardness, dissolved and suspended alpha, beta, total uranium, and pH.

12.2.5 Sediment and Mud from Separation of Decontamination and Purge Water

Decontamination water and mud (soil sediment/mud) will be generated during cleaning of the drilling and sampling equipment. An estimated total of 375 ft^3 is expected to be generated. The water will be collected in a sump in the decontamination facility, decanted on-site, and collected in a manner that will minimize the possibility of spills, to the extent possible, and added to the Purge/Decontamination/Drilling water waste stream described in Section 12.2.4. The mud will be containerized as it is removed from the sump, then sampled and managed similarly to drill cuttings (Section 12.2.2).

12.2.6 Treated Groundwater

An aboveground treatment system will be installed to treat groundwater extracted during operation of the ERH process. The treatment system will remove VOCs and Tc-99 from the groundwater prior to discharge to an on-site ditch, which drains to KPDES-permitted Outfall 001. The system will have a treatment capacity of approximately 80 gal per minute (gpm). During Phase I operations, the system operated at approximately 30 to 50 gpm. During Phase II, the system is expected to operate between 45 to 65 gpm. At full capacity of 80 gpm, the C-400 treatment system discharge will only increase the overall flow to Outfall 001 by approximately 5%.

The treatment system influent and discharge design parameters are shown in the Table 18.

Table 18. Liquid Treatment System Design Parameters and Discharge Criteria Relative to Outfall 001

Analyte/Design Parameter	Influent	Discharge Limit
Groundwater flow	20–80 gpm	N/A
Condensate flow	10 gpm max	N/A
TCE concentration	5–1,100 ppm	30 ppb[a]
1,1-DCE concentration	154 ppb	3.2 ppb[a]
Tc-99 activity	14-342 pCi/L (observed in groundwater sampled during the Six-Phase Treatability Study and Phase I)	900 pCi/L[b]
Temperature	203˚F (95˚C) maximum 18˚F (85˚C) average	89˚F (31˚C) daily max[c]
pH	5.5–6.5	6–9[c]
Total suspended solids	10–50 ppm	30 mg/L monthly average[c] 60 mg/L daily max[c]
Total residual chlorine	Plant potable water levels	0.011 mg/L monthly average[c] 0.019 daily max[c]

[a] Discharge limits are based on 401 *KAR* 5:031.
[b] DOE target limit.
[c] KPDES permit limit for Outfall 001 effluent discharge.

During system startup and testing treated water will be sampled prior to discharge to verify that the system is adequately treating the groundwater. During routine operations weekly samples of the system effluent will be analyzed to monitor ongoing performance of the treatment system.

Aqueous waste (including, but not limited to, well sampling, well development, well purging, and decontamination waters) that has undergone wastewater treatment and meets the KPDES discharge limits shall be considered to "no longer contain" listed hazardous waste (i.e., TCE). This treated wastewater may be directly discharged to permitted KPDES Outfalls or on-site ditches that flow to permitted KPDES Outfalls.

12.2.7 Carbon Media, Ion Exchange Resin, Zeolite Media, and Cloth Filters

During the implementation of the C-400 IRA, the aboveground treatment system will contain several types of media used in the treatment of VOC-contaminated extracted groundwater and vapors including activated carbon, ion exchange resin, zeolite, and cloth filters. In addition to VOCs, other laboratory analyses conducted on these wastes include TCLP SVOCs and metals and total radiological (RAD). If any of these analyses indicate that the waste is characteristically hazardous or a listed-hazardous waste, the waste will be managed and disposed of as such.

The carbon, ion exchange resin and zeolite are recyclable, which is the preferred disposition for these materials if health physics (HP) survey indicates that radiological contamination is less than free-release limits. If the analytical results show that the wastes are not characteristically hazardous but the HP survey indicates that radiological contamination is too high for recycling (free release), but less than the authorized limits of the C-746-U Landfill, they will be disposed of there if other disposal criteria are met. An estimated total of 8,000 ft^3 of carbon media is expected to be generated. Spent filter cloths are included with the PPE waste estimate stated in Section 12.2.3 since they are a similar waste stream. No ion exchange resin or zeolite filter media are expected to become waste streams during the Phase IIa project.

12.2.8 Infrastructure Removal Debris

Site preparation will include removal of interfering C-400 infrastructure. In the southeast treatment area, a concrete loading dock wall will be removed to allow for drilling and installation of ERH components. An estimated 540 ft^3 of concrete and debris will be generated from this project.

12.2.9 DNAPL VOC

To accomplish the mass reduction of VOCs (primarily TCE and its breakdown products) in the C-400 area, free-phase DNAPL VOCs will be recovered by the aboveground treatment system. All liquid phase VOCs will be containerized, labeled, and managed according to the substantive requirements of RCRA while on-site. The analytical results are expected to exceed the levels listed in Section 8.3.1; therefore, the liquid VOCs are expected to be treated at an off-site RCRA-permitted hazardous waste facility. Other target analytes for this waste are SVOCs, metals, and total RAD. An estimated total of approximately 2,500 gal of this waste is expected to be generated from this project.

12.2.10 Process Piping, Equipment, and Well Abandonment Waste

During the implementation of the C-400 IRA, a subsurface ERH treatment system and an aboveground treatment system will be constructed and operated. Following completion of the C-400 IRA, the process piping and equipment from these systems will be dismantled. Equipment from the aboveground portions of the treatment system will be dismantled and removed from the site. A portion of the equipment will be leased or rented equipment that will be returned to the appropriate vendor following decontamination activities. The remaining equipment and process piping is expected to be recycled or disposed of in the C-746-U Landfill, as appropriate. If scrap metal is able to be recycled under 40 *CFR* § 261.6(a)(3)(ii), the waste is exempt from regulation as a hazardous waste. Any hazardous waste that has residual solvents on it will be decontaminated per 40 *CFR* § 268.45 and disposed of as nonhazardous according to the provisions of 40 *CFR* § 268.45(c) and 40 *CFR* § 261.3(f)(1). Any process piping and equipment that cannot be successfully decontaminated will be disposed of off-site at a RCRA-permitted hazardous waste facility. An estimated total of 3,780 ft^3 of this waste is expected to be generated.

Approximately 1,500 ft^3 of waste will be generated during abandonment of ERH subsurface components, including piezometers from the Six-Phase Treatability Study. The waste generated from these activities will be stored at the C-760 CERCLA storage area during characterization. Wastes determined to be hazardous will be transferred to an on-site permitted RCRA storage facility until such time as it is transferred off-site to an approved RCRA treatment and disposal facility. See Sections 11.4.4 and 11.4.10 for details regarding abandonment of ERH subsurface components.

12.2.11 Miscellaneous Noncontaminated Clean Trash

DOE has implemented waste management activities for the segregation of all clean trash (i.e., trash that is not chemically or radiologically contaminated). Examples of clean trash are office paper, aluminum cans, packaging materials, and glass bottles not used to store potentially hazardous chemicals, aluminum foil, and food items. During implementation of this WMP, all clean trash will be segregated according to those guidelines and then collected and recycled/disposed of by the WMC once it has been approved for removal. An estimated total of 500 ft^3 of this waste is expected to be generated.

12.3 WASTE MANAGEMENT ROLES AND RESPONSIBILITIES

12.3.1 Waste Management Tracking Responsibilities

Waste generated during sampling activities at PGDP will require a comprehensive waste-tracking system capable of maintaining an up-to-date inventory of waste. The inventory database will be used to store data that will enable determination of management, storage, treatment, and disposal requirements for the waste.

12.3.2 Waste Management Coordinator

The WMC will ensure that all waste activities are conducted in accordance with PGDP facility requirements and this WMP. Responsibilities of the WMC also include coordinating activities with field personnel, overseeing daily waste management operations, and maintaining a waste management logbook that contains a complete history of generated waste and the current status of individual waste containers. Designated waste operators also may complete the waste management logbook.

The WMC will ensure that procurement and inspection of equipment, material or services critical for shipments of waste to off-site TSDFs are conducted in accordance with appropriate procedures. In addition, the WMC will ensure that wastes are packaged and managed in accordance with applicable requirements (e.g., the WAC for the landfill).

Additional responsibilities of the WMC include the following:

- Maintaining an adequate supply of labels;
- Maintaining drum inventories at sites;
- Interfacing with all necessary personnel;
- Preparing Requests for Disposal;
- Tracking generated waste;
- Ensuring that drums are properly labeled;
- Coordinating waste recycling, disposal, or transfers;
- Sampling waste containers to characterize wastes;
- Coordinating pollution prevention and waste minimization activities;
- Transferring characterization data to DOE prime contractor's data manager; and
- Ensuring that temporary project waste storage areas are properly established, maintained, and closed.

The WMC and waste operators will perform the majority of waste handling activities. These activities will involve coordination with the DOE prime contractor IRA project manager or designee who will perform periodic inspections to verify that drums are labeled in accordance with the WMP guidelines.

The WMC will be responsible for ensuring characterization sampling of the waste in accordance with the procedures outlined in this plan. When sampling is complete, the WMC will transfer the waste into the waste holding area established for this project, if necessary.

12.3.2.1 Coordination with Field Crews

The WMC will be responsible for daily coordination with all field crews involved in activities that generate waste. The WMC will perform daily rounds of each of the work sites to oversee the waste collection and will verify that procedures used by the field crews comply with the WMP guidelines. Deficiencies will be documented in the waste management logbook, and appropriate direction will be given to the field crews. Site visits will be documented in the field logbook.

12.3.3 Coordination with Treatment, Storage, and Disposal Facilities

The waste streams generated on the C-400 IRA may be managed and disposed of in a variety of ways depending on characterization and classification. Waste will be temporarily stored on-site as previously discussed. Waste that is to be shipped to an off-site TSDF must be done so in accordance with applicable DOE contractor procedures and U.S. Department of Transportation requirements.

12.3.4 Waste Management Training

The WMC and other project personnel with assigned waste management responsibilities will be trained and qualified in accordance with DOE contractor-approved Training Position Descriptions.

12.4 TRANSPORTATION OF WASTE

The areas where the C-400 IRA activities will be conducted are on DOE property. Transportation of waste on DOE property will be conducted in accordance with applicable DOE, PGDP, and DOE prime contractor policies and procedures. In the event that it becomes necessary to transport known or suspected hazardous waste over public roads, coordination will be initiated with PGDP Security, as necessary, which may result in the temporary closing of roads. Once hazardous wastes are transported from a CERCLA site, they are subject to full RCRA regulation; therefore, all transportation and TSDF requirements under RCRA must be followed. Off-site shipments must be accompanied by a manifest. Off-site disposal of hazardous wastes will occur only at a RCRA facility in a unit in full compliance with the Subtitle C requirements. Transportation of known or suspected hazardous waste on public roads will be conducted in accordance with applicable U.S. Department of Transportation regulations (*CFR* Title 49).

12.4.1 Screening of Analytical Samples

During the course of the C-400 IRA field activities, screening of samples in the field and in an on-site laboratory routinely will be performed to protect the health and safety of on-site personnel to ensure compliance with regulatory requirements.

12.4.2 Field Screening

Field screening for health and safety will be conducted during project field activities and sample collection. The field screening to be performed will incorporate the use of instrumentation to monitor for organic vapors, as well as radiation meters capable of detecting alpha and beta/gamma radioactivity. An elevated reading from field monitoring may be cause for reevaluation of current waste classification, labeling, and handling activities.

12.4.3 On-Site Laboratory Radiation Screening

A fixed-base laboratory will analyze all waste characterization samples. All samples to be shipped off-site for laboratory analysis will be screened for radiation at an on-site laboratory before shipment and will receive approval for off-site shipment.

12.5 SAMPLE RESIDUALS AND MISCELLANEOUS WASTE MANAGEMENT

The SMO-approved analytical laboratory that has been audited under DOECAP will generate sample residuals and laboratory wastes. The laboratory will manage and return waste sample residuals to the project. Nonhazardous wastes generated during analyses will be disposed of by the laboratory.

12.6 WASTE MINIMIZATION

Waste minimization requirements that will be implemented, as appropriate, include those established by the 1984 Hazardous and Solid Waste Amendments of RCRA; DOE Orders 5400.1, 5400.3, 435.1; and DOE contractor's requirements. Requirements specified in the DOE contractor's WMP regarding waste generation, waste tracking, waste reduction techniques, and the waste reduction program, in general, also will be implemented.

To support DOE's commitment to waste reduction, an effort will be made during field activities to minimize waste generation as much as possible, largely through ensuring that potentially contaminated wastes are localized and do not come into contact with any clean media (which could create more contaminated waste). Waste minimization also will be accomplished through waste segregation, immediate containerization of waste, selection of PPE, and waste handling (spill control). Efforts will be made to avoid stockpiling soil waste, use coveralls only when necessary, attempt to reuse coveralls, and segregate visibly soiled coveralls from clean coveralls.

12.7 HEALTH AND SAFETY ISSUES RELATED TO WASTE ACTIVITIES

Waste management activities will be conducted in accordance with health and safety procedures documented in the HASP included as Section 7 of this work plan.

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