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July 9, 2025

DATA REQUEST RESPONSE
LIBERTY UTILITIES (LIBERTY)

Data Request No.:	OEIS-P-WMP_2025-Liberty-002
Requesting Party:	Office of Energy Infrastructure Safety
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Subject:

Q01. Regarding Liberty's Compliance Audit Program Objective and Sampling Statistics
Q02. Regarding Liberty's Compliance Audit Pass Rate Calculation
Q03. Regarding Margin of Error and Confidence Level for Quality Control of Detailed Inspections
Q04. Regarding Quality Control Pass Rate Calculations
Q05. Regarding Workforce Relevant Educational Requirements
Q06. Regarding Eagle Rock Analytics Report
Q07. Regarding Risk Reduction Values Presented in Table 8-1
Q08. Regarding Traditional Overhead Hardening (WMP-GDOM-GH-05)
Q09. Regarding Emerging Grid Hardening Technology Installations and Pilot Progress
Q10. Regarding Covered Conductor Installation
Q11. Regarding Fire Risk Maps

Q01. Regarding Liberty's Compliance Audit Program Objective and Sampling Statistics: On page 199 of its 2026-2028 Base WMP, Liberty states that "Compliance Audits are performed by qualified vendors." However, on page 200 Liberty does not include its qualified vendor Compliance Audit in Table 9-20. Similarly, on page 201 Liberty does not include its qualified vendor Compliance Audit in Table 9-21.

a. Complete the table below to describe the program objective for Liberty's qualified vendor Compliance Audit.

Compliance Audit Program Objective

Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program

b. Complete the table below to provide sampling statistics for Liberty's qualified vendor Compliance Audit.

Compliance Audit Sampling Statistics

Initiative/Activity Being Audited	Population/Sample Unit	2026, 2027, or 2028 Population Size	2026, 2027, or 2028 Sample Size	2026, 2027, or 2028 % of Sample in HFTD	Confidence Level / MOE

Response:

Compliance Audit Program Objective

Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program
Compliance with minimum clearance requirements	N/A	Compliance Audit	To provide reasonable assurance that minimum clearance requirements are being maintained.

Compliance Audit Sampling Statistics

Initiative/Activity Being Audited	Population/Sample Unit	2026, 2027, or 2028 Population Size	2026, 2027, or 2028 Sample Size	2026, 2027, or 2028 % of Sample in HFTD	Confidence Level / MOE
Compliance with minimum clearance requirements.	Circuit Miles	700 Circuit Miles	40 Circuit Miles	100%	95/3

Q02. Regarding Liberty's Compliance Audit Pass Rate Calculation:

On page 206 of its 2026-2028 Base WMP, Liberty states "as described in Section 9.11.1, Liberty uses the results of the external Compliance Audit as a metric to provide reasonable assurance that work is being completed as assigned and/or prescribed and in compliance with applicable regulations."

a. Provide a list of the criteria that generate the Compliance Audit pass rate (e.g., regulation clearance distance [RCD], ANSI A300 standards, pre-inspector work accuracy, tree crew work accuracy, etc.).

   i. If multiple criteria generate the Compliance Audit pass rate, explain how Liberty weights each criterion to calculate the pass rate.

Response:

Compliance Audit Criteria	Description
Population	Within each span that has been evaluated from the sample size, the count of trees that have been pruned and/or trees that are expected to encroach into the regulated clearance distances within 3 years.
Trees within Regulated Clearance Distance	Count of trees that are located within regulated clearance distances (4' for 12kv - 60kV, 10' for 120kV) within the evaluated sample.

The number of trees located within regulated clearance distance during the compliance audit is measured against the total population of trees within the sample to determine the compliance rate.

Q03. Regarding Margin of Error and Confidence Level for Quality Control of Detailed Inspections:

On page 201 of its 2026-2028 Base WMP, Liberty does not include a confidence level or margin of error (MOE) for its audit of Detailed Inspections. Provide the following for Liberty's Audit of Detailed Inspections, or provide an explanation why it cannot be provided:

a. The confidence level.
b. The margin of error.

Response:

Due to the small number of units, applying standard statistical parameters (e.g., 95% confidence level, 5% margin of error) results in disproportionately large sample sizes. To maintain efficiency and adequate oversight, a 33% sample size was applied for Detailed Inspections. This percentage aligns with the proportion used for Completed Tree Work.

Q04. Regarding Quality Control Pass Rate Calculations:

On pages 204-205 of its 2026-2028 Base WMP, Liberty lists multiple conditions that it averages to produce a final quality control pass rate for either a "single tree" or a "single pole." On page 201 of its 2026-2028 Base WMP, Liberty indicates that the "Population/Sample Unit" for its quality control audit of "Completed Tree Work" and "Detailed Inspections" is "Annual Circuit Miles."

a. Describe how Liberty calculates the quality control pass rate at the "annual circuit mile" level (i.e., indicate if the pass rate target is the average of all individual tree or pole pass rates, if the target pass rate is the average of each circuit mile's pass rate, or if Liberty calculates the target pass rate using another method).

Response:

The pass rate is calculated as the average of all condition scores for the sample units evaluated within each QC work type. See Section 9.11.4, Table 9-24, 9-25, 9-26, 9-27, and 9-28 of Liberty's 2026-2028 WMP.

Q05. Regarding Workforce Relevant Educational Requirements:

On page 210 of its 2026-2028 Base WMP, Liberty states that it requires a "bachelor's degree or equivalent" for Vegetation Management Supervisor, and System Arborist/Forester roles. Liberty does not indicate that it has education requirements for any other vegetation management roles.

a. Does Liberty require relevant education for any positions other than Vegetation Management Supervisor and System Arborist/Forester (e.g., degrees in Forestry, Environmental Science, Natural Resources, Biology, etc.)?

    i. For positions with educational requirements, indicate each position and the level of education Liberty requires.

    ii. For positions without educational requirements, indicate each position and describe why these positions do not have minimum educational requirements

Response:

Generally, Liberty's minimum educational requirement for internal vegetation management positions is a bachelor's degree or equivalent. Relevant work experience may be an exception to the minimum educational requirement for these positions. All other vegetation management roles are staffed through contracted vendors, as those positions are technical in nature.

Q06. Regarding Eagle Rock Analytics Report:

In Liberty's response to area for continued improvement LU-23-18 "Weather Station Optimization" Liberty indicated it has "engaged Eagle Rock Analytics to perform a weather station optimization analysis for its system to evaluate how well the network captures the diversity of climate conditions within Liberty's territory."

In Data Request OEIS-P-WMP_2024-LU-003 (Question 01), Liberty stated that it expected to receive the Weather Station Optimization final analysis from Eagle Rock Analytics by the end of 2024, and that, "Liberty will provide the final analysis in its next WMP submission or in response to stakeholder request."

a. Provide the Weather Station Optimization report from Eagle Rock Analytics.

Response:

The results of the analysis performed by Eagle Rock Analytics were provided in the form of GIS data. Please refer to attachments: "Liberty Response_DR-002-Q06.i" and "Liberty Response_DR-002-Q06.ii" for the weather station optimization analysis.

Q07. Regarding Risk Reduction Values Presented in Table 8-1:

a. Some risk reduction values are presented as negative, implying an increase in risk within the service territory.
   i. Explain if the intent was for these values not to include a negative sign
   ii. Or clarify why these values have a negative sign

b. All risk reductions percentages reported in Table 8-1 should be at a service territory level and should represent how much impact an activity has that year on its service territory. Are the risk reduction values reported in Table 8-1 calculated at a service territory level or circuit/segment level?

c. Explain why the anticipated risk reduction for certain activities, such as covered conductor installation, appears to remain constant (e.g., 0.3%) over multiple years despite varying annual circuit mile targets.

d. Provide calculations in an Excel file of each calculated risk reduction per year and per activity.

Response:

a.

i. The negative values presented in the risk reduction results are outputs from the risk model and reflect statistically non-significant changes in risk. These values do not indicate an actual increase in risk but rather result from the inherent variability in the simulation process.

ii. The model, developed by Direxyon, employs a stochastic simulation methodology. This approach incorporates randomness to account for uncertainty in future outcomes. Each scenario is simulated 100 times, and in each iteration, the probability of a risk event is randomly selected at the segment level. This process generates a distribution of risk values for each investment scenario.

Negative values may occur when the investment level is insufficient to produce a consistent and measurable reduction in risk across all simulated futures. In such cases, small improvements may be obscured by the variability introduced through random sampling. As a result, the average risk reduction may appear negative, even though the initiative does not increase risk. Instead, the model is indicating that the effect is not statistically distinguishable from zero.

When all initiatives are simulated in combination, the cumulative investment demonstrates a clear and consistent reduction in risk. However, when initiatives are evaluated individually, their isolated impact at the service territory level may be too small to register as statistically significant within the model's variability. Increasing the number of simulation iterations could reduce this variability, as the average risk values tend to converge with more runs.

b. The risk reduction values reported in Table 8-1 are calculated at a service territory level.

c. Risk reduction was calculated and reported in Table 8-1 as a three-year average over the 2026-2028 Wildfire Mitigation Plan.

d. Please refer to attachment "Liberty Response_DR-002-Q07" for the results of the simulations of each calculated risk reduction per year and per activity. Additional information regarding calculations is provided in *Section 2.2: Utility Risk Model* of the Phase 3-Implementation of DIREXYON Suite and WMP Support (2025) Final Report.

Q08. Regarding Traditional Overhead Hardening (WMP-GDOM-GH-05):

On page 123 of its 2026-2028 Base WMP, Liberty states, “Traditional overhead hardening typically includes installation of stronger poles, modern conductor, shorter spans, increased phase spacing, reduced sag, and hardware upgrades such as brackets, crossarms, insulators, fuses, and arrestors.” Additionally, in Table 8-1, Liberty's three-year target for its traditional overhead hardening activity is 3.3 circuit miles.

a. Provide a complete description of the scope of work planned for the 3.3 circuit miles of this activity.

   i. What percentage of these miles will replace existing bare wire conductor?

   ii. Explain what “modern conductor” means, and how this conductor differs from the existing conductor being replaced.

   iii. Explain how covered conductor differs from “modern conductor.” Include a description of the insulation Liberty uses for covered conductor.

b. Additionally, on page 124 of its 2026-2028 Base WMP, Liberty states that "traditional overhead hardening remains a cost-effective and versatile approach, particularly in areas where forest density or terrain constraints make covered conductor or undergrounding less feasible."

   i. Explain why it is not feasible to replace the existing bare wire conductor with covered conductor in these locations.

c. Lastly, in its response to ACI LU-23B-06 (Effectiveness of Sensitive Relay Profile ["SRP"] and Traditional Hardening), Liberty noted "Normal Replacement Baseline" as a project (Appendix D, Table 1-2: Comparison of Risk Calculations).

   i. Explain how "Normal Replacement Baseline" is the same or different compared to traditional overhead hardening activity.

Response:

a.

i. The 3.3 circuit miles of traditional overhead hardening planned will consist of targeted rebuilds of existing overhead electric distribution lines in high fire threat districts (HFTDs). The scope of work includes:

- Replacement of aging or undersized poles with stronger poles rated for higher wind and loading conditions.
- Replacement of aged, damaged, or inadequate hardware such as insulators, crossarms, brackets, fuses, and arrestors.
- Installation of modern conductor (ACSR) to replace aging conductor.

- Shortening of spans, where feasible, to reduce mechanical stress and potential conductor slap.
- Increasing phase spacing and reducing sag to minimize the potential for line-to-line contact or conductor-to-vegetation interactions.

This scope is aimed at improving mechanical integrity and electrical reliability in areas where more advanced mitigation strategies (e.g., covered conductor or undergrounding) are constrained by terrain, environmental, or economic considerations.

Approximately 90–100% of the 3.3 circuit miles will involve the replacement of existing bare wire conductor. Traditional overhead hardening efforts under this initiative are generally tied to full-line segment rebuilds, which include the removal of degraded bare wire and installation of modern alternatives.

ii. "Modern conductor" refers to bare wire conductor that meets current electrical and mechanical standards for strength, ampacity, and durability. Liberty's standard is ACSR.

iii. Covered conductor is ACSR tree wire with a polyethylene jacket. This jacket helps reduce ignition risk from wire slap and incidental vegetation contact, but it is not considered insulated by NESC, and standard spacing requirements still apply. In contrast, "modern conductor" refers to bare ACSR (as described above) that meets the current standards for strength, corrosion resistance, and ampacity, but has no outer jacket. Liberty uses both types, depending on site conditions.

b.

i. Covered conductor is typically used in dense forest areas where it's not feasible to widen crossarms or interset poles, due to environmental constraints, such as steep terrain, limited access, or hard granite. In these areas, the added jacket on covered conductor helps reduce ignition risk from vegetation contact or wire slap.

If there is space to widen crossarms and safely interset poles, Liberty uses traditional overhead hardening with modern bare conductor. This approach offers similar risk reduction as covered conductor but is more efficient to install and more cost effective.

c.

i. The Normal Replacement Baseline is part of Liberty's broader resiliency program and refers to isolated pole and equipment replacements driven by asset condition assessments or inspections. These are typically reactive or maintenance-driven and do not include full line rebuilds.

In contrast, Traditional Overhead Hardening consists of planned projects that target specific high-fire-risk areas identified through Liberty's risk analysis. These projects involve replacing conductor identified as needing replacement, along with structural

upgrades such as pole intersets, reconductoring, crossarm widening, and hardware replacement.

Q09. Regarding Emerging Grid Hardening Technology Installations and Pilot Progress:

On page 125 of its 2026-2028 Base WMP, Liberty states that it "is not currently piloting additional grid hardening technologies and at this time does not have new emerging technologies to report in its 2026-2028 WMP."

a. What additional grid hardening technologies, if any, were considered for piloting and why did Liberty decide not to pursue them for piloting?

Response:

Currently, Liberty is not piloting or evaluating specific emerging grid hardening technologies. As a smaller utility with limited resources, Liberty leverages research and pilot results from larger IOUs to inform the future adoption of technologies. Liberty actively participates in joint IOU calls and working groups to stay aligned with proven, cost-effective technologies.

Q10. Regarding Covered Conductor Installation:

On page 118 of its 2026-2028 Base WMP, Liberty states that "when a conductor is covered, it is assumed that the Probability of Ignition (POI) calculated by Technosylva is reduced to account for the effectiveness of the mitigation strategy. For bare conductors, the electrical fire probability remains equal to the POI provided by Technosylva. For covered conductor, the POI is reduced by 50% based on the assumed effectiveness of the activity." On page 119 of its 2026-2028 Base WMP, Liberty provides cause-specific reductions used in the model (i.e. "60% reduction in corrosion-related failures," "20% reduction in lightning-related failures," etc.).

a. How was the 50% POI reduction determined?

   i. Provide an explanation and documentation to support this reduction percentage.

b. Explain how each of the following cause-specific reductions were determined. For each reduction percentage listed below, provide explanations and documentation to support these figures:

   i. "60% reduction in corrosion-related failures"

   ii. "20% reduction in lightning-related failures"

   iii. "10% reduction in mechanical failures"

iv. "70% reduction in animal-related failures"

v. "75% reduction in tree-related failures"

vi. "40% reduction in unknown causes"

Response:

a. Liberty assumed a 50% reduction in the Probability of Ignition (POI) for covered conductor in its 2026–2028 Wildfire Mitigation Plan based on a combination of factors, including subject matter expertise, joint IOU working groups, and industry research. This assumption reflects a conservative estimate of mitigation effectiveness, consistent with findings from the Joint IOU Covered Conductor Effectiveness Workstream, which included lab testing, field data, and SME input.

Additional supporting references include:

- TDWorld: Covered Conductor – A Wildfire Mitigation Solution
- Edison: Insulated Wires Help Reduce Wildfire Risk
- Marmon Utility: Wildfire Mitigation with Aerial Covered Conductor
- IIT Kharagpur: High Voltage Lab – Covered Conductor Behavior

While some sources suggest higher ignition reduction potential, Liberty selected a conservative 50% reduction to avoid overestimating mitigation benefits in its risk model.

b. The explanations and documentation to support each of the reductions listed are provided in *Section 8.1, Annex 1: Conductor Failure model and vegetation* of the Phase 3-Implementation of DIREXYON Suite and WMP Support (2025) Final Report.

Q11. Regarding Fire Risk Maps:

On pages 68-69 of its 2026-2028 Base WMP, Liberty provided Figures 5-4 and 5-5 showing Fire Risk Maps.

a. Provide higher quality and high-resolution files as a PDF for Figures 5-4 and 5-5 that clearly show the differentiated sections on the maps.

Response:

Refer to attachment "Liberty Response_DR-002-Q11"