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August 6, 2025

DATA REQUEST RESPONSE
LIBERTY UTILITIES (LIBERTY)

Data Request No.:	OEIS-P-WMP_2025-Liberty-008
Requesting Party:	Office of Energy Infrastructure Safety
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Date Received:	August 1, 2025
Due Date:	August 6, 2025

Subject:
Q01. Regarding Data Request OEIS-P-WMP_2025-Liberty-006
Q02. Regarding Risk Calculations

Q01. Regarding Data Request OEIS-P-WMP_2025-Liberty-006:

a. Regarding OEIS Data Request 6, Question 4 parts b and c:

i. Provide the percentage of PSPS risk influenced by EPSS/PEDS/SRP.

ii. In the utility risk equation in Section 5.2.2.3 (Liberty 2026-2028 Base WMP, p. 49), is "PSPS Risk" used for determining Utility Risk equivalent to "Outage Program Risk"? If not, explain why Outage Program Risk is not used.

b. Regarding OEIS Data Request 6, Questions 5 parts c and e:

i. Provide units for the PEDS likelihood equation inputs and provide units for the final output.

ii. Provide the documentation for how Arup developed the PSPS multiplier equation.

Response:

a. Liberty is not clear what OEIS data request is being referenced in this question. OEIS Data Request 6, Question 4 requests the miles for traditional hardening completed among the HFTD zones. Furthermore, OEIS Data Request 6, Question 4 does not have a part b or c. Despite the question not being clear, Liberty will attempt to respond below.

i. There is no difference between EPSS and SRP in Liberty's risk modeling. The only PEDS in the model is EPSS; captured as one strategy in the model. Liberty can add different types of PEDS to the model, but currently only EPSS (or SRP) exist. Comparing the simulation with and without SRP, there is a difference of 66% for 2025 (when circuits are weighted by conductor length) or 75% (average value). The percentage varies from year to year because EPSS risk can change based on asset health.

ii. No, because it was not specified when the logic was created for the model.

b. Liberty is not clear which OEIS Data Request is being referenced in this question. OEIS Data Request 6, Question 5, part c explains how Liberty determined is circuit miles target for traditional overhead hardening and is not related to the PSPS multiplier equation developed by Arup. Furthermore, there is no OEIS Data Request 6, Question 5, part e.

Q02. Regarding Risk Calculations:

a. Provide a step-by-step example demonstration for how risk is calculated for one of the top circuits in Table 5-6 on page 72 of Liberty's 2026-2028 Base WMP.

b. Explain why Fuse Type is a top risk contributor for each of the top risk circuits in Table 5-6 on page 72 of Liberty's 2026-2028 Base WMP.

i. Explain how this is related to the Expulsion Fuse Replacements described in Section 8.2.12.2.

ii. Explain how this is related to the "Weibull distribution with age dimension" described on page 20 of the Direxyon report

Response:

a. The value in the WMP table is an average of all iterations simulated. Since Liberty is looking at the first simulated year, the principal difference between iteration is principally due to the variation in all distributions, random value picked, and strategy applied. See below for an example of one iteration:

Simulation for future reference

- Id: 13994
- Iteration: 1
- Year: 2025
- circuit: CEM41

Step 1 : PSPS

- The probability of having at least one event of high wind during the high FFWI days.
    - This probability between is calculated using the weather station data (see Direxyon report).
    - This table is imported in the platform with the number of FFWI days wind gust probability.

The following table represents the projected probability of each wind category for **circuit CEM41:**

Wind category mph	Projected probability
Below 35	0.896
35-39	0.049
40-44	0.041
45-49	0.01
50-54	0.005
55-59	0
60+	0.0001

The following table represents the results of this analysis for **circuit CEM41**:

FFWI Category	Number of records in 2024
Less than 45	351
45 - 49	6
50 - 54	7
55 - 59	1
60 - 64	0
65 - 69	1
70+	0

Probability of PSPS : 0.12

- The probability of having high wind during a high FFWI day (refer to Direxyon report included in Appendix B of Liberty's 2026-2028 Base WMP for more details). Since these values were produced, Liberty has made improvements to the model.
    - In the result presented in Liberty's 2026-2028 Base WMP (simulation 13994) the probability was 12%.
    - In future simulation the calculation will be: 1 - pow((1 - Problematic wind gust probability (PSPS)),Number of Days with high FFWI) = Probability of PSPS.
        - For CEM41 the probability is around 4%.
    - SRP will reduce the number of days with high FFWI since those days will be managed with SRP (or EPSS).
    - The wind gust is considered equal for all days, however, with additional data, Liberty could find a link between high FFWI days and wind gust. Currently, the two numbers are independent.

Consequence of PSPS : 0.03746

- For an explanation of consequence of PSPS, refer to the Direxyon Report included in Appendix B of Liberty's 2026-2028 Base WMP, Section 2.2.2.2 and the Arup documentation.
    - The PSPS duration is random value (minutes) picked in a triangular distribution (480,840,1200).

PSPS Risk: 0.004495

- Probability of PSPS x PSPS Consequence = PSPS Risk.

Step 2 : Wildfire Risk

- Refer to Direxyon Report 2.2.1, included in Appendix B of Liberty's 2026-2028 Base WMP.

Probability of Fire: 0.001008

- Average probability of fire of all assets in the circuit.

Consequence of Fire: 0.04866

- Scaled weighted consequence of the circuit.

Wildfire Risk : 0.112272

- Probability of Fire x Consequence of Fire = Fire Risk.

Step 3 : EPSS Risk

Probability of EPSS : 0

- The value is not always 0 but it was for this iteration. Like the probability of PSPS, an improvement has been applied to the model to correct the probability calculation:
    - 1 - pow((1 - *Average - Probability of Failure* x *Probability of having at least 95th percentile weather*),*Count - Asset (CON+SCO+POL+OHF)*) = *Probability of EPSS*

Consequence of EPSS : 0

- Scaled weighted consequence of the circuit.

Wildfire Risk : 0

- Probability of EPSS x Consequence of EPSS = Fire Risk.

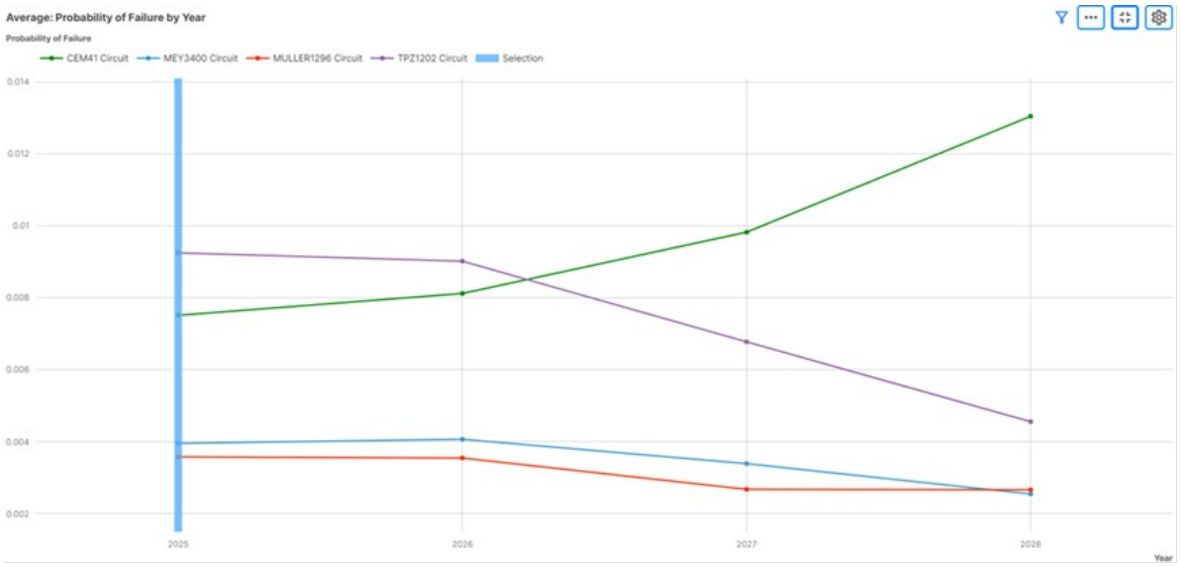
Step 4 : KPIs

- Overall Utility Risk = Average of PSPS Risk and wildfire Risk.
    - EPSS risk is not considered.
- Wildfire Risk = Step 2.
- Outage Program Risk = Average of PSPS Risk and EPSS Risk.

b.

i.

- Liberty's asset count, which is used in the probability of failure, includes the following:
    - Conductor: 17866
    - Overhead Fuse: 15235
    - Pole: 36415
    - Secondary Conductor: 17762
- Fuse type impacts the probability of fire because, in the model, fuse failure can cause outages and outages can cause fire (see Direxyon Report section 2.2.1).
- Fuse Probability of failure uses age to pick a probability of failure in a Weibull distribution:
    - 0 years old a fuse has 0.21% chance of breaking.
    - 15 years old a fuse has 0.91% chance of breaking.
    - 43 years old a fuse has 70% chance of breaking.
- When a failure occurs, a fuse has 70% chance of generating an outage.
    - This is an estimate based on a text analysis of workorders.
- CEM41 has an average fuse age of 11 years old, and the average age of the fuse, even with replacements, goes up in future years.



- Assuming averages:
    - Probability of failures average at 0.0054% for this circuit for 2025.
    - Asset count for this circuit: 149+1079+461+550 = 2239.
    - Average POI for 2025: 0.53%.
    - 2239 * 0.0054*0.7*0.53 = 4.5 simulated fire per year cause by fuse for the top 4 circuits.
    - This is an estimate based on non-weighted averages and the results actually use a stochastic approach, so these numbers can vary between iterations.

i. Fuse Probability of failure uses age to pick a probability of failure in a Weibull distribution:

a. 0 years old a fuse has 0.21% chance of breaking.

b. 15 years old a fuse has 0.91% chance of breaking.

c. 43 years old a fuse has 70% chance of breaking.