APPLICABILITY EXTENSION REPORT
RAIL LOOP DISPOSAL AREA

WIDOWS CREEK FOSSIL PLANT
STEVENSON, ALABAMA

TENNESSEE VALLEY AUTHORITY
1101 Market Street
Chattanooga, TN 37402-2801

Prepared by:

Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801

November 8, 2024

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
0	11/08/24	All	Initial Applicability Extension Document

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY

TVA is documenting the need for additional time to develop a legacy Surface Impoundment (Legacy SI) applicability report for the Widows Creek Fossil Plant (WCF Plant) Rail Loop Disposal Area, due to a lack of information available to determine through field investigation whether the coal combustion residuals (CCR) unit contained both CCR and liquids (i.e. free liquids in this case as no standing water is present at the potential unit) on or after October 19, 2015. TVA developed this extension report pursuant to 40 C.F.R. 257.100(f)(1)(iii)(A), to secure additional time to support additional phased field investigations on the unit to defensibly determine whether the unit qualifies as a legacy SI as defined by 40 C.F.R. 257.53.

1.0 INTRODUCTION/RULE REQUIREMENTS

1.1. Background

WCF Plant is an inactive facility that ceased power generation in September 2015 and is currently not in use. WCF Plant hosts no power production activities of any kind. Initial Legacy CCR Rule compliance screening indicates a potential legacy surface impoundment is located at this plant. The required information for the potential Legacy SI is provided in Section 2.

1.2. Outline of Rule Requirements

The Legacy CCR Rule requires the preparation of an applicability report for identifying and evaluating potential legacy Surface Impoundments. The Legacy CCR Rule includes provisions for applicability report extensions if field investigations are necessary to determine whether the unit contains both CCR and liquids, and whether the CCR unit qualifies as a Legacy SI prior to the November 8, 2024 deadline. §257.100(f)(1)(iii)(A) requires the following documentation for each potential Legacy SI, as restated for the purposes of this report:

(1) §257.100(f)(1)(i)(A) through (C) requirements:

A. The name and address of the person(s) owning and operating the potential Legacy SI with their business phone number and email address;

B. The name associated with the potential Legacy SI;

C. Information to identify the potential Legacy SI, including a figure of the facility and where the unit is located at the facility, facility address, and the latitude and longitude of the facility;

(2) A statement by the owner or operator that to the best of their knowledge or belief, existing and available information does not provide a sufficient basis to determine that the unit contained free liquids on or after October 19, 2015. (Note that per the Legacy CCR Rule, "free liquids" is a subset of "liquids");

(3) The details of a written field investigation work plan, including the following:

i. A detailed description of the approach to characterize the physical, topographic, geologic, hydrogeologic, and hydraulic properties of the CCR in the unit and native geologic materials beneath and surrounding the unit, and how those properties will be used to investigate for the presence of free liquids in the CCR unit;

ii. A detailed description of the methods and tools that will be employed to determine whether the unit contains free liquids, the rationale for choosing these methods and tools, how these methods and tools will be implemented, and at what level of spatial resolution at the CCR unit to identify and monitor for the presence of free liquids;

iii. A detailed description of how groundwater elevations will be determined, and at what level of spatial resolution, in relation to the sides and bottom of the CCR unit and how any intersection of the groundwater table with the CCR unit will be evaluated, and at what level of spatial resolution;

iv. A plan for evaluating stormwater flow over the surface of the unit, stormwater drainage from the unit, and stormwater infiltration into the unit and how those processes may result in the formation of free liquids in the CCR unit. This plan must include a current topographic map showing surface water flow and any pertinent natural or man-made features present relevant to stormwater drainage, infiltration and related processes;

v. An estimated timeline to complete the workplan and make a determination if the CCR unit contains free liquids;

vi. A narrative discussion of how the results from implementing the workplan will determine whether the unit contains free liquids specified;

vii. A narrative discussion describing any anticipated problems that may be encountered during implementation of the workplan and what actions will be taken to resolve the problems, and anticipated timeframes necessary for such a contingency;

viii. The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer stating that the field investigation work plan meets the requirements of paragraph (f)(1)(iii)(A)(3).

Section 257.100(f)(1)(iii)(B) states that the maximum amount of additional time that can be secured is 18 months, secured in 6-month increments, provided each 6-month increment is supported by an applicability extension report. However, § 257.100(f)(1)(iii)(E) states that if during implementation of the field investigation

workplan it is determined that the unit contains free liquids, operation under extension provisions must cease and the applicability report must be prepared within 14 days of this determination. If, during implementation of the field investigation work plan, it is determined that the unit does not contain both CCR and liquids, according to §257.100(f)(1)(iii)(F), a notification must be prepared stating that the investigation has concluded and the owner/operator has determined that the unit does not contain CCR and liquids and is not a Legacy SI. This notification must be placed in the facility's operating record as required by § 257.105(k)(3).

1.3. Objective

The objective of this applicability extension report is to document the need for additional time to prepare a Legacy SI applicability report. The applicability report is prepared for Legacy SIs by providing site characteristic information essential to its inclusion under the United States Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities: Legacy CCR Surface Impoundments (Legacy CCR Rule) as a Legacy SI. While the initial deadline for the applicability report is November 8, 2024, 40 C.F.R. § 257.100(f)(1)(iii)(A) states that an owner or operator may secure additional time to complete the report for the sole reason of determining through a field investigation whether the unit contains both CCR and liquids on or after October 19, 2015. TVA identified potential legacy units where existing and available information is not sufficient to determine whether the unit contained both CCR and liquids (including free liquids) on or after October 19, 2015, so an extension is required for the purpose of making the determination.

2.0 RAIL LOOP DISPOSAL AREA REQUIRED INFORMATION

The Rail Loop Disposal Area at WCF is a potential Legacy SI. Because of a lack of information on the presence of free liquids within the unit, TVA is preparing this applicability extension report.

2.1 §257.100(f)(1)(iii)(A)(1) – Owner/Facility Information

The Rail Loop Disposal Area is located approximately 700 feet to the northwest of the former plant footprint. Appendix A provides location maps showing the facility boundary and unit location. The Rail Loop Disposal Area at WCF Plant is owned and operated by the Tennessee Valley Authority (TVA). Required information is provided below:

Owner/Operator Address: Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Contact Person: Michael Scott Turnbow, Ph.D.
Title: Vice President, Civil Projects, ESS & CCP
Phone: (865) 632-2101
Email: tvainfo@tva.com

Facility Address: Widows Creek Fossil Plant
2800 Steam Plant Road
Stevenson, AL 35772

Facility Latitude/Longitude: 34.904078N, 85.740686W

2.2 §257.100(f)(1)(iii)(A)(2) – Extension Necessity Statement

To the best of TVA's knowledge and belief, existing and available information does not provide a sufficient basis to determine that the unit contained free liquids on or after October 19, 2015.

2.3 §257.100(f)(1)(iii)(A)(3) – Written Field Investigation Work Plan

The written field investigation work plan prepared by Stantec Consulting Services Inc. (Stantec) for the Rail Loop Disposal Area is included in Appendix B.

The Rail Loop Disposal Area is a potentially large legacy SI, and significant investigation is necessary to fully characterize the unit's nature and extents. It is common practice that hydrogeologic and geotechnical investigations are conducted in phases, starting from an initial high-level phase and moving further into detailed phases based on the findings. The Legacy CCR Rule provides for two additional six-month extension periods from the initial six-month extension period, further lending support for the practice of a phased investigation work plan. Execution of a phased approach will mean the first applicability extension report would present details of the initial investigation phase, while subsequent phases would only be presented at a concept level until the execution of the first phase is completed, associated data evaluated, and further phase details developed.

APPENDIX A
LOCATION MAP

Exhibit No.

1

Title

Widows Creek Fossil Plant
Site Map

Client/Project

Tennessee Valley Authority
Widows Creek Fossil (WCF) Plant

Project Location

Jackson County, Alabama

175578499

Prepared by DMB on 2024-11-07
Technical Review by CB on 2024-11-07

0 550 1,100 1,650 2,200 Feet

1:6,600 (At original document size of 22x34)

Legend

- Potential Unit Boundary
- TVA Property Boundary

CCR: Coal combustion residuals

Notes

1. Coordinate System: NAD 1983 StatePlane Alabama East FIPS 0101 Feet
2. Imagery Provided by TVA (2023)

Stantec TVA

APPENDIX B
FIELD INVESTIGATION WORK PLAN

Field Investigation Work Plan - CCR and Free Liquids Determination Rail Loop Disposal Area

Widows Creek Fossil Plant
Stevenson, Alabama

November 8, 2024

Prepared for:
Tennessee Valley Authority

Prepared by:
Stantec Consulting Services Inc.

Stantec

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0	11/8/24	All	Initial Plan

Table of Contents

CERTIFICATION

I certify that this plan meets the requirements of §257.100(f)(1)(iii)(A)(3) – Written Field Investigation Work Plan

Will Mattingly

Signature
Will Mattingly, PE
Senior Principal, Stantec

11/08/2024

Date

1 Introduction

Stantec Consulting Services Inc. (Stantec), on behalf of the Tennessee Valley Authority (TVA), has prepared this Field Investigation Work Plan (Work Plan) for the execution of CCR and Free Liquids determination at TVA's Widows Creek Fossil Plant, in Jackson County, Alabama.

All investigation activities outlined within the plan will be conducted by qualified persons working under the direction of a licensed Professional Engineer (PE) in the state of Alabama. Any significant variance from the procedures and guidance contained herein or determination of the presence of free liquids shall be documented and reported by noon the next business day to the TVA Technical Lead, TVA Construction Manager, TVA Engineering Manager, TVA Site Representative, and the Stantec Project Manager.

2 Purpose

The objective of this Work Plan is to define a specific framework for the field investigation, laboratory testing and technical evaluation activities related to determining the presence of CCR and free liquids consistent with the regulatory requirements outlined in §257.100(f)(1)(iii)(A)(3) of the Legacy CCR Rule. At this point in time, there is not sufficient information to determine whether the Rail Loop Disposal Area at the Widows Creek Fossil Plant contains both CCR and liquids. Due to the variability in both natural groundwater flow regimes and CCR deposits, it is anticipated that the investigation will need to be structured following the process outlined herein.

3 Health, Safety and Environmental Clearance

This work will be conducted under an approved Site-Specific Health and Safety Plan (SHSP). This SHSP will be in accordance with TVA Safety policies and procedures and contractual requirements. Each worker will be responsible for reviewing and following the SHSP. Personnel conducting field activities will have completed required training, understand safety procedures, and be qualified to conduct the field work described in this Work Plan. The SHSP will include a job safety analysis (JSA) for each task described in this Work Plan and provide control methods to protect personnel. Personal protective equipment (PPE) requirements, safety, security, health, and environmental procedures are defined in the SHSP. In addition, authorized field personnel will attend site-specific TVA- safety training (if required).

Following arrival onsite each day, the Field Team Leader or Contractor Safety Representative will conduct a safety meeting that all onsite personnel are required to attend and sign in. TVA specific protocols will be followed, including the completion of 2-Minute Rule cards each day. The pre-job safety meeting will be conducted at a pre-designated location before any field work is conducted. A post-job safety meeting at the end of the day will also be held, and all onsite personnel are required to attend and

sign out. Should there be any visitors to the site, they must meet with the onsite safety representative for a safety briefing. All attendees must sign the safety documents. If they leave the site prior to the end of the day, they are required to meet with the safety representative for a post-job briefing.

Development of the SHSP will be developed under separate cover prior to the field mobilization stage of the investigation.

Following development of the final locations of all intrusive field investigation activities, TVA will address National Environmental Policy Act (NEPA) clearance protocols. Following NEPA clearance, Stantec will stake the field investigation locations in the field in advance of an Instrumentation Engineering and Field Services (IEFS) visit and submission of the Excavation Permit. Stantec will also provide a layout and any assistance IEFS needs to clear the planned locations. Stantec will contact the state-wide utility clearance coordinator to have underground utility locations marked at the site at least three working days prior to the field investigation.

4 Approach

This Work Plan has been prepared in accordance with the Legacy CCR Rule §257.100(f)(1)(iii)(A)(3) requirements. In addition, the work plan is prepared in general accordance with the overall framework presented in the EPA's April 22, 2024 memorandum titled "Considerations for the Identification and Elimination of Free Liquids in Coal Combustion Residuals (CCR) Surface Impoundments and Landfills (40 CFR Part 257, Subpart D)". In relation to this memorandum EPA stated there that "Any decisions regarding a particular facility will be made based on the statute and regulations. Therefore, interested parties are free to raise questions and objections about the substance of this guidance and the appropriateness of the application of this guidance to a particular situation."

Per the EPA's Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities (2015 CCR Rule) definition, "[f]ree liquids means liquids that readily separate from the solid portion of a waste under ambient temperature and pressure." Testing methods to determine the presence of free liquids in the field are yet to be fully developed and tested to fully align with the regulatory standards, specifically in terms of requirement to determine whether the liquids "readily separate from the solid portion of a waste under ambient temperature and pressure." This work plan includes measures to evaluate and consider the separability of liquids from the solids as part of the data to inform the regulatory categorization of the subject CCR unit.

The Work Plan recognizes that the aforementioned EPA memorandum somewhat distinguishes between the free liquids identification and elimination stages, and provides for Conceptual Site Model (CSM) and other investigations to be conducted in stages. The Work Plan is prepared to start from data review, gap analyses, initial free liquids identification investigation that is based on using CPTs (with pore pressure dissipation tests and P-wave velocity measurements as additional features) to obtain vertically dense data that is supplemented by conventional borings and laboratory testing. In addition, Vibrating Wire Piezometers (VWPs) will be used as primary porewater pressure measurement devices due to their ability to provide data over time. The Work Plan recognizes that the EPA memorandum provided guidance to

cover wide ranging site conditions, while allowing the flexibility for site specific selection and application of appropriate tools and methods. This Work Plan could be modified based on actual field conditions encountered during the execution or after data interpretation.

§257.100(f)(1)(iii)(A)(3)(i) A detailed description of the approach to characterize the physical, topographic, geologic, hydrogeologic, and hydraulic properties of the CCR in the unit and native geologic materials beneath and surrounding the unit, and how those properties will be used to investigate for the presence of free liquids in the CCR unit;

The investigation plan will follow the approach outlined as follows.

Background Data Collection and Initial Assessment. The investigation will begin with review of applicable historical records related to the site. These records will be cataloged, with notation cross-referenced to the data requirements needed to address the referenced objectives of the investigation as they are related to free liquids. Applicable data will be cataloged in relation to the CCR and native geologic materials within the following categories consistent with the Rule requirements:

- Physical
- Topographic
- Geologic
- Hydrogeologic
- Hydraulic CCR Properties

Gap Analysis. A data Gap Analysis will be performed to identify where historical data can be leveraged versus those areas where additional investigatory studies are required. In addition, programmatic collaboration will be performed to determine if information generated from any ongoing plant investigations can be leveraged within this study.

Field Investigations. Based on the current limited knowledge of this Unit, it is anticipated that the categorical data elements outlined above will require varying levels of additional field inspection, mapping and subsurface investigatory studies specific to the physical extents of CCR and multiple aspects of the site-specific hydrogeologic setting. The detailed scope and schedule for “gap” ancillary investigation efforts will be developed following the guidelines and approach outlined herein.

Analysis and Free Liquids Determination. Anticipated analysis methodology is outlined herein.

4.1 Methods

§257.100(f)(1)(iii)(A)(3)(ii) A detailed description of the methods and tools that will be employed to determine whether the unit contains free liquids, the rationale for choosing these methods and tools, how these methods and tools will be implemented, and at what level of spatial resolution at the CCR unit to identify and monitor for the presence of free liquids;

4.1.1 Physical and Topographic

The physical and topographic elements of the Unit will be established through subsurface investigations and an array of integrated mapping, cross-sections and geospatial modeling. Review, study and appropriate application of available drawings, construction and operations documentation, and historical aerial imagery will form the initial understanding of the physical and topographic investigation elements. The understanding developed from this framework will then be validated through investigative subsurface exploration efforts.

Facility surface feature base mapping is anticipated to be established via aerial lidar methodology potentially supplemented with field surveying. Subsurface data will be used to define the physical geometry of the Unit below the ground surface. Rationale for selection of the methods identified herein is based on professional experience in similar CCR characterization studies and correlation with industry standard practice.

4.1.2 Geologic and Hydrogeologic

Geologic and hydrogeologic conditions will be established through strategic leveraging of historical data combined with supplemental subsurface field studies. Intrusive supplemental subsurface investigation methods are anticipated to include:

- Cone Penetrometer Testing (CPT)
- Conventional hollow stem auger drilling and sampling
- Vibrating wire piezometers
- Laboratory testing

The planned progression of the subsurface exploration process will start with CPT characterization of vertical profiles of native soils and CCR materials. The conclusions drawn from the CPT data assessment will inform refinements to the details of the subsequent conventional auger boring sampling and piezometer installation program while conforming to the framework outlined herein.

CPT profiling will include excess pore pressure dissipation (PPD) tests on vertical intervals not anticipated to exceed 5 feet. PPD testing will provide nearly instantaneous measurement of static pore pressures and a relatively large collection of pore pressure profiling for analysis. CPT testing will also include P-wave velocity measurements along selected vertical profile intervals not anticipated to exceed 10 feet. These measurements will be used to identify capillary (negative pore water pressure) zones and delineation of potentially encountered zones with high water content. These determinations will be based on established correlations between P-wave velocities and degree of saturation.

Supplementary material sampling via conventional auger drilling methods will provide both visual observation of retrieved samples and correlation of subsequent laboratory test data with the initial CPT results. Conventional hollow-stem auger sample borings will supplement the CPT profiles with information

derived from both disturbed bag samples and undisturbed Shelby or piston tube sampling of unconsolidated materials. Sampling is anticipated to occur on maximum 5-foot vertical intervals.

Spatial resolution for CPT borings within the limits of CCR will be based on a maximum target horizonal spacing of roughly 400 feet (~1/Acre). CPT borings located outside of the unit will be located within roughly 200 feet of the projected CCR material boundary on perimeter spacing of roughly 800 feet between borings.

Spatial resolution for supplementary conventional auger borings within the limits of CCR will be based on maximum horizontal spacing of roughly 800 feet (~1/15 Acres). Auger sampling and rock core borings located outside of the unit will be positioned within roughly 200 feet of the CCR material boundary on perimeter spacing of roughly 1,600 feet between borings.

Select samples retrieved from the auger borings will be subject to an array of laboratory testing anticipated to include:

- Soil Classification and grain size distribution
- Moisture content
- Permeability
- In-situ unit weight, void ratio and porosity
- Paint Filter (varying moisture contents)

The level of spatial resolution generated from the referenced horizontal location spacing combined with the vertical CPT profiling and discrete sampling intervals is anticipated to be adequate to facilitate the CCR and Free Liquids determination.

Hydraulic

The CCR and soil hydraulic properties will be initially characterized through parameters derived from CPT testing and supplemented with laboratory testing referenced herein.

Laboratory permeability testing will be performed on undisturbed Shelby tube samples of potential Unit cover soils and representative samples of encountered CCR. Selection of samples targeted for permeability testing will be determined based on review of the lithology established from the field investigation program. These results will be used to correlate CPT data profiles to laboratory results for use in the overall hydraulic analysis.

The paint filter testing methodology will include varying moisture content of disturbed CCR samples to determine the sensitivity of the material to exhibit readily separable free liquids behavior with increasing levels of pore water content. This EPA approved methodology has been relied on for four decades to delineate the presence of free liquids. The rationale for including this testing as part of the evaluation is that disturbed CCR samples are likely to exhibit conservative results (higher propensity to exhibit readily separable free liquids behavior at a given moisture content) in contrast to material within ambient conditions for in-situ CCR deposits. A comparable industry standard testing protocol for undisturbed

samples has not been identified at this time but development of related methodology or correlations with disturbed sample results will be considered as part of this study.

Analysis based on the collective data pool will include a site water balance model and an Equivalent Flux model using free liquids compliance criteria developed based on this study. The water balance model will be established within the ModFlow platform.

Field Instrumentation

It is anticipated that vibrating wire piezometers will be used to characterize the native groundwater and CCR porewater conditions. Piezometer readings will be obtained manually or through automated data acquisition.

It is anticipated that internal Unit porewater elevation and related investigatory monitoring will be executed without penetrating the base of the CCR deposits and disturbing potential natural barriers below the CCR unit.

It is anticipated that two vibrating wire piezometers will be installed within each auger boring.

Other Tools and Methods

Based on data gathered from CPTs, VWPs, and other investigatory and testing methods proposed, traditional piezometers could be added at strategic locations if deemed necessary to confirm the presence or absence of free liquids via subsequent CSM and modeling approach presented in Section 4.5 to look at the collected data wholistically at a potential unit level. Hydraulic Profiling Tool (HPT) will also be considered for strategic use based on the interpretation of CPT data, site specific factors, CSM, and modeling data needs.

4.2 Groundwater elevations

§257.100(f)(1)(iii)(A)(3)(iii) A detailed description of how groundwater elevations will be determined, and at what level of spatial resolution, in relation to the sides and bottom of the CCR unit and how any intersection of the groundwater table with the CCR unit will be evaluated, and at what level of spatial resolution;

Determination of groundwater elevations will include analysis of the CPT and piezometer data and supplemented as additional piezometer readings become available with time. Spatial resolution for the data sources are outlined within the Methods section of this plan. Projection of elevations from these discrete locations will be derived via conventional interpolation and/or industry standard modeling tools. These projections will encompass the estimated physical limits of the sides and bottom of the CCR Unit.

All associated subsurface lithology will be integrated into a geospatial model that facilitates development of cross-sections and advanced mass flow or flux modeling.

4.3 Stormwater Analysis

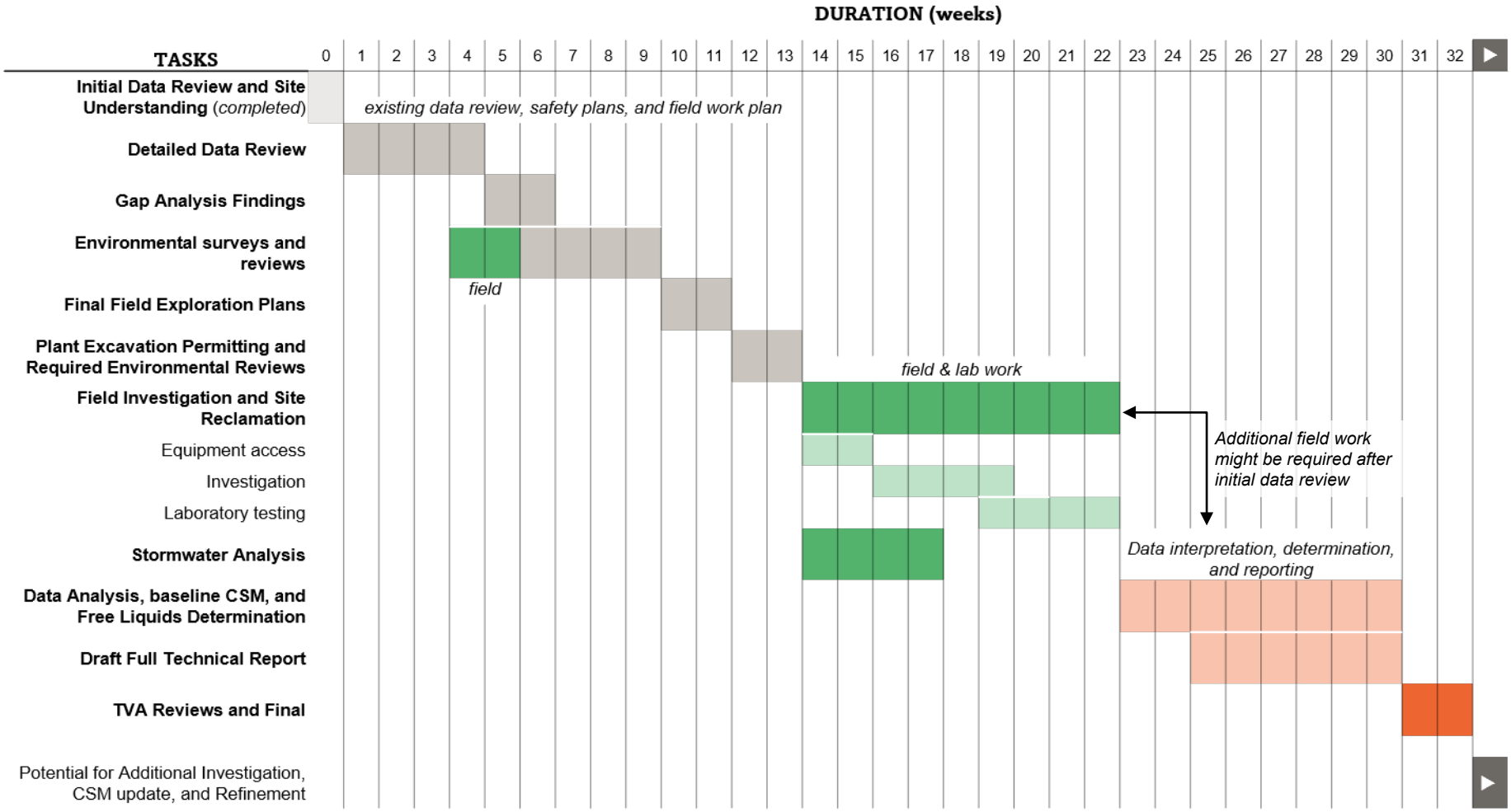
§257.100(f)(1)(iii)(3)(iv) A plan for evaluating stormwater flow over the surface of the unit, stormwater drainage from the unit, and stormwater infiltration into the unit and how those processes may result in the formation of free liquids in the CCR unit. This plan must include a current topographic map showing surface water flow and any pertinent natural or man-made features present relevant to stormwater drainage, infiltration and related processes;

Stormwater flow within the unit will be evaluated beginning with initial site reconnaissance. Through refinement of the site mapping via delineation with addition field surveys if necessary, existing storm flow routing directions and level of positive drainage will be documented. Stormwater analysis will include H&H modeling for a range of precipitation events. The resulting analysis will be reflected on the topographic basemap via both the areas subject to inundation (if any) and the associated time to discharge the subject storm events. Relative infiltration potential will be estimated through engineering analysis with input from field investigation results related to mapping, existing cover soil characterization and CCR hydraulic properties.

4.4 Estimated Timeline

§257.100(f)(1)(iii)(A)(3)(v) An estimated timeline to complete the workplan and make a determination if the CCR unit contains free liquids;

TVA has completed historical facility operational employee debriefs, initial data collection and review, collection of mapping and initiated initial schedule, scope, Hazard Assessment and Safety Plans for required environmental (NEPA) survey prerequisites for implementation of the Investigation Plan field work. It is anticipated that that execution of this workplan, beginning with a site walkdown and TVA Joint Project Team kick-off meeting, will occur within 2 weeks of notice to proceed. The projected execution schedule for the remaining tasks is provided below:


DURATION (weeks)
TASKS
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Initial Data Review and Site Understanding (completed)
existing data review, safety plans, and field work plan
Detailed Data Review
Gap Analysis Findings
Environmental surveys and reviews
field
Final Field Exploration Plans
Plant Excavation Permitting and Required Environmental Reviews
field & lab work
Field Investigation and Site Reclamation
Equipment access
Investigation
Laboratory testing
Additional field work might be required after initial data review
Stormwater Analysis
Data interpretation, determination, and reporting
Data Analysis, baseline CSM, and Free Liquids Determination
Draft Full Technical Report
TVA Reviews and Final
Potential for Additional Investigation, CSM update, and Refinement

It is noted that inherent with the iterative nature of CSM data collection and evaluation processes, the projected schedule is subject to change. Typical issues include additional permitting requirements, varying site conditions, safe access facilitation, weather, time needed for instrumentation data collection and evaluation, and availability of specialty subcontractors for field work. The schedule does not currently include a contingency for impacts associated with pending promulgation of the EPA CCR permitting program. TVA forecasts potential schedule impacts in the execution of this plan and if those are realized, an updated applicability extension report will be posted as required in *§257.100(f)(1)(iii)(B).*

Section 4.1.2 outlines that testing methods to determine the presence of free liquids in the field are yet to be fully developed and verified to align with the regulatory criteria. In addition, Section 2.3 of the Applicability Extension Report notes the large area to be investigated and the common practice of conducting CSM hydrogeologic and geotechnical investigations in phases. Due to the above discussed reasons, it is anticipated that additional extensions may be needed.

4.5 Analysis and Free Liquids Determination

§257.100(f)(1)(iii)(A)(3)(vi) A narrative discussion of how the results from implementing the workplan will determine whether the unit contains free liquids specified;

The collective results from the field investigation will inform the subsequent analysis and ultimate free liquids determination. The data analysis will include development of hydrogeologic free liquids centric models, drawings, cross-sections, key site condition heat maps, laboratory data and related visualization tools to provide a clear understanding of the site-specific conditions within the unit and the external natural groundwater setting.

The free liquids determination will be focused on applying appropriate compliance criteria and subsequent assessment of the presence of both CCR and free liquids leveraging the expanded data pool that integrates industry standard hydrogeologic mapping, cross-sections, modeling and engineering judgement. Per the definitions provided within the Rule, the analysis will include the stated “readily separable” free liquids provisions within the determination criteria.

The baseline for the determination will include the process of establishing the presence of both CCR and pore water that constitutes readily separable conditions. One criteria that will be considered where it is determined that CCR pore water conditions warrant further analysis is adopting the volumetric flux from a CCR Rule prescriptive cap system as a potential CCR deposit “equivalent flux” compliance criteria. The Rule has effectively established the prescriptive cap system infiltration as a means to maintain adequate protection of human health and the environment for closed Units. For the project-specific setting, consideration will be given to comparing this cap flux to the modeled flux associated with the existing porewater and native groundwater conditions within the project setting. This is consistent with the Rule’s recognition that there are significant practical limitations for determining the presence of readily separable free liquids as well as controlling and minimizing infiltration from these facilities in a closed and unlined condition.

4.6 Potential Challenges and Contingency Planning

§257.100(f)(1)(iii)(A)(3)(vii) A narrative discussion describing any anticipated problems that may be encountered during implementation of the workplan and what actions will be taken to resolve the problems, and anticipated timeframes necessary for such a contingency;

TVA intends to comply with the requirements to develop this work plan as required by §257.100(f). However, identified potential challenges or problems that may be encountered are outlined below. While development of this plan included adjusting the investigation strategy to mitigate challenges known through experience, the elements below remain under consideration. Related contingency planning will continue through the investigation process.

- Equipment site access challenges associated with physical obstructions or near-surface ground bearing capacity conditions
- Availability of the prescribed field exploratory equipment and/or qualified operators (industry capacity)
- Extended laboratory analysis turn-around times (industry capacity)
- Penetration thru the base of the disposal unit during field drilling operations and planned mitigation
- Solid/Industrial Waste standard practice established by various regulatory authorities includes monitoring of groundwater levels for a minimum of one year to account for seasonal variability. Schedule framework outlined within Rule may not accommodate this level of extended data collection. Proposed schedule acknowledges the potential need for subsequent field investigations following the initial one as well as need for longer data collection and monitoring periods using instrumentation.

Industry standard practice has not been established for Free Liquids determinations

Challenge Mitigation

The following challenge mitigation measures will be considered by the project team:

- Physical access challenges will be proactively identified in association with initial site reconnaissance. The ability of near-surface materials to support equipment loading can be established through hand vane shear testing if soft or limited equipment bearing conditions are noted. Site clearing or development of access routes and subgrade improvement measures will be developed and integrated within the investigation activities and projected schedule, if necessary.
- Proper plans will need to be developed for investigations within units that were closed by capping with geosynthetic layers, protective soil cover, and vegetative soil layer. These plans shall include measures to restore cap integrity, Construction Quality Assurance (CQA), and documentation.

- Availability of exploratory equipment and operators will be determined during the final field planning efforts. Scheduling of these activities will be integrated within the investigation plan.
- Laboratory result lead times will be determined at the time of the investigation and reflected within the schedule.
- In the event the base of the CCR is penetrated during exploratory activities, specific protocols will be developed through mitigative sealing methods to reduce the potential for vertical communication of water.
- Seasonal groundwater variability may be reflected within existing historical data sources (TBD).

This investigation will serve as initial framework for establishing industry practice related to determination of Free Liquids using available geoscience methodology and engineering judgement as dictated by the Rule.