



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Remediation - Oak Ridge
761 Emory Valley Road
Oak Ridge, Tennessee 37830

November 9, 2017

Mr. John Michael Japp
DOE FFA Project Manager
P.O. Box 2001
Oak Ridge, TN 37831-8540

Dear Mr. Japp:

Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee DOE/OR/01-2739&D1, October 2017

The Tennessee Department of Environment and Conservation (TDEC), - Division of Remediation, received the draft (D1) Phase 1 Field Sampling Plan (FSP) on October 5, 2017. The FSP presents the U.S. Department of Energy (DOE) plan for characterizing Site 7c, also known as the Central Bear Creek Valley site, for the proposed Environmental Management Disposal Facility (EMDF). EMDF is proposed for disposal of low level radioactive waste pursuant to DOE Orders and Tennessee radiological health regulations, solid waste pursuant to Tennessee solid waste regulations, hazardous waste pursuant to the Resource Conservation and Recovery Act and Tennessee hazardous waste regulations, and toxic waste pursuant to the Toxic Substances Control Act.

Since the Environmental Protection Agency (EPA) and the TDEC found the remedial investigation and feasibility study (RI/FS) for the EMDF insufficient to demonstrate CERCLA threshold criteria would be met, the RI/FS was placed in dispute pursuant to the Federal Facility Agreement (FFA). Threshold criteria, including overall protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs), are required for a remedial action to be selected under CERCLA. One lesson learned from DOE's Environmental Management Waste Management Facility is that site-specific characterization is needed to understand subsurface hydrogeologic conditions. Site-specific characterization is also necessary to determine whether certain ARARs would be met at the proposed EMDF and, if not, whether there is site-specific justification to waive those ARARs.

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We understand that under DOE's process, site-specific characterization is not needed until remedial design, however, the D1 FSP includes data quality objectives related to the design. Under environmental statutes, site suitability for mixed radioactive waste disposal should be determined before remedial design, and approval of this FSP does not imply approval of the design or design-related items. Further, under CERCLA, determinations as to whether ARARs are met or may be waived are documented in the Record of Decision (ROD), which is before remedial design.

On July 27, 2017, DOE requested that EPA and TDEC provide a statement of work (SOW) for the minimum site characterization that the agencies would accept. Subsequent to that meeting, EPA and TDEC developed that SOW, and it was submitted to DOE by email on August 8, 2017. The transmittal email and SOW are attached for reference (Attachment A).

The D1 FSP DOE submitted October 5, 2017 was approved for public release on August 15, 2017. The transmittal letter identifies modifications to the FSP pursuant to the August 8, 2017 EPA/TDEC SOW and recommends changes in the FSP necessary to comply with the SOW. TDEC accepts changes to the FSP identified in the transmittal letter and understands that DOE will incorporate these changes in the D2 FSP to be attached to the Proposed Plan.

Prior to collecting data to support landfill design, TDEC advocates performing the minimum characterization to verify Site 7c achieves ARARs and that there is site-specific justification for any necessary ARAR waivers. **TDEC therefore approves implementing the work outlined in the SOW according to the processes and procedures identified in the FSP, as modified by the changes in the FSP transmittal letter,** as well as other activities identified in the FSP that DOE believes are necessary to verify compliance with CERCLA or to justify ARAR waivers. Two items in the SOW that are not identified in the transmittal letter or FSP include 1) the need for monitoring during the January-April 2018 wet season and 2) estimating the horizontal buffer zone boundary, which shall not overlie the karstic Maynardville Limestone or its contact with the Nolichucky shale. TDEC fully expects DOE to complete these items as described.

TDEC recognizes that it may be cost effective to collect some geotechnical data while implementing the SOW and agrees DOE may perform those activities in conjunction with the Phase 1 field effort. If Site 7c is selected in the ROD, DOE may need additional investigation or geotechnical data for remedial design.

DOE's October 4, 2017 transmittal letter states that as "agreed to during formal dispute resolution meetings, the D2 version of this document will be attached as an appendix to the D2 version of the Proposed Plan for...". It is also our understanding from the formal dispute resolution meetings that there will be an opportunity for public review and comment on the site-specific characterization data collected pursuant to the FSP prior to the ROD. The D2 FSP should include data collection from the SOW (or attach the SOW) and indicate which parts of the D2 FSP specific to site characterization will be completed prior to public comment.

Mr. John Michael Japp

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Questions or comments regarding the contents of this letter should be directed to Andy Binford, Division of Remediation, W R Snodgrass Tennessee Tower, 14th Floor, 312 Rosa L. Parks Avenue, Nashville, Tennessee 37243 or by phone at (615) 532-0911.

Sincerely

A handwritten signature in black ink, appearing to read "J. Randy Young" followed by a stylized flourish and the word "for".

Randy Young
FFA Manager

Enclosure: Attachment A

xc John M. Japp, Dave Adler, Patricia Halsey, DOE
 Carl Froede, Connie Jones, Rich Campbell, EPA
 Pete Osborne, SSAB
 Amy Fitzgerald, Ron Woody, Traci Cofer, ORRCA
 Shari Meghreblian, TDEC



From: Campbell, Richard

Sent: Tuesday, August 8, 2017 10:31 AM

To: Blevins, John <John.blevins@orem.doe.gov>; Henry, Brian <Brian.Henry@orem.doe.gov>

Cc: Froede, Carl <Froede.Carl@epa.gov>; Chris P. Thompson (Chris.P.Thompson@tn.gov)
(Chris.P.Thompson@tn.gov) <Chris.P.Thompson@tn.gov>; Andy Binford <Andy.Binford@tn.gov>

Subject: Statement of Work for Site 7c Characterization

John/Brian – attached is a draft Statement of work that was jointly developed by EPA and TDEC. Please look it over and provide any feedback you have. We are open to participating in a conference call to discuss.

Richard Campbell, PE

Chief, Restoration & DOE Coordination Section

US EPA Region 4

Office: (404) 562-8825

Cell: (404) 769-2611

**Environmental Protection Agency
Tennessee Department of Environment and Conservation**

STATEMENT OF WORK

**To Expedite Groundwater Characterization
Central Bear Creek Valley Site 7c**

August 8, 2017

BACKGROUND

The lack of site-specific characterization for the Department of Energy (DOE) proposed Environmental Management Disposal Facility (EMDF), particularly for the Central Bear Creek Valley (CBCV) Site (Site 7c), is one of the primary reasons that the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) cannot approve DOE's draft Remedial Investigation/Feasibility Study (RI/FS) report. Site-specific geologic/hydrologic data are needed to determine the long-term protection of human health and the environment from future release.

As part of the formal dispute resolution process, the Senior Executive Committee (SEC) met on July 27, 2017, and tasked EPA and TDEC personnel with developing this statement of work (SOW) to describe the minimum site-specific geologic and hydrologic characterization data that DOE must collect to evaluate the suitability of CBCV Site 7c with respect to siting criteria applicable or relevant and appropriate requirements (ARARs). As required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOE's RI/FS must demonstrate that the proposed EMDF will meet the threshold criteria of protecting human health and the environment and complying with—or justifying site-specific waivers of—federal and state ARARs. Specifically, DOE must demonstrate compliance with or justify waivers for the following ARARs, which are identified in the July 24, 2017, letter from EPA and TDEC.

- TDEC 0400-20-11-17(1)(h) provides that the hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site.
- Toxic Substances Control Act (TSCA) 40 CFR 761.75(b)(5) provides that the landfill shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping.
- TSCA 40 CFR 761.75(b)(3) provides that the bottom of the landfill liner system or natural in-place soil barrier shall be at least 50 feet above the historical high water table, and there shall be no hydraulic connection between the site and standing or flowing surface water¹.

The work described herein balances the data collection needed to evaluate ARAR compliance and/or waiver requests with DOE's desire to expedite approval of a tri-party CERCLA RI/FS and Proposed Plan. Additionally, this document provides an outline for data collection, analysis, reporting, and scheduling that should allow DOE to expedite characterization of CBCV Site 7c; provide modeling input values; and produce a CERCLA Proposed Plan for public review and comment in Fiscal Year (FY) 2018. This investigation's purpose is to determine whether several ARARs are met and to provide site-specific data to develop and evaluate an ARAR waiver(s). DOE will need to collect additional data to complete the design of a protective mixed-waste landfill in Bear Creek Valley.

DATA NEEDS

Modeling to assess the protectiveness of the proposed mixed-waste landfill must be supported by site-specific information. Consideration of the necessary field work specified in this SOW is based on DOE's draft Field Sampling Plan map dated July 20, 2017, that was distributed at the project team meeting on July 26, 2017. This map shows the proposed outside berm perimeter at CBCV Site 7c and is

¹ This siting requirement must also be consistent with EPA/540/G-90/007 (Guidance on Remedial Actions for Superfund Sites with PCB Contamination, August 1990) and any waiver justification.

based on data quality objectives that DOE scoped collaboratively with EPA and TDEC. TDEC annotated the attached copy of the map to illustrate the groundwater SOW described herein.

Collaborative scoping efforts defined a process for using field measurements to determine the water table depths/elevations and to support evaluation of potential changes in the water table configuration following placement of the landfill liner. Field measurements must also provide for determination of whether DOE would propose the use of an underdrain or other drainage feature to lower the water table. Scoping discussions focused on installation of pairs of piezometers to understand groundwater levels and vertical hydraulic gradients between shallow and deep intervals. Specifically, at the scoping meeting DOE proposed that the shallow interval is not expected to dry up after placement of the liner at locations where an upward hydraulic gradient exists or there is no dry zone between the screened intervals of the shallow and deep intervals.

In order to obtain data on water level fluctuations through one wet season and to use that data to estimate historical high water table fluctuations pursuant to 40 CFR 761.75(b)(3), DOE must 1) perform continuous water-level monitoring at CBCV Site 7c piezometers, 2) identify appropriate monitoring wells/piezometers from similar locations in Bear Creek Valley that DOE will use to correlate with the CBCV Site 7c to establish historic high water levels, 3) demonstrate these wells are comparable to CBCV Site 7c piezometers, and 4) estimate historical high water table fluctuations. DOE shall document precipitation recorded at stations monitored by operations personnel at the Environmental Management Waste Management Facility (EMWMF).

In an effort to understand groundwater levels and vertical gradients across CBCV Site 7c, DOE must install at least a subset of the previously scoped piezometer pairs (identified in Attachment figure) to develop a profile across the site. Data will be collected during drilling and after piezometer installation to understand hydraulic properties (e.g., hydraulic conductivity) relative to the lithology and water bearing/transmission zones within the soil and rock underlying the site. Data must be sufficient to demonstrate how groundwater moves through the site and discharges to the ground surface and surface water, including geotechnical characteristics of natural materials at the site (e.g., horizontal and vertical hydraulic conductivity values).

DOE shall perform the following characterization during drilling the boreholes for piezometer installation to better understand properties at the site and to support modeling. This type of data is also needed for remedial design. It is DOE's option as to whether DOE collects remedial design data with these borings or installs additional future borings to collect data for remedial design. DOE shall detail this Phase 1 investigation in the Field Sampling Plan and shall clearly state whether DOE elects to collect this information as part of this investigation or in the future during a remedial design investigation. During drilling of the borings for piezometer installation, DOE shall collect standard penetration test (SPT) data and use split spoons and Shelby tubes (or equivalent equipment) to log and sample soils and saprolite continuously throughout the deepest boring at each paired piezometer location. A geologist, soil scientist or engineer must describe the material with sufficient detail to identify lithology, chert lenses, fractures, relic bedding, moisture and other features that may bear or transmit water. Appropriate intervals for geotechnical samples shall be based on observed characteristics. If bedrock is drilled, the bedrock shall also be cored with detailed observations to identify, quantify, and describe areas of fracturing, bedding, dissolution and other features that may transmit water.

Piezometers shall be screened at depths that contain groundwater, based on information and observations made during drilling. Following piezometer installation, the horizontal position and ground

surface at each location shall be surveyed within 0.1 foot, and the top-of-casing elevation shall be surveyed within 0.01 foot. DOE shall instrument each piezometer to record hydraulic head (water level), temperature, conductivity, and pH at intervals of at least every 30 minutes.

At a minimum DOE must collect the data described above from seven (7) of the approximately 24 locations planned as illustrated on the attached July 20th map. These locations are listed below from the uphill end of the proposed site to the downhill end.

Piezometers	Rationale	Comment
GW-978/ GW-979	Upgradient edge of site in saddle that partially separates the site from Pine Ridge	Edge of proposed perimeter berm
GW-982/ GW-983	Atop a knob (hill) that may have high groundwater levels, per the D5 RI/FS report	D5 Figure 7-1 indicates the pre-construction water table may intersect the facility
GW-986/ GW-987	Within a valley that partially bisects the knob within the heart of the site	
GW-988/ GW-989	Atop the knob that may have high groundwater levels, as suggested in the D5 RI/FS report	Setting is similar to GW-982/GW-983, but this location is further away from Pine Ridge
GW-994/ GW-995	At downhill end of the knob within the heart of the site	
GW-998/ GW-999	Near the downhill end of the site	Map suggests this location lies within the Nolichucky Shale less than 100 feet from its contact with the karstic Maynardville Limestone
GW-992/ GW-993	Along stream D-10W where field observations suggest potential groundwater discharge	Off the cross-section near D-10W

The July 20th map (attached) does not identify the boundary of the buffer zone required for monitoring and potential future corrective action. DOE must estimate the buffer zone boundary which shall not overlie the karstic Maynardville Limestone or its contact with the Nolichucky Shale². DOE shall measure the flow of surface water using standard flumes or weirs where any stream (e.g., NT-10, D-10W, and NT-11) enters and leaves the buffer zone. For streams originating within the site/buffer area, spring discharge or stream flow shall be measured as close as possible to the spring/seep zone. In order to measure the entire flow, each device must be constructed deep enough in the channel to minimize the flow of water under or around it. The downstream locations must be on the Nolichucky Shale, not the Maynardville Limestone. DOE shall instrument each stream gaging station to record discharge (flow), temperature, conductivity, and pH at intervals of at least every 30 minutes.

DOE must engage a Qualified Hydrologic Professional in accordance with TDEC 0400-40-17 to walk the site area, including the buffer zone, during the wet season and identify locations of springs and seeps. For any spring or seep where it is practical, DOE must measure flow, temperature, conductivity, and pH.

DOE must evaluate NT-10, D-10W, and NT-11 at intervals of 50 feet or less within the disposal site including buffer zone by describing stream sections, including any observed springs or seeps, and measuring temperature, conductivity, and pH. This evaluation should be performed twice during the wet

² DOE must identify the Nolichucky-Maynardville contact based on field observations that do not rely on regional geologic maps. It is particularly important to identify locations where the contact underlies any portion of the site, including locations where the contact crosses streams that flow through the site/buffer.

season and twice during the dry season. Dry season evaluation may be performed during the fall of 2017 to prevent extending the schedule.

This SOW assumes that neither the disposal area nor the associated buffer zone overlies the Maynardville Limestone or the Maynardville-Nolichucky contact. If any portion of the disposal area or buffer zone overlies the Maynardville Limestone or its contact with the Nolichucky shale, additional site characterization will be required to demonstrate compliance with additional ARARs complicated by groundwater movement in a karst environment.

DOE shall perform the field work consistent with EPA guidance, including the Uniform Policy for Quality Assurance Project Plans (Office of Solid Waste and Emergency Response [OSWER] Directive 9272.0-17, dated June 7, 2005).

DATA EVALUATION

Site-specific data must be integrated into modeling used to support ARAR waiver requests, develop waste acceptance criteria, and assess long-term protectiveness of human health and the environment—a CERCLA threshold criterion. For example, the determination of protectiveness and waste acceptance criteria development would incorporate site-specific data in the evaluation of 1) future risks to the public and downstream water resources and users, including fishing and people consuming fish and 2) the cumulative dose, risk, and toxicity (non-carcinogenic effects) impacts of the proposed EMDF (including all underdrains or drainage features) with existing/future sources of contamination in Bear Creek Valley.

If DOE collects any additional characterization or design information beyond the minimum effort identified in this SOW, DOE must also include those data in the evaluation.

The SEC agreed that DOE will perform modeling for CBCV Site 7c and that TDEC will independently verify that CERCLA requirements are met. Such independent verification will be completed for any modeling conducted by DOE which is used to make EMDF decisions pursuant to CERCLA. EPA and TDEC encourage DOE to schedule tri-party consultations as needed to resolve questions and data gaps that may arise during data evaluation and modeling.

REPORTING

DOE shall prepare and submit a report of findings to EPA and TDEC following the wet season. This information will be used to demonstrate in the RI/FS that CBCV Site 7c is a viable location for the EMDF disposal facility (i.e., that CBCV Site 7c meets ARARs or there is reasonable expectation for waivers for ARARs that the site does not meet). The report of findings shall identify any ARAR(s) that site characterization indicates would not be met and provide justification for any needed waiver(s).

Upon approval by EPA and TDEC, the report of findings, resolving any EPA and TDEC comments, will be appended to the D5 RI/FS along with the amended ARARs table and any demonstration or process needed to support ARAR waiver requests. Upon regulatory approval of the amended D5 RI/FS, DOE, EPA, and TDEC will collectively present the public with a Proposed Plan that includes, and is not limited to: 1) wet season site conditions, 2) site-specific groundwater elevation/fluctuation information including comparison with other areas to estimate historical high water table, 3) justification for ARAR waivers, 4) site-specific data to inform waste acceptance criteria modeling, and 5) the process and schedule for developing waste acceptance criteria and compliance processes including additional public participation on what is proposed to be disposed.

Following submittal of the report of findings and approval of the amended RI/FS report, EPA and TDEC expect that DOE will continue collecting groundwater data continuously throughout all seasons and that DOE will include data collected over at least one year in the remedial design report. The additional data will establish a longer-term trend of groundwater elevation fluctuation and better define the required position of the geologic buffer. It may also be used to refine the model(s) used to develop protective waste acceptance criteria. Site-specific remedial design characterization (not addressed by this document) can then proceed following approval of the Record of Decision.

SCHEDULE

DOE shall provide a Field Sampling Plan consistent with this Statement of Work for EPA and TDEC review and shall resolve EPA and TDEC comments. The Field Sampling Plan shall include a schedule of activities necessary to collect groundwater data during the January-April portion of the FY2018 wet season and anticipated dates for the delivery of the report of findings to EPA and TDEC for regulatory review. As stated above, upon approval by EPA and TDEC, the report of findings, resolving any EPA and TDEC comments, will be appended to the D5 RI/FS along with the amended ARARs table and any demonstration or process needed to support ARAR waiver requests. Upon regulatory approval of the appended D5 RI/FS, DOE will submit a draft Proposed Plan to EPA/TDEC and the DOE, EPA, and TDEC will collectively present the public with a Proposed Plan.

