



Florida Keys Electric Cooperative, Inc.

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Re: Hurricane Irma Docket No. 20170215-EU - Review of electric utility hurricane preparedness and restoration actions.

Overview

Hurricane Irma struck the Florida Keys in the early morning of Sunday, September 10, 2017. Sunday afternoon after the storm had passed, 90% of Florida Keys Electric Cooperative's (FKEC) members were without power.

FKEC began the restoration efforts with the 32 FKEC employees who had not evacuated during the storm on Monday morning, September 11. By Wednesday, September 13, FKEC had 115 employees and over 350 contract workers participating in the restoration effort.

No transmission structures or substations suffered major damage during the storm. The transmission system and all six substations were restored by Monday afternoon, September 11. Approximately 50% of FKEC's main line distribution feeders were partially or completely restored during the same period of time.

By the end of day on Tuesday, September 12 approximately 75% of FKEC's main line distribution feeders were partially or completely restored. The vast majority of FKEC critical infrastructure members were also restored by Tuesday evening, September 12.

Power was restored to 98% of FKEC's members by Tuesday, September 19. All of FKEC's members who were able to receive power were restored by Saturday, September 23.

Final Tally

Outside Assistance:

- 40 – electric line construction crews
- 23 – tree crews
- 12 – Damage Assessment Teams
- 2 – base camps (sleep 300/feed 400)

Distribution Poles Replaced: Approximately 175
Distribution Poles Worked On: Approximately 1,200
Transmission Poles Replaced: Zero
Transmission Poles Worked On: Approximately 150
Services Replaced: Approximately 1,100
Lost Time Injuries (FKEC and Contractors): ZERO

The following are Florida Keys Electric Cooperative's responses to the data request pertaining to Docket No. 2017215-EU – Review of electric utility hurricane preparedness and restoration actions.

Note: Florida Keys Electric Cooperative (FKEC) was not impacted by Hurricanes Hermine, Matthew, Maria, and Nate. The following responses pertain to Hurricane Irma only.

Staging for Utility Personnel and Mutual Aid/Outside Contractors

1. Please describe the pre-storm coordination process for Hurricane Irma. The description should include:
 - a. Dates and topics of internal meetings held after Irma was named.
 - *FKEC began following Invest 93 soon after it rolled off the coast of Africa on August 29, 2017. By August 31 Hurricane Irma was considered a potential threat. FKEC notified all employees on Friday, September 1 that management believed Irma to be a genuine threat and encouraged everyone to prepare their homes and finalize personal hurricane plans over the Labor Day weekend. Employees were also reminded that all leaves would be cancelled for the following week if Hurricane Irma continued to track towards South Florida.*
 - *FKEC's executive team conferred via phone conference on Labor Day, Monday September 4 and made the decision to activate FKEC's Five Day Major Storm Plan the following day, Tuesday, September 5.*
 - *A brief stand-up meeting was held with all employees at 0800 on Tuesday, September 5 to brief everyone regarding the current Irma forecast and FKEC's Major Storm Plan including FKEC policies regarding evacuations and employee returns.*
 - *FKEC's management team met at 0830 on Tuesday, September 5. The Five Day Major Storm Plan was activated and specific assignments were made. These assignments included securing FKEC facilities, stocking food and supplies to be self-sufficient through the storm and for 3-5 days following, and communications with suppliers, mutual aid partners, and outside contractors.*
 - *FKEC participated in the daily morning and evening Monroe County EOC conference calls. The morning conference calls were followed each day by an FKEC management staff meeting to review the progress of the storm preparations. Additional assignments were made as needed.*
 - b. Dates and topics of external communication pertaining to mutual aid/outside contractors held after Irma was named.
 - *Following the activation of the Five Day Major Storm Plan on Tuesday, September 5, suppliers, mutual aid partners, and outside contractors were contacted to determine their abilities to assist in possible storm restoration efforts. It quickly became evident that Irma's potential impact to the entire Florida peninsula and much of the southeast all but eliminated the possibility of assistance from FKEC's traditional mutual aid partners. FKEC opted to pursue outside contractors to provide restoration assistance.*

- *FKEC was able to confirm the availability of contract restoration crews and base camp facilities as of Tuesday, September 5 but the resources were quickly being secured by other utilities.*
- c. Date mutual aid/outside contractors were requested and nature of request.
- *FKEC made the decision to secure restoration resources utilizing outside contractors on Wednesday, September 6. Resource commitments were secured from six different contractors by Friday, September 8:*
 - *40 electric line construction crews (265 workers)*
 - *23 tree crews (60 workers)*
 - *12 Damage Assessment Teams (24 workers)*
 - *2 Base Camps to sleep 300 workers and feed 400 workers (30 workers)*
2. Please provide a detailed description of the utility's allocation of storm duties for all FKEC personnel. This should include a description of each function and the number of utility personnel assigned.
- *FKEC does not require any employees to remain in the Florida Keys if a mandatory residential evacuation order is given. Monroe County issued a mandatory residential evacuation Wednesday evening, September 6.*
 - *FKEC employees choosing to evacuate were released at the end of their shift on Wednesday, September 6. Each employee who evacuated was issued a Monroe County Emergency Worker reentry badge and were directed to return to work immediately following the storm.*
 - *FKEC employees choosing to stay finalized storm preparations and responded to emergencies until Mariners Hospital closed at 1900, Thursday, September 7. Following the hospital closure, only low risk activities continued due to the lack of critical care facilities.*
 - *Eighty-three of FKEC's 115 employees evacuated. Twenty-six FKEC employees moved into FKEC's Tavernier and Marathon facilities to ride out the storm. Six employees rode the storm out in their homes.*
 - *Hurricane Irma hit the Florida Keys in the early hours of Sunday, September 10. At the request of the Monroe County EOC, FKEC sent out teams (approximately 10 employees) Sunday afternoon with tropical force winds still blowing to assist in efforts to clear the main road from Ocean Reef to Islamorada.*
 - *Beginning at day break on Monday, September 11, FKEC began restoration efforts with the following low risk activities:*
 - *Visually inspect all transmission structures and distribution main feeders (10 employees)*
 - *Visually inspect all substations (3 employees)*
 - *Visually inspect and prepare the Tavernier and Marathon Operation Centers for the return to full operation (7 employees)*
 - *Established communications with our outside contractors to begin the process of their deployment into the Florida Keys (3 employees)*
 - *Maintain communications with the Monroe County and State of Florida EOC's. (3 employees)*

- *Prepare meals and provide support for employees staying in the FKEC facilities (5 employees)*
- *Most of the FKEC employees who had evacuated reported back to work by Monday afternoon, September 11 or early Tuesday, September 12. Temporary trauma care was restored via Life Flight Medical Helicopter service, and local EMT coverage on Tuesday morning which allowed FKEC's crews to resume line work.*
- *On Tuesday, September 12 the following activities took place:*
 - *FKEC line crews made up of two or three Lineworkers began restoring critical loads and repairing the main distribution lines (25 employees)*
 - *FKEC tree trimming crews began clearing access for the line crews (10 employees)*
 - *FKEC engineering, accounting, and customer service employees began damage assessment of the distribution facilities (20 employees)*
 - *FKEC warehouse operations resumed to support the line crews (6 employees)*
 - *Maintain communications with the Monroe County and State of Florida EOC's. (3 employees)*
 - *Prepare meals and provide support for employees staying in the FKEC facilities (5 employees)*
 - *During the day on Tuesday, September 13 the base camp resources and many of the outside contract crews began arriving. All contract crews received an extensive safety briefing identifying hazards, an overview of the FKEC system, and a detailed explanation of the work plan prior to beginning work the next day.*
- *By Wednesday morning, September 13 the majority of the outside contractor resources arrived and began work. FKEC line crews were dismantled and assigned contractor crew liaison duties. Work teams made up of an FKEC journeyman lineman, 2-4 contractor construction crews, 1-2 tree trimming crews, and a contractor damage assessment team were assigned to a specific feeder. An FKEC office employee was assigned to each work team to assist with documentation, photos and other administrative duties.*
- *During the day on Wednesday, September 13 the following activities took place:*
 - *Outside contract line crews began restoration on transmission and distribution facilities support by FKEC employees (265 outside contract workers and 50 FKEC employees)*
 - *Outside contract tree crews supported by FKEC tree crews worked ahead of the line construction crews to clear impeding vegetation (57 outside contract workers and 10 FKEC employees)*
 - *Outside contract damage assessment teams supported by the FKEC engineering department began documenting the damage on all distribution facilities (24 outside contract workers and 10 FKEC employees)*
 - *Warehouse operations were ramped up to support the restoration effort (6 outside contract employees and 6 FKEC employees)*
 - *Maintain communications with the Monroe County and State of Florida EOC's. (3 employees)*
 - *Base camps with kitchens, dining tents, laundry, showers, and sleep trailers were established at Founders Park in Islamorada and FKEC's Marathon facility to fully support 150 workers and feed 200 plus workers at each location (30 outside contract workers)*

- *The work assignments for Wednesday, September 13 were repeated each day until outside contract crews began being released on Wednesday, September 20.*
 - *On Thursday, September 21 the work teams were broken up as FKEC transitioned to mostly service work. The majority of the outside contract workers were released by Saturday, September 23 and the formal restoration effort was officially closed.*
3. When did the costs for Hurricane Irma begin to accrue for receiving mutual aid/outside contractors?
- *FKEC committed to the mobilization costs for the base camps and outside crews on Wednesday, September 6 and Thursday September 7. Actual costs began accruing on Friday, September 8 as the outside contract resources began actual mobilization and staging in various secure locations as close to the Florida Keys as Irma would allow.*

Damage Assessment Process

4. Please provide a detailed overview of the initial damage assessment process for Hurricane Irma including the number of utility employees or contractors involved, their duties, and how initial damage assessment is disseminated within the utility to assist in restoration activities. Additionally, please provide photographs or other visual media that memorializes storm damage, which was documented during the initial damage assessment process.
- *At first light on Monday, September 11, 2017 a limited number of FKEC personnel began visually inspecting the transmission system, the substations and the main distribution feeder backbones. Any damage found in this inspection was relayed to SCADA and FKEC's storm team via company radios.*
 - *The detailed damage assessment began Tuesday, September 12 utilizing 4 two-person Damage Assessment Field Teams staffed by FKEC personnel. The effort expanded to 12 two-person Damage Assessment Contractor Field Teams assisted by FKEC staff in support roles on Wednesday, September 13. The teams drove every distribution line in the system, starting with the main line feeders and then progressing to the lateral feeders.*
 - *To gather data as fast as possible, FKEC utilized a combination of paper maps and tablets to efficiently gather the data and communicate it back to the office for input into the Geographic Information System (GIS). At the end of day 2, we had assessed nearly 80% of the primary system. The initial damage assessment of the entire system was completed by Friday, September 16.*
 - *Once the damage assessment information was put into GIS, FKEC was able to do a database query to create a list of all material needed to restore the system. A complete list of the materials was provided to our purchasing department and storm team.*
 - *FKEC was also able to utilize the GIS map to visually "fly over" the system to see where the damage locations were, and visually get a quick look at how many meters were affected by each damage location. In this way, the map could quickly show us the locations that required the least effort to restore power to the most meters. The system enabled us to "pick the low hanging fruit first".*

- *Once the initial damage assessment was completed, we sent four teams out to photograph the damage locations. These photos have been geospatially linked to our GIS map.*
 - *Photographs located in Attachment A.*
5. Please provide a description of how damage assessment data is updated and communicated internally.
- *The GIS team consisted of two GIS Technicians, a GIS Supervisor and several employees from other departments who had been trained during our storm preparation and practice in the years before the storm. This team received the paper maps periodically from the Damage Assessment Field Teams and immediately transferred the damage points to the GIS map.*
 - *The GIS map data is located on the system server, and users in the cooperative offices periodically re-synchronize with the system server to see the latest updated damage points.*
 - *As damage was repaired, the GIS team marked the damage points “completed”, which removed them from the user’s view. All damage point locations and codes have been retained in the GIS system.*

Restoration Workload

6. Please provide a detailed description of how the utility determines when and where to start restoration efforts.

Immediately following a storm low risk damage assessment activities and SCADA switching commences. Actual line repairs cannot begin until critical health care capabilities are restored. Once that happens the following response/repair priorities are utilized during the restoration efforts:

- *Public Safety*
- *Transmission Facilities*
- *Substations*
- *Distribution Main Line Feeders*
- *Critical Infrastructure*
 - *First responder and Government EOC locations*
 - *Hospitals so that they can re-open*
 - *Water, sewer, and communications*
 - *Critical businesses (hardware stores, grocery stores, ice providers, gas stations, hotels, etc.)*
- *Distribution Lateral feeders (progressing from the largest number of members down to the fewest)*
- *Remaining Services*

FKEC is unique in that we are 75 miles long and about a mile wide on average. Our mainline distribution feeders are underbuilt under our radial transmission lines along the Overseas Highway. The two hospitals, sheriff and fire stations, Marathon airport, water

pump stations, waste water treatment plants, etc. are almost all served from the main distribution feeders. As FKEC restores the transmission system, substations, and main distribution feeders we will have restored service to most if not all of the critical infrastructure. Likewise we cannot restore the critical infrastructure until we restore the transmission, substation, and main distribution line.

During Irma we worked closely with the Monroe County EOC, first responder organizations, and other utilities (water, sewer, and communication) to ensure all critical loads came online as expected when the main distribution feeders were restored adjacent to a critical load.

The two hospitals in FKEC’s service territory were closed due to mandatory resident evacuations. FKEC was able to restore power to both locations prior to their staff returning.

Additionally, all of the critical loads, area Publix and Winn Dixie supermarkets, and many of the hotels and gas stations have stand-by generators. This was somewhat problematic however as many of these generators were not well maintained and adequate fuel for extended run times was not provided for.

7. For Hurricane Irma please complete the following table on workload priority:

Personnel Responsible for Restoration Workload Assignments		
Title	Years of experience	Number of crews managed
<i>Chief Operating Officer</i>	<i>37</i>	<i>0</i>
<i>Director of Distribution Operations</i>	<i>35</i>	<i>30</i>
<i>Director of Safety, Loss Control & Procurement</i>	<i>25</i>	<i>33</i>

8. Please provide a description of how restoration workload adjusts based on work completed and updates to damage assessments.

Before contractor crews arrived, FKEC Line Workers focused solely on restoring main line feeders and critical infrastructure. When contractor crews arrived they were divided and assigned to an FKEC Line Worker creating a platoon. The FKEC system was divided into circuits/sections and assigned to a platoon with restoration remaining focused on main feeder and critical infrastructure based on early damage assessment information. As the assignments were restored the platoons were re-assigned to the areas on a priority level basis and provided all damage assessment information. The FKEC Line Workers were available to assess damage ahead of the platoon, and were constantly provided updates from damage assessors continually monitoring the infrastructure.

9. If applicable, please describe how mutual aid/outside contractors were determined to be no longer needed following Hurricane Irma.

FKEC continually monitored the progress on restoration efforts. At the end of each day the restoration workload was assessed, and number of crews required determined. When the restoration work was identified less than the number of outside crews needed, crews were released. The crews were released by contractor, with re-assignment of remaining crews to the workload, to the point FKEC Line Workers could effectively provide restoration.

Staffing Considerations

10. Regarding Hurricane Irma, please provide the following:
- Days of lodging provided for Utility personnel (Person-Days) – *approximately 250*
 - Days of lodging provided for contractors (Person-Days) – *approximately 4,000*
 - Number of meals provided for Utility personnel – *approximately 7,000*
 - Number of meals provided for contractors – *approximately 12,000*
 - Number of Utility personnel injuries – *Zero loss time injuries*
 - Number of contractor injuries – *Zero loss time injuries*
 - Number of Utility personnel fatalities - *None*
 - Number of contractor fatalities- *None*

Please note any delays in restoration associated with items e-h above.

N/A

11. Please provide a detailed description of when your Utility was considered fully restored from Hurricane Irma.

All of FKEC's members who were able to receive power were restored by Saturday, September 23, 2017.

Customer Communication

12. Regarding Hurricane Irma, please respond to the following for each county in the Utility's service territory affected by the storms.
- Total number of customer accounts – *33,882 total accounts prior to Irma*
 - Peak number of outages – *90% (30,400 accounts)*

13. Please provide how call center customer service representatives were utilized before, during and after Hurricane Irma.:

FKEC does not have a call center, however our incoming customer contacts were received using the following channels:

Before:

September 7-10 – calls directed to inter-active voice response (IVR) only

During:

September 11-12 – no communication available (AT&T/Comcast system outage)

After:

September 13 – communications restored – calls directed to IVR only

September 14 – All available office staff taking live calls

September 18 – Tavernier area office re-opened for business

September 25 – Marathon area office re-opened for business

14. Please provide the number of customer service representatives the Utility had during Hurricane Irma.
- a. Were there additional personal deployed or 3rd party entities utilized to help address customer contacts during each named storm event? If so, how many?

None

15. Please provide the number of customer contacts received by the customer call center(s) during Hurricane Irma.

No valid available data / call center not utilized

16. Please provide all methods (call centers, email, Utility website, etc.) utilized to submit and collect customer contacts before, during, and after Hurricane Irma.

Before:

September 7-9 – IVR, email, SmartHub (online account management) & Social Media

During:

September 10-11 – IVR, email, SmartHub, Outage Management System (OMS) & Social Media

After:

September 11-12 – email, SmartHub & Social Media – no communication available (AT&T/Comcast system outage)

September 13 – communications restored – IVR, email, SmartHub, OMS & Social Media

17. Please describe the step by step process(es) by which customer contacts are addressed before, during, and after a named storm event. If different during each timeframe, please describe the step by step process during each separately.

All contacts received through all channels as indicated above in #16. The reported information was then given to our System Control Operators who subsequently dispatched to the field.

- a. Did the utility identify any delays in restoration as a result of addressing customer contacts related to Hurricane Irma? If so, please provide detail.

None that can be specifically identified.

18. Please provide whether or not customer contacts are categorized (by concern, complaint, information request, etc.) If so, how are they categorized? If not, why not?

Yes, by concern and/or complaint (i.e. critical infrastructure, line(s) down posing a life-threatening situation, environmental concerns (transformer down), no power, geographic area, and vegetation issues).

19. Please provide a detailed description of how customer service representatives are informed of restoration progress.

Direct updates were provided at the beginning and end of each day during the restoration process by upper level management including the CEO, COO, and CFO as well as Operations Supervisors.

- a. Is there a script provided to each customer service representative to relay restoration progress to customers? If so, what is the process by which the script is created?

The script provided to CSR's followed our primary restoration strategy (transmission/main line work will be addressed first – then the distribution/feeders to neighborhoods – then individual member outages). The script was updated regularly based on the progress of the restoration and updates were also posted on Social Media.

20. Please describe the process the Utility uses to notify customers of approximate restoration times. The response should include at a minimum:

- a. How restoration time estimates were determined.

No estimates were provided.

- b. How customers are notified.

If an inquiry was made by a member we advised no estimates could be provided and would refer to our restoration strategy.

- c. How restoration time estimates are updated.

No estimates were provided.

- d. How restoration time estimates are disseminated internally, to the county and state Emergency Operations Centers, and to the public.

Via daily (morning and afternoon) County EOC calls with executive staff.

Material Considerations

21. Regarding Hurricane Irma, please provide a description of how vehicle fuel was procured for Utility personnel and mutual aid partners. As part of the response, please answer the following:

a. Whether or not the Utility has fuel stored for these types of events

FKEC has approximately 2 weeks of fuel on hand for normal working circumstances. FKEC also has large quantities of dyed-diesel fuel on hand at the Marathon generation facility. Governor Scott's declaration allowing the use of dyed-diesel allowed FKEC to use generator diesel fuel until our diesel fuel vendor could arrive.

b. Whether or not fuel shortage was an issue during these events

Fuel shortages were not an issue at either the Tavernier or Marathon facilities throughout Hurricane Irma.

c. Whether or not there were any delays due to fuel shortage

There were no fuel shortages.

d. Whether or not there were enough vehicles available during these events/any issues mobilizing crews

There was no shortage of vehicles throughout the event.

22. Please detail any complications or delays such as shortage or delayed delivery of materials for Hurricane Irma.

FKEC restoration efforts were not delayed due any delay or shortage of materials. Most materials were received within 36 – 48 hours of being ordered.

Restoration Process

23. Please provide a summary timeline of the utility's restoration process for Hurricane Irma. The timeline should include, but not limited to, staging, stand-down, deployment, re-deployment, allocation, mutual aid/contractors, release of mutual aid/contractors, and date last outage was restored.

Wednesday 9/6/2017:

- *FKEC secures 20 Line crews from Storm Services.*
- *FKEC secures 13 Line crews from Michels Powerline.*

Thursday 9/7/2017:

- *FKEC secures 23 Asplundh tree trimming crews.*

Saturday 9/9/2017:

- *FKEC secures 5 Line crews from D.H. Elliot.*

Monday 9/11/2017:

- *FKEC secures 2 additional D.H. Elliot Line crews.*
- *Asplundh 6 tree trimming crews arrive and are assigned to Tavernier District.*

Tuesday 9/12/2017:

- *Michels Powerline 13 crews arrive and assigned to Tavernier District.*
- *Storm Services 7 Line Crews arrive assigned to Marathon District.*
- *Asplundh 17 crews arrive and are assigned to Tavernier District.*

Wednesday 9/13/2017:

- *Storm Services 13 Line Crews arrive assigned to Marathon District.*
- *D.H. Elliot 7 crews arrive assigned to Tavernier District.*
- *Asplundh 6 crews re-deployed from Tavernier to Marathon District.*

Sunday 9/17/2017:

- *D.H. Elliot 2 Line crews re-deployed from Tavernier to Marathon District.*

Wednesday 9/20/2017:

- *Storm Services 7 Line crews released from Marathon District.*

Friday 9/22/2017:

- *D.H. Elliot 2 Line crews released from Tavernier District.*
- *Michels 1 Line crew released from Tavernier District.*
- *Asplundh 23 tree trimming crews are released.*

Saturday 9/23/17:

- *Storm Services 7 Line crews released from Marathon District.*
- *D.H. Elliot 2 crews released from Marathon District.*
- *Michels 2 Line crews re-deployed to from Tavernier to Marathon District.*

Sunday 9/24/2017:

- *Storm Service 6 Line crews released from Marathon District.*
- *D.H. Elliot 3 crews released from Tavernier District.*
- *Michels 2 Line crews released from Marathon District.*
- *Michels 9 Line crews released from Tavernier District.*

Monday 9/25/2017:

- *Michels 1 Line crew released from Tavernier District.*

Saturday 9/23/17 the last outage was restored.

24. Please explain how the Utility validates adherences and departures from its storm preparation plan.

a. If the Utility does not assess departures from its storm plan, explain why not.

Having no hurricane impact prior to 2017, FKEC is currently assessing the departure from the storm preparation for Irma.

b. If the Utility does not document or otherwise memorialize departures from its storm plan, explain why not.

FKEC has documented the departures.

c. Have departures from the Utility's storm preparation plan resulted in modification of the storm preparation plan during 2015 through 2017? If so, please explain how with examples.

It is anticipated FKEC will implement modifications in areas proven successful during Irma in future storm preparations.

25. Please explain how the Utility validates adherences and departures from its storm restoration plan.

a. If the Utility does not assess departures from its storm restoration plan, explain why not.

Having no hurricane impact prior to 2017, FKEC is currently assessing the departure from the storm restoration executed for Irma.

b. If the Utility does not document or otherwise memorialize departures from its restoration storm plan, explain why not.

FKEC has documented the departures.

c. Have departures from the Utility's storm restoration plan resulted in modification of the storm restoration plan during 2015 through 2017? If so, please explain how with examples.

It is anticipated FKEC will implement modifications in areas proven successful during Irma in future storm restorations.

Outages

26. Please identify all counties, including reporting regions/division for each county if applicable, that were impacted (had outages or damage) due to Hurricane Irma.

FKEC's serves Monroe County from the Miami-Dade County line south to the 7 Mile Bridge. This is entirely within Monroe County. All parts of Monroe County were impacted from Hurricane Irma and experienced outages.

27. Please complete the table below summarizing the wind speed and flooding impacts by Hurricane Irma within Monroe County and FKEC's service area.

Weather Impact				
County	Maximum Sustained Winds (MPH)	Maximum Gusts (MPH)	Maximum Rainfall (inches)	Maximum Storm Surge (Feet)
<i>Key Largo</i>	90	95	7	5
<i>TAV</i>	100	115	10	5
<i>ISL</i>	90	100	10	6
<i>MAR</i>	100	115	10	7

Hardened and Non-Hardened Structures

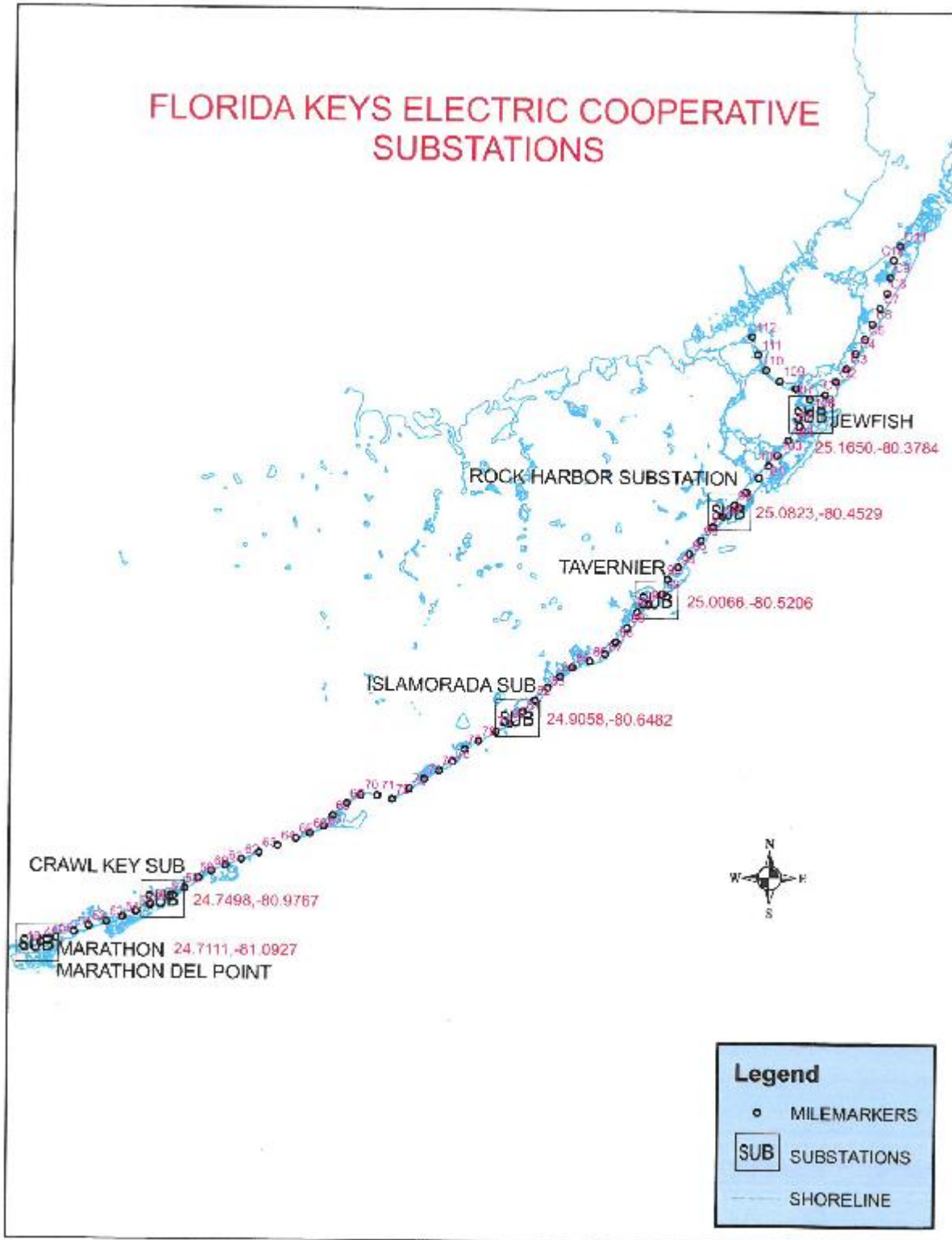
28. Please provide a county map or graphic indicating the geographic locations where the Utility's infrastructure was storm hardened after 2006. For purposes of this question, do not include vegetation management.

Total Number of Hardened Poles by Substation

<u>Substation</u>	<u>Pole Quantity</u>
<i>Jewfish</i>	494
<i>Rock Harbor</i>	629
<i>Tavernier</i>	482
<i>Islamorada</i>	250
<i>Crawl Key</i>	290
<i>Marathon</i>	562
<i>Total Poles</i>	2,707

*** Spreadsheets with unique identifiers, lat/long, date of birth, and material type are available for each individual feeder upon request.

FLORIDA KEYS ELECTRIC COOPERATIVE SUBSTATIONS



29. Please complete the table below summarizing hardened facilities that required repair or replacement as a result of Hurricane Irma.

Hardened Facilities		
Hurricane	Number of Facilities Requiring	
	Repair	Replacement
<i>Transmission</i>		
Structures	0	0
Substations	0	0
Total		
<i>Distribution</i>		
Poles	3	10
Substation	0	0
Feeder OH	0	0
Feeder UG	0	0
Feeder Combined	0	0
Lateral OH	0	0
Lateral UG	0	0
Lateral Combined	0	0
<i>Service</i>		
Service OH	0	0
Service UG	0	0
Service Combined	0	0

30. Please complete the table below summarizing non-hardened facilities that required repair or replacement as a result of Hurricane Irma.

Non-Hardened Facilities		
Hurricane	Number of Facilities Requiring	
	Repair	Replacement
<i>Transmission</i>		
Structures	141	0
Substations	0	0
<i>Distribution</i>		
Poles	1,197	165
Substation	4	0
Feeder OH	16	0
Feeder UG	2	0
Feeder Combined	18	0
Lateral OH	1,600	0
Lateral UG	170	0
Lateral Combined	1,770	0
<i>Service</i>		
Service OH	0	1,000
Service UG	0	100
Service Combined	0	1,100

31. For Hurricane Irma, please provide a ranking of the five highest volume of outage causation that impacted the Utility's service area.

FKEC's damaged facilities were exclusively caused by wind and storm surge. It is impossible to determine whether wind or surge caused the most damage.

32. For Hurricane Irma, please provide a ranking of the top five drivers that protracted service restoration time.

- 1- Lack of trauma care for workers immediately following the storm*
- 2 - Poor performance by AT&T, Verizon, and Comcast (all failed immediately after the storm and were not available again until after the majority of FKEC's restoration effort was completed).*
- 3 - Check point delays for contractors arriving to assist with restoration*
- 4 - Check point delays for employees coming back from evacuation*
- 5 - Lack of maintenance/planning of critical infrastructure generators by their owners (many generators failed to start or provisions were not made to keep them fueled)*

33. If applicable, please describe any damage prevented by flood monitors during Hurricane Irma.

Not Applicable.

34. How many outages were avoided by automated feeder switches during Hurricane Irma? Please explain how the data for each event was collected.

Not applicable or unable to determine due to the transmission outages.

Critical Infrastructure Restoration

35. Please complete the table below for all critical infrastructure facilities (CIFs), by location (city/county) and facility type, which lost power, the restoration time for the CIFs and the cause of the outage (such as wind, storm-surge, flooding, debris, etc.) and facilities structure type that required replacement and/or repair. Please provide this information for Hurricane Irma.

Hurricane IRMA - CIF							
CIF Name/Type (i.e. Hospital)	Monroe/ Location	Mile Marker	Restoration Time	Outage Cause	Number of Facilities Requiring The following refer to the storm restoration window of 9/10/2017 through 9/23/2017. Permeant Repairs are ongoing.		
						Repair	Replace
AT&T - Mobility	305 Magnolia St	100.5	9/14/2017	wind/debris	Transmission		
AT&T - Mobility	81880 Overseas Hwy	81.8	never off		Structures	150	0
AT&T - Mobility	MM68	68	9/17/2017	wind/debris	Substations	0	0
AT&T - Mobility	31 Ocean Reef Dr	ORC	9/18/2017	wind/debris			
AT&T - Mobility	88770 Overseas Hwy	88.7	9/13/2017	wind/debris	Distribution		
AT&T - Mobility	93351 Overseas Hwy	93.3	9/16/2017	wind/debris	Poles	1,200	175
AT&T - Mobility	59001 Overseas Hwy	59	9/15/2017	wind/debris	Substation	4	0
AT&T - Mobility	13860 Overseas Hwy	54.2	9/15/2017	wind/debris	Feeder OH	16	0
AT&T - Mobility	MM48	48	9/20/2017	wind/debris	Feeder UG	2	0
AT&T - Mobility	809 Largo Rd	106.3	9/15/2017	wind/debris	Feeder Combined	18	0
AT&T - Mobility	86490 Overseas Hwy	86.4	9/11/2017	wind/debris	Lateral OH	1600	0
Comcast - Cable	Holiday Homesites	100.2	9/12/2017	wind/debris	Lateral UG	170	0
Comcast - Cable	MM81	81	9/13/2017	wind/debris	Lateral Combined	1770	0
Comcast - Cable	MM100	100	9/12/2017	wind/debris			
Comcast - Cable	103400 Overseas Hwy	103.4	9/13/2017	wind/debris	Service		
Comcast - Cable	Sombrero Beach Rd	50	building destroyed	wind/debris	Service OH		1,000
Comcast - Cable	ORC Gatehouse	ORC	9/16/2017	wind/debris	Service UG		100
FCAA - Water Utility	3375 Overseas Hwy	48.8	9/12/2017	wind/debris	Service Combined		1,100
FCAA - Water Utility	3200 Overseas Hwy	48.7	9/12/2017	wind/debris			
FCAA - Water Utility	375 69th St Ocean	50.7	9/12/2017	wind/debris			
FCAA - Water Utility	11699 1st Ave Gulf	52.8	9/17/2017	wind/debris			

FCAA - Water Utility	13912 Dolphin Ave	54.2	9/16/2017	wind/debris			
FCAA - Water Utility	1150 Greenbriar Rd	61	9/15/2017	wind/debris			
FCAA - Water Utility	67711 Overseas Hwy	67.7	9/17/2017	wind/debris			
FCAA - Water Utility	81860 Overseas Hwy	81.8	never off				
FCAA - Water Utility	91620 Overseas Hwy	91.6	never off				
FCAA - Water Utility	1 Thurman Dr	99	9/14/2017	wind/debris			
FCAA - Water Utility	Marine Ave & Harbor View Dr	92	9/15/2017	wind/debris			
FCAA - Water Utility	305 Magnolia Dr	92	9/14/2017	wind/debris			
FCAA - Water Utility	70000 Overseas Hwy	70	9/16/2017	wind/debris			
FCAA - Water Utility	821 Largo Rd	106.3	9/15/2017	wind/debris			
FCAA - Water Utility	Boat Ramp	111	9/14/2017	wind/debris			
Monroe County Sheriff	2796 Overseas Hwy	48.6	9/12/2017	wind/debris			
Monroe County Sheriff	3103 Overseas Hwy	48.8	9/12/2017	wind/debris			
Monroe County Sheriff	86800 Overseas Hwy	86.8	never off				
Monroe County Sheriff	50 High Point Rd	88.8	never off				
Monroe County Sheriff	3981 Overseas Hwy	49.2	9/12/2017	wind/debris			
Monroe County Sheriff	53 High Point Rd	88.8	never off				
Monroe County Fire	10 S Conch Ave	62.9	9/16/2017	wind/debris			
Monroe County Fire	68260 Overseas Hwy	68.2	9/18/2017	wind/debris			
Monroe County Fire	151 Marine Ave	92	9/15/2017	wind/debris			
Monroe County Fire	10100 Overseas Hwy	101	9/12/2017	wind/debris			
Monroe County Fire	8900 Overseas Hwy	51.5	9/13/2017	wind/debris			
Monroe County Fire	86800 Overseas Hwy	86.8	never off				
Monroe County Fire	MM107	107	9/13/2017	wind/debris			
Monroe County Fire	59265 Overseas Hwy	59.2	9/18/2017	wind/debris			
Fisherman's Community Hospital	3301 Overseas Hwy	48.8	9/12/2017	wind/debris			
Baptist Mariners Hospital	91500 Overseas Hwy	91.5	never off				
City of Marathon	9805 Overseas Hwy	52	9/12/2017	wind/debris			
City of Key Colony Beach	600 W Ocean Dr	53.6	9/16/2017	wind/debris			
City of Layton	68260 Overseas Hwy	68.2	9/16/2017	wind/debris			
Village of Islamorada	86800 Overseas Hwy	86.8	9/11/2017	wind/debris			
Murray Nelson Govt Ctr	102050 Overseas Hwy	102	9/13/2017	wind/debris			
FL Keys Marathon International Airport	9000 Overseas Hwy	51.5	9/12/2017	wind/debris			
Monroe County EOC	490 63rd St Ocean #150	50.5	9/12/2017	wind/debris			
Sun FM - Radio Comm	93351 Overseas Hwy	93.3	9/16/2017	wind/debris			
Statewide Comm Towers	MM106	106	9/15/2017	wind/debris			
Statewide Comm Towers	MM88	88	never off				
Statewide Comm Towers	MM68	68	9/17/2017	wind/debris			
Statewide Comm Towers	MM62	62	9/15/2017	wind/debris			

Statewide Comm Towers	MM48	48	9/13/2017	wind/debris			
Key Largo Wastewater	98240 Overseas Hwy	98.2	9/14/2017	wind/debris			
Key Largo Wastewater	150 Lorelane Pl	99.5	9/13/2017	wind/debris			
Key Largo Wastewater	10335 Overseas Hwy	103.3	9/14/2017	wind/debris			
City of Marathon Wastewater	100 Avenue I	54.2	9/16/2017	wind/debris			
City of Marathon Wastewater	140 Sombrero Beach Rd	50	9/14/2017	wind/debris			
City of Marathon Wastewater	4095 Overseas Hwy	49.2	9/14/2017	wind/debris			
City of Marathon Wastewater	59255 Overseas Hwy	59.2	9/15/2017	wind/debris			
City of Marathon Wastewater	10685 Overseas Hwy	52.4	9/12/2017	wind/debris			
City of Marathon Wastewater	7280 Overseas Hwy	51.8	9/15/2017	wind/debris			
Publix - Grocery Store	101437 Overseas Hwy	101.4	9/14/2017	wind/debris			
Publix - Grocery Store	83268 Overseas Hwy	83.2	new building - no certificate of occupation				
Publix - Grocery Store	5407 Overseas Hwy	50	9/12/2017	wind/debris			
Winn-Dixie-Grocery Store	105300 Overseas Hwy	105.3	never off				
Winn-Dixie-Grocery Store	92100 Overseas Hwy	92.1	never off				
Winn-Dixie-Grocery Store	5585 Overseas Hwy	50	closed	wind/debris			
Florida Highway Patrol	3380 Overseas Hwy	48.8	9/12/2017	wind/debris			
Florida Highway Patrol	10100 Overseas Hwy	101	9/13/2017	wind/debris			
FL Dept of Transportation	3100 Overseas Hwy	48.9	9/12/2017	wind/debris			

Underground Facilities

36. Please provide an assessment of the performance of underground facilities during Hurricane Irma. As part of this assessment please summarize the number of underground facilities that required repair or replacement for each event.

Approximately 18% of our primary system and 15% of our secondary system is underground, and sustained minimal damage from Irma. The total damage to our underground system was:

- *At two locations (one location was 3-phase and one location was 2-phase) primary cable was damaged. We replaced 2,050' of primary 1/0 Al cable.*
- *Five primary splices failed and were replaced.*
- *Five padmount transformers were damaged – 4 from trees falling on them, one failed electrically.*
- *12 padmount transformers were washed off their pads with no damage or outage.*
- *15 pull boxes had filled with sand and debris and were vacuumed out.*
- *Additionally, two 50' concrete riser poles with 3-phase risers broke and were replaced. FKEC had no actual damage to the underground system at these locations.*

37. Please provide a discussion what programs/tariffs the utility has in place to promote

a. Undergrounding of new construction (e.g., subdivisions)

FKEC has been promoting underground systems for new construction since 2006. For new construction, FKEC will provide and install primary risers, transformers, up to 250 feet of underground primary conductor per transformer, and up to 150 feet of secondary/service conductor per meter.

b. Conversion of overhead to underground

For overhead to underground primary conversions, to incentivize the conversion, FKEC pays for 25% of the cost for primary risers, conductor, transformers and switchgear.

For secondary and service conversions, FKEC provides material and labor for up to 150 feet of conductor at no charge.

For members desiring an underground service (new or to convert from overhead) when FKEC's primary line is on the opposite side of the street, FKEC will pay for up to 50 feet of trenching, conduit, junction boxes and asphalt repair for bringing the secondary to the other side of the street, as well as 100% of the cost for material and labor for the conductor.









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STOP

















