WELL PLACEMENT / DEVELOPMENT PLAN FOR THE
INSTALLATION OF ADDITIONAL MONITORING WELLS AT THE
BOTTOM ASH SETTLING AREA SURFACE IMPOUNDMENT

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 assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those 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.

Jared Morrison

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1/26/2023

Jared Morrison
Director Environmental Services
Evergy, Inc.

Date

HALEY ALDRICH

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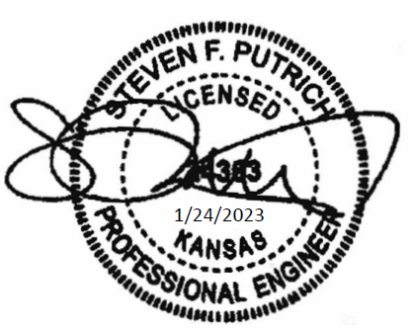
WELL PLACEMENT / DEVELOPMENT PLAN FOR THE INSTALLATION OF ADDITIONAL MONITORING WELLS AT THE BOTTOM ASH SETTLING AREA SURFACE IMPOUNDMENT

TECUMSEH ENERGY CENTER
BOTTOM ASH SETTLING AREA
TECUMSEH, KANSAS



by
Haley & Aldrich, Inc.
Phoenix, Arizona

for
Evergy Kansas Central, Inc.

File No. 0129778-043
January 2023

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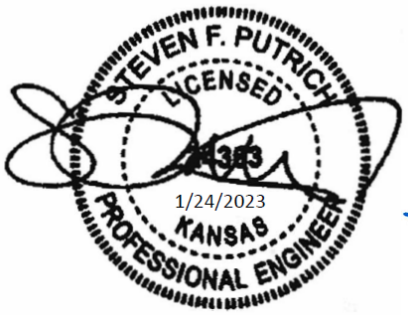

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1. Introduction

This document is a well placement and development plan prepared pursuant to Paragraph 10.e. of the Consent Agreement and Final Order (CAFO) between the U.S. Environmental Protection Agency (USEPA) and Evergy Kansas Central, Inc. (Evergy) In the Matter of Evergy Kansas Central, Inc.: Docket No. RCRA-07-2023-0001 dated November 7, 2022. Paragraph 10.e. of the CAFO requires that Evergy provide USEPA a Surface Impoundment Well Placement/Development Plan (Plan) for the installation of additional wells at the Bottom Ash Settling Area (BASA) surface impoundment.

1.1 BACKGROUND

Evergy Tecumseh Energy Center (TEC) is a closed coal fired power generation facility. While TEC was active, coal combustion residuals (CCR) were dewatered at the BASA and permanently disposed of at the TEC solid waste landfill. The BASA CCR management unit has ceased operations and been removed. All CCR material within the BASA has been removed, together with the berms that created the impoundment and all visible CCR material. The BASA site has been returned to its approximate pre-development surface grade.

Bottom ash slurry generated at TEC was sluiced and gravity fed to the BASA where it was allowed to settle out. Excess water was decanted via gravity to the Clear Pond located north of the BASA, where it was gravity decanted again to Tecumseh Creek. Ultimately, the clear process water flowed into Tecumseh Creek and the Kansas River in accordance with the terms of a Kansas Pollutant Discharge Elimination System permit at Outfall 002X1. Bottom ash was recovered from the BASA, dewatered, and transported by truck to Ash Landfill 322.

Pursuant to Paragraph 10.e. of the CAFO, this Plan has been prepared for the installation of additional monitoring wells at the BASA surface impoundment. The items requested by USEPA in Paragraphs 10.e.i. through 10.e.vii. of the CAFO are provided in the following sections.

1.1.1 Monitoring Network

Consistent with Code of Federal Regulations Title 40 (40 CFR) § 257.90 through § 257.95, Evergy installed and certified a groundwater monitoring network for the BASA at TEC and collected eight rounds of groundwater samples for the analysis of Appendix III and Appendix IV baseline constituents. The groundwater monitoring network at the BASA includes one upgradient monitoring well (MW-7) and three downgradient monitoring wells (MW-8, MW-9, and MW-10); and one cross gradient well (MW-11) is used to monitor groundwater elevations for the purpose of establishing groundwater flow direction at each sampling event.

Monitoring well MW-7 was sited at a location considered to be representative of background groundwater conditions. Groundwater in the uppermost aquifer beneath the BASA historically flows in a west and northwest direction. The downgradient monitoring wells were sited based on site-specific conditions at locations considered sufficient to detect groundwater constituents in the uppermost aquifer passing the waste boundary of the unit. Due to space constraints, the downgradient monitoring wells were constructed in the berms surrounding the BASA. The locations of the monitoring wells are shown on Figure 1, and well construction details are provided in Table 1.

During semi-annual assessment monitoring sampling completed in December 2019, downgradient monitoring well MW-9 was found to contain too little water to support sample collection using the dedicated low flow pump system and was consequently identified as dry.

1.2 PURPOSE AND SCOPE

This document addresses requirements set forth in Paragraph 10.e. of the CAFO and is consistent with requirements outlined in 40 CFR §§ 257.90(b)(1) and 257.91 for groundwater monitoring and system, and applicable requirements outlined in 40 CFR § 257.95. The specific requirements for this Plan listed in the CAFO are provided in Sections 2 through 4 of this Plan and are in bold italic font, followed by a narrative describing how each requirement has been met.

2. Groundwater Monitoring Well Installation

2.1 MONITORING WELL LOCATIONS

Paragraph 10.e.i. of the CAFO requires:
"A discussion of how the proposed new well(s) will comply with 40 CFR §§ 257.90(b)(1) and 257.91. The discussion should include how the well(s) replace(s) or augment(s) the failed and/or lost capacity of the required unit boundary monitoring network and how the proposed well(s) overcome(s) the factors that led to the non-productivity of MW-9."

Downgradient monitoring well MW-9 was installed July 6, 2015 and was sampled 14 times between installation and October 2019. Beginning in December 2019, MW-9 was reported to have too little water to support conventional sampling. The groundwater elevation at MW-9 declined following cessation of operations at the BASA in preparation for CCR unit closure in accordance with 40 CFR § 257.102(c). Due to the low water level, groundwater samples were not collected from MW-9 after October 2019. In January 2023, downgradient monitoring wells MW-8 and MW-10 were found to have water levels that were too low to complete sampling.

In accordance with CAFO Paragraph 10.e.i., the installation of three new downgradient monitoring wells at TEC BASA is proposed to monitor groundwater quality passing the former waste boundary of the BASA (Figure 2) pursuant to 40 CFR § 257.90(b)(1)(i) and the performance standard of 40 CFR § 257.91(a). These wells augment MW-9 and provide additional capacity for the required unit boundary monitoring network.

Pursuant to 40 CFR § 257.91(b), the number, spacing, and depths of proposed monitoring wells were determined based upon site-specific technical information obtained during drilling, installation, and testing of the original monitoring wells at the BASA, including stratigraphy, lithology, hydraulic conductivity, porosity, and site-specific data developed during previous characterization activities.

Based on historic groundwater elevation data, the groundwater flow direction is toward the northwest, and the water bearing geologic formation nearest the natural ground surface at the BASA is composed of poorly sorted glacial till material that includes clay, sand, and gravel. The proposed monitoring wells will be installed to a depth of approximately 30 to 40 feet below ground surface and will be screened within the glacial till material directly above the shale confining unit that underlies the BASA (Figure 3). The depth and location of the proposed wells are intended to overcome the factors that led to the non-productivity of MW-9. The proposed monitoring wells will be designed and installed in accordance with 40 CFR § 257.91(e).

If adequate saturated thickness is not encountered in the glacial till material above the shale (directly above the shale confining unit), the proposed monitoring well will be screened within the next encountered water bearing hydrogeologic unit below the top of the shale, at a depth of no greater than 100 feet.

As directed in 40 CFR § 257.91(c), following installation of the proposed monitoring wells, the BASA monitoring system will include one upgradient monitoring well and five downgradient monitoring wells. Downgradient monitoring wells will be at a horizontal spacing ranging between approximately 60 and 150 feet along the former waste boundary of the CCR unit. The minimum number of upgradient

monitoring wells is appropriate for this unit based on the size of the unit and the consistent groundwater flow direction observed during the baseline sampling and compliance monitoring sampling events.

The newly installed monitoring wells will be allowed to set for a minimum of 12 hours prior to well development. The wells will be developed by swabbing, bailing, airlifting, and/or pumping methods. Development will be complete once the monitoring well is visibly clear and sediment free, turbidity is reduced to less than 10 Nephelometric Turbidity Units (NTU) or has stabilized, and when pH, temperature, and conductivity have stabilized. Water level elevations will be measured with a decontaminated water level indicator throughout the well development.

The proposed schedule for the initiation of installation of new BASA monitoring wells is provided in Table 2.

2.2 BASELINE SAMPLING

Paragraph 10.e.ii. of the CAFO requires:
"A proposed sampling schedule to meet the requirements of 40 CFR § 257.90(b)(1)(iii)."

A detection monitoring program will be initiated at the newly installed monitoring wells in accordance with 40 CFR § 257.90(b)(1)(iii) within 30 days of monitoring well development. The program will include a minimum of eight independent baseline groundwater samples collected from each new monitoring well and analyzed for the constituents listed in Appendices III and IV. Based on historical groundwater elevation data and the calculated groundwater flow velocity at the BASA, independent samples will be collected bi-monthly from the newly installed monitoring wells to obtain the initial eight baseline samples over 16 months, which will provide analytical data presentative of seasonal variability.

All samples will be analyzed by a laboratory certified by the State of Kansas. Data validation and usability assessment will be performed in accordance with guidance and requirements established in the documents titled *USEPA National Functional Guidelines for Inorganic Data Review (USEPA, 2020)*[1] and *the Evaluation of Radiochemical Data Usability* (Paar, 1997).[2]

The baseline sampling schedule for the new BASA monitoring wells is provided in Table 2.

[1] U.S. Environmental Protection Agency, 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.
[2] Paar, J.G., 19978. Evaluation of Radiochemical Data Usability. April.

3. Assessment Monitoring Groundwater Sampling Program

3.1 RE-INITIATION OF ASSESSMENT MONITORING

Paragraph 10.e.iii. of the of the CAFO requires:
"A proposed well development/reconditioning plan and sampling schedule to re-initiate assessment monitoring for Appendix III and Appendix IV constituents at MW-7, MW-8 and MW-10. The schedule shall include a plan for incorporating the new well(s) into the assessment monitoring sampling program when viable. The proposed schedule shall include a schedule to initiate the annual assessment monitoring event."

Evergy will re-initiate assessment monitoring at upgradient monitoring well MW-7 and downgradient monitoring wells MW-8 and MW-10. The wells will be re-developed by swabbing, bailing, airlifting, and/or pumping methods. Development will be complete once the monitoring well is visibly clear and sediment free, turbidity is reduced to less than 10 NTU or has stabilized, and when pH, temperature, and conductivity have stabilized. Water level elevations will be measured with a decontaminated water level indicator throughout the well re-development.

The assessment monitoring program will include sampling and analysis of Appendix III and Appendix IV constituents followed by statistical analysis in accordance with the sampling and analysis program (40 CFR 257.90(b)(1)(ii) and (iv)). The initial annual assessment monitoring sampling event will consist of all Appendix IV constituents pursuant to 40 CFR 257.95(b). Upon completion of eight baseline sampling events at the newly installed BASA monitoring wells, the new monitoring wells will be included in the assessment monitoring program together with MW-7, MW-8, and MW-10 and be certified as part of the network in accordance with 40 CFR § 257.91(f).

The schedule for re-initiation of assessment monitoring at BASA is provided in Table 2.

3.2 SEMI-ANNUAL ASSESSMENT MONITORING SAMPLING

Paragraph 10.e.iv. of the CAFO requires:
"A proposed sampling schedule for semi-annual assessment monitoring for any Appendix III and Appendix IV constituents identified in the annual assessment monitoring event pursuant to 40 CFR § 257.95(d)."

In accordance with 40 CFR § 257.95(d)(1), assessment monitoring sampling will be completed at monitoring wells MW-7, MW-8, and MW-10 on a semi-annual basis beginning within 90 days of obtaining validated results from the initial annual assessment monitoring sampling event. The schedule for the initial and semi-annual assessment monitoring sample is provided in Table 2.

3.3 GROUNDWATER PROTECTION STANDARDS

Paragraph 10.e.v. of the CAFO requires:
"A proposed schedule for establishing groundwater protection standards pursuant to 40 CFR § 257.95(h) in order to evaluate whether closure has been accomplished pursuant to 40 CFR § 257.102(c);"

In accordance with 40 CFR § 257.95(d)(2), groundwater protection standards (GWPS) will be established following the initial assessment monitoring for all Appendix IV constituents detected during the annual assessment monitoring sampling event. GWPS values for each of the detected Appendix IV constituents will be set equal to the highest value of the maximum contaminant level, levels provided in 40 CFR § 257.95(h)(2) (from regional screening levels), or background concentrations.

Following the establishment of GWPS, semi-annual assessment monitoring will be conducted to determine if the BASA meets requirements for closure set forth in 40 CFR § 257.102(c) in accordance with the schedule outlined in Table 2.

3.4 NATURE AND EXTENT INVESTIGATION

Paragraph 10.e.vi. of the CAFO requires:
"A proposed schedule for establishing nature and extent investigation for any new statistically significant levels detected during the re-initiated assessment monitoring of additional Appendix IV constituents. An SSL at a newly established well for a constituent previously identified as an SSL under item (c) of this section is assumed to be associated with a previous release and not "new" per this paragraph Requirements under 40 CFR § 257.95(g) for these SSL(s) are satisfied by the plan and actions associated with item (d)."

In accordance with 40 CFR § 257.95(g), a nature and extent investigation will be conducted at the BASA, as shown in the schedule in Table 2. As described in Paragraph 10.e.vi. of the CAFO, a statistically significant level (SSL) at a newly established well for a constituent previously identified as a SSL under Paragraph 10.c. of the CAFO is not considered "new" and will be addressed during nature and extent characterization required pursuant to CAFO Paragraph 10.d.

4. Reporting

Paragraph 10.e.vii. of the CAFO requires:
"Identification of any potential updates and/or modifications to reports/notifications in respondent's operating record and on Respondent's publicly available CCR compliance webpage, and a schedule for making the updates and/or modifications."

In accordance with CAFO Paragraph 10.e.vii., the following reports/notifications will be updated or modified to reflect the additional groundwater monitoring wells and re-initiation of assessment monitoring. The schedule for document updates is presented in Table 3:

- Groundwater System Certification – 40 CFR § 257.91(f)
- Sampling and Analysis Plan – 40 CFR § 257.93(a)
- Statistical Data Analysis Plan – 40 CFR § 257.93
- Statistical Method Certification – 40 CFR § 257.93(f)(6)

TABLES

TABLE 1
MONITORING WELL CONSTRUCTION INFORMATION
EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

Location	Well Identification	Well Installation Date	Casing Diameter (inches)	Blank Casing Type	Screened Casing Type	Slot Size (inch)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Well Depth (feet bgs)	Depth to Water[a] (feet btoc)	Water Level Elevation (feet amsl)	Water Column Depth (feet)	Northing[b]	Easting[b]	Ground Surface Elevation (feet amsl)[c]	Top of Casing Elevation (feet amsl)[c]
Bottom Ash Settling Area																
Downgradient	MW-8	5/27/2015	2	Schd 40 PVC	Schd 40 PVC	0.020	12	22	22	18.40	851.34	3.60	271159.2111	2001886.2591	867.09	869.84
	MW-9[d]	7/6/2015	2	Schd 40 PVC	Schd 40 PVC	0.020	12	22	22	-	-	-	271115.6500	2001608.3036	864.89	868.66
	MW-10	5/27/2015	2	Schd 40 PVC	Schd 40 PVC	0.020	12	22	22	18.10	851.54	3.9	270957.7952	2001594.1357	864.84	869.11
	MW-11	4/9/2016	2	Schd 40 PVC	Schd 40 PVC	0.020	20	30	30	25.56	851.29	4.44	270892.7851	2001649.954	873.94	876.85
Upgradient	MW-7	7/6/2015	2	Schd 40 PVC	Schd 40 PVC	0.020	24	34	34	25.04	854.69	8.96	270755.4546	2001876.9832	875.38	878.19

Notes:

Monitoring Well Used for Piezometric Observation Only

[a] *Depth to water from groundwater elevation survey on December 5, 2019.*

[b] *Data Source: Evergy Kansas Central, Inc (f/k/a Westar Energy, Inc.) Tecumseh Energy Center, August 2016.*

[c] *Survey elevations revised February 2020 after well casings were shortened during unit closure activities prior to the September/October 2019 groundwater sampling event.*

[d] *Monitoring Well MW-9 was dry during the December 2019 sampling event and a depth to water was unsuccessful.*

amsl - above mean sea level

bgs - below ground surface

btoc - below top of casing

Schd 40 PVC - Schedule 40 polyvinyl chloride

TABLE 2
PROPOSED SCHEDULE FOR CONSENT AGREEMENT PARAGRAPH 10.e.
EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

Schedule Item[1]	CAFO Item	CCR Rule Regulation	Estimated Start Date
Assessment Monitoring Program and Nature & Extent Investigation			
Re-initiate assessment monitoring for MW-7, MW-8, and MW-10 - Initial Annual Assessment Monitoring sampling event	*Paragraph 10.e.iii.*	*40 CFR § 257.95(b)*	Within 90 days of statistical analyses completed under Paragraph 10.c. of the CAFO
Establish Groundwater Protection Standards	*Paragraph 10.e.v.*	*40 CFR § 257.95(d)(2)*	Within 30 days of obtaining validated results from the initial annual assessment monitoring sampling event
First re-initiated semi-annual sampling for MW-7, MW-8, and MW-10	*Paragraph 10.e.iv.*	*40 CFR § 257.95(d)(1)*	Within 90 days of obtaining results from the annual assessment monitoring sampling event
Establish a Nature and Extent Investigation	*Paragraph 10.e.vi.*	*40 CFR § 257.95(g)(1)*	Within 180 days of newly detected SSLs identified during the first re-initiated semi-annual assessment monitoring sampling event
Semi-annual assessment monitoring sampling for MW-7, MW-8, and MW-10	*Paragraph 10.e.iv.*	*40 CFR § 257.95(d)(1)*	Within 6 months of completing the first re-initiated semi-annual assessment monitoring sampling event
New Monitoring Wells			
Install new wells	*Paragraph 10.e.i.*	*40 CFR § 257.90(b)(1)(i)* *40 CFR § 257.91*	Within 180 days of USEPA approval of this Plan[2]
Initiate baseline sampling of new wells	*Paragraph 10.e.ii.*	*40 CFR § 257.90(b)(1)(iii)*	Within 30 days of monitoring well development
Incorporation of new wells into network	*Paragraph 10.e.iii.*	*40 CFR § 257.90(b)(1)(iv)*	Within 30 days of obtaining validated results from eight independent baseline sampling events

Notes:

1. Proposed schedule address the requirements in Paragraph 10.e. of a consent agreement between the U.S. Environmental Protection Agency and Evergy dated November 7, 2022
2. Surface Impoundment Well Placement/Development Plan (Plan) for the installation of additional wells at the Bottom Ash Settling Area surface impoundment
CAFO = Consent Agreement and Final Order
CCR = Coal Combustion Residual
CFR = Code of Federal Regulation
SSL = statistically significant level
USEPA = U.S. Environmental Protection Agency

TABLE 3
PROPOSED SCHEDULE FOR REPORTING UPDATES / MODIFICATIONS
EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

Report Item[1]	CCR Rule Regulation	Estimated Completion Date
Groundwater System Certification	*40 CFR § 257.91(f)*	Within 60 days of incorporating new monitoring wells into the monitoring well network
Sampling and Analysis Plan	*40 CFR § 257.90(b)(1)(ii)* *40 CFR § 257.93(a)*	Within 60 days of incorporating new monitoring wells into the monitoring well network
Statistical Data Analysis Plan	*40 CFR § 257.93*	Upon completion of statistical analyses following the re-initiation semi-annual assessment monitoring sampling event
Statistical Method Certification	*40 CFR § 257.93(f)(6)*	Upon completion of statistical analyses following the re-initiation semi-annual assessment monitoring sampling event

Notes:

1. Proposed schedule address the requirements in Paragraph 10.e.vii. of a consent agreement between the U.S. Environmental Protection Agency (EPA) and Evergy dated November 7, 2022

CAFO = Consent Agreement and Final Order

CCR = Coal Combustion Residual

CFR = Code of Federal Regulation

FIGURES

LEGEND

- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- BOTTOM ASH SETTLING AREA UNIT BOUNDARY/APPROXIMATE EDGE OF FORMER WASTE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019

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0 60 120

SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

BOTTOM ASH SETTLING AREA MONITORING WELL LOCATION MAP

evergy

JANUARY 2023

FIGURE 1

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LEGEND

- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- TYPICAL GROUNDWATER FLOW DIRECTION
- APPROXIMATE AREA FOR PROPOSED MONITORING WELL
- BOTTOM ASH SETTLING AREA UNIT BOUNDARY/APPROXIMATE EDGE OF FORMER WASTE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019

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0 60 120

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TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

PROPOSED GROUNDWATER MONITORING WELLS

evergy

JANUARY 2023

FIGURE 2

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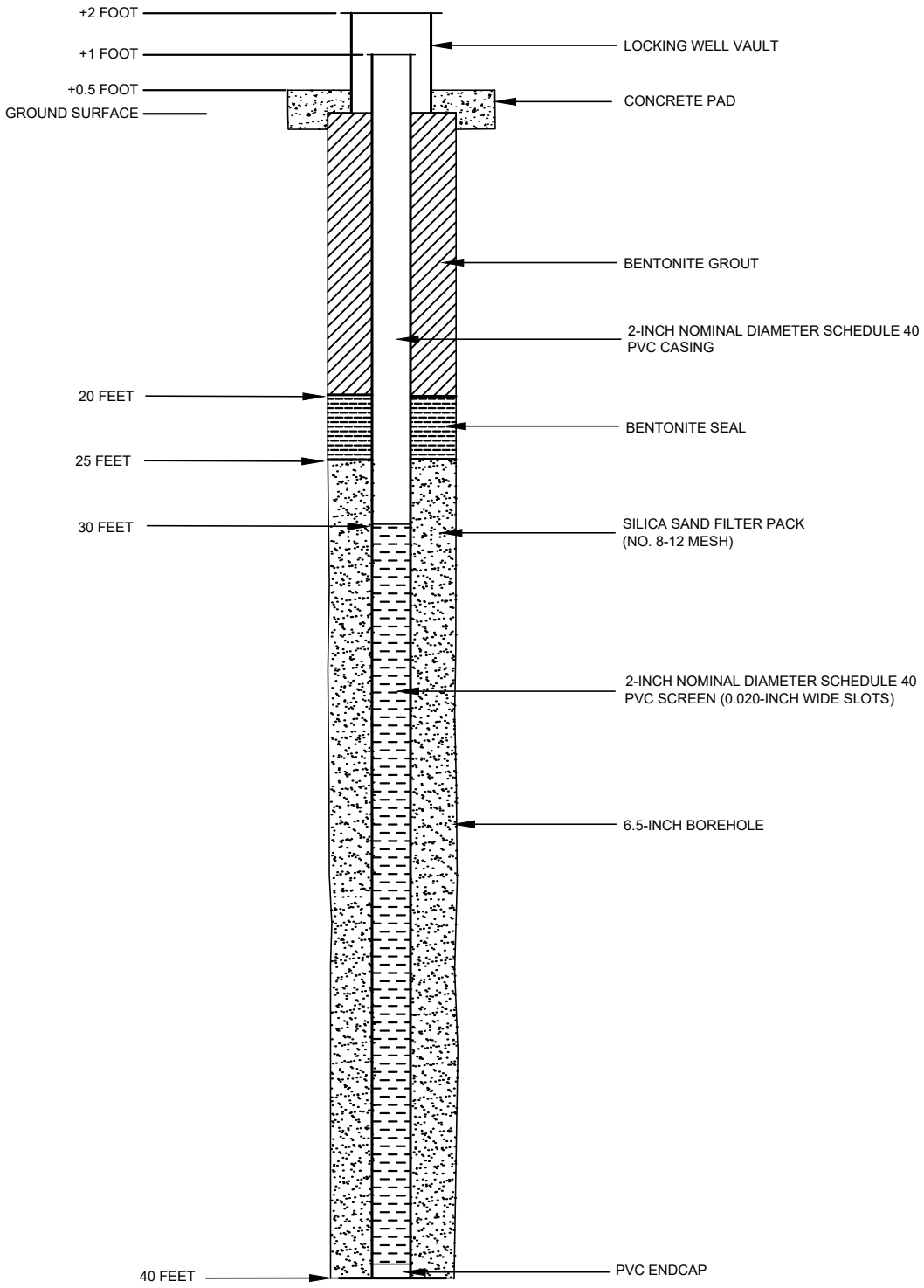

EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

PROPOSED MONITORING WELL DESIGN

NOT TO SCALE
JANUARY 2023

FIGURE 3

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