

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

**CERTIFICATE OF WAIVER**

**ISSUED TO;**  
**Xcel Energy**

**Responsible Person: Eileen Lockhart**  
**Waiver Number: 107W-2019-00055B**

**ADDRESS:**

**10001 W. Hampden Ave**  
**Lakewood, CO 80127**

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

**OPERATIONS AUTHORIZED**

Small unmanned aircraft system (sUAS) operations beyond the visual line of sight of the remote pilot in command (PIC) and Visual Observer (VO), in lieu of visual line of sight (VLOS) for the purpose of electrical power transmission line inspection.

**LIST OF WAIVED REGULATIONS BY SECTION AND TITLE**

**14 CFR § 107.31 — Visual line of sight aircraft operation,**  
**14 CFR § 107.33(b) and (c)(2) — Visual observer, and**  
**14 CFR § 107.39 — Operations over human beings.**

**STANDARD PROVISIONS**

1. A copy of the application made for this certificate shall be attached to and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Administrator of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.
4. This certificate is nontransferable.

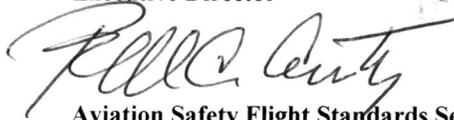
NOTE—This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

**SPECIAL PROVISIONS**

Special Provisions Nos. 1 to 39, inclusive, are set forth on the attached pages.

This Certificate of Waiver is effective from August 16, 2019 to October 31, 2021 and is subject to cancellation at any time upon notice by the Administrator or an authorized representative.

**Executive Director**



**Aviation Safety Flight Standards Service**

**AUG 22 2019**

**SPECIAL PROVISIONS ISSUED TO**

**Xcel Energy**

**General.**

This waiver is an amendment and supersedes and replaces waiver 107W-2019-00055A. Waivers 107W-2019-00055 and 107W-2019-00055A are no longer valid.

The FAA's Flight Standards Service has reviewed your application to ensure compliance with the requirements of 14 CFR § 107.200. The Administrator finds that the proposed sUAS operation can be conducted safely under the provisions of this Certificate of Waiver (Waiver) as listed below because you have established adequate mitigations for risks involved with operating your sUAS in the manner you described. Adherence to the provisions of this Waiver establishes the required level of safety within the national airspace system.

This Waiver may be canceled at any time by the Administrator, the person authorized to grant the Waiver, or a representative designated to monitor a specific operation. As a general rule, this Waiver may be canceled when it is no longer required, there is an abuse of its provisions, or when unforeseen safety factors develop. Failure to comply with any provision listed below is a violation of the terms of this Waiver and may serve as justification for cancellation.

List of Regulations Waived by Section and Title. The following regulations are waived:

- 14 CFR § 107.31**, Visual line of sight aircraft operation, is waived to allow operation of the small unmanned aircraft (sUA) beyond the direct visual line of sight of the remote pilot in command (PIC) and any visual observer (VO) who is participating in the operation.
- 14 CFR § 107.33(b) and (c) (2)**, is waived to the extent necessary to allow operation of the small unmanned aircraft (sUA) when any VO who is participating in the operation may not be able see the unmanned aircraft in the manner specified in §107.31.
- 14 CFR § 107.39** is waived to the extent necessary to allow the operation of the small unmanned aircraft over human beings.

No part of this waiver will function as an airspace authorization under 14 CFR § 107.41. The FAA's Air Traffic Organization responds directly to requests for such authorizations.

**Common Special Provisions.** The Responsible Person is directly responsible for safety of operations conducted under this Waiver and will ensure the remote PIC, manipulator of the controls, and VO<sup>1</sup> comply with all provisions of this Waiver.

1. The Responsible Person listed on the Waiver is responsible to the FAA for the safe conduct of the operations. Prior to conducting operations that are the subject of this Waiver, the responsible person:
  - a. Must ensure the remote PIC, manipulators of the controls, and VOs are informed of the terms and provisions of this Waiver and strictly observe the terms and provisions herein;
  - b. Must ensure the remote PIC, manipulators of the controls, and VOs are informed and familiar with part 107 regulations; and
  - c. Evidence of the above (a and b) must be documented and must be presented for inspection upon request from the Administrator or an authorized representative;
2. This Waiver may not be combined with any other waiver(s), authorization(s), or exemption(s) without specific authorization from the FAA;
3. The FAA has the authority to cancel or delay any or all flight operations if the safety of persons or property on the ground or in the air are in jeopardy or there is a violation of the terms of this Waiver;
4. A copy of this Waiver must be accessible and available to the Remote Pilot in Command (remote PIC) at the ground control station during sUAS operations that are the subject of this Waiver;
5. The Responsible Person listed on this Waiver must maintain a current list of pilots by name and remote pilot certificate number used in operations under this Waiver. This list must be presented for inspection upon request from the Administrator or an authorized representative;
6. The Responsible Person listed on this Waiver must maintain a current list of small unmanned aircraft (sUA) by registration number(s) used in the Waiver holder's operations. This list must be presented for inspection upon request from the Administrator or an authorized representative;
7. For the purposes of this Waiver, Direct Participants are the remote pilots in command (PICs), persons manipulating the controls, visual observers (VOs), and any persons whose involvement is necessary for safety of the sUAS operation;

---

<sup>1</sup> Title 14 CFR § 107.3 defines the term "visual observer." Any VO participating in operations conducted under this Waiver must meet the requirements listed in § 107.33 throughout the duration of flight operations.

**Waiver Specific Special Provisions.** sUAS operations beyond the visual line of sight (BVLOS) of the remote PIC and VO(s) may be conducted under this waiver when the operation complies with the following provisions:

## **OPERATIONAL PROVISIONS**

8. The remote PIC must ensure sufficient VO(s) are used to identify any non-participating aircraft in sufficient time for the sUAS to maneuver and remain well clear of other aircraft. For the purpose of this Waiver sufficient VO(s) is defined as at least one VO using the electronic means described in the waiver application to monitor the airspace, or the minimum number of VO(s) required to continuously observe, using human vision unaided by any device other than corrective lenses, at least a 2.5 statute mile radius of airspace surrounding the sUA in flight;
9. Individuals directly participating in the operation of the sUAS must be easily identifiable visually (e.g., apparel, safety vests);
10. The Responsible Person must ensure all operations conducted under this Waiver follow the procedures outlined in the submitted operations manual. If a discrepancy exists between the provisions in this Waiver and the procedures outlined in the operations manual, the provisions of this Waiver take precedence and must be followed;
11. The Responsible Person may update or revise its operations manual. The Responsible Person must track such revisions and present revised documents to the Administrator or an authorized representative upon request. The Responsible Person must also present revised documents when applying for extension of or amendment to this Waiver. If any revision to the manual would be contrary to the information provided in the waiver application or obviate a condition or limitation of this waiver, then the Responsible Person must apply for an amendment to this Waiver;
12. The Responsible Person must ensure a copy of the current operations manual is available to the remote PIC and all other direct participants prior to and during sUAS operations that are the subject of this Waiver;
13. Prior to conducting operations under this Waiver, the remote pilot must be proficient in visual line of sight (VLOS) operations and trained in accordance with waiver application's specific training program. This proficiency and training must be documented and must be presented for inspection upon request from the Administrator or an authorized representative;
14. The Responsible Person must establish and maintain a Safety Management System (SMS) appropriate for the size, scope, and complexity of operations that occur under this Waiver. Guidance on establishing and maintaining an SMS is available in FAA Advisory Circular 120-92B (or current revision). This program must be made available upon request by the Administrator;

15. Prior to operations under this Waiver, all direct participants must attend a safety briefing that addresses at minimum, the following items:
  - a. Designated positions, physical locations, responsibilities, and Crew Resource Management,
  - b. Planned flight operating area,
  - c. Designated launch and recovery areas,
  - d. Lost link contingency plan,
  - e. GPS availability for the planned duration of the sUAS flight operation,
  - f. Normal procedures,
  - g. Abnormal procedures, and
  - h. Emergency procedures;
16. Communication between the remote PIC and any VO(s) must occur to facilitate, when necessary, the remote PIC taking action to maneuver the sUA with sufficient time to:
  - a. Give way to all other aircraft accordance with § 107.37,
  - b. React to any unforeseen operational or mechanical failure without creating a hazard to other people, other aircraft, or property in the event of a loss of control of the sUA, and
  - c. Maintain compliance with this Waiver and the requirements of part 107;
17. Operations subject to this waiver must cease if, at any time:
  - a. Safety of human beings or property on the ground or in the air is in jeopardy,
  - b. Any failure to comply with the provisions of this Waiver exists,
  - c. Communications cannot be maintained between the remote PIC and any VO participating in the operation,
  - d. GPS signal is lost, or
  - e. sUA GPS location information is degraded;
18. Launch or recovery areas must be pre-designated and monitored to keep any human being who is not directly participating in the operation out of the areas prior to, during, and immediately following flight operations;
19. During all planned launches and recoveries, the remote PIC must comply with § 107.31(a)(1-2);
20. As described in the application, outreach must be conducted and coordinated with other potentially affected aircraft operators prior to any sUAS operations subject to this Waiver and not less than 24 hours prior to conducting operations that are the subject of this Waiver, a Notice to Airmen (NOTAM) must be filed. The NOTAM must include location, altitude, and/or operating area, time and nature of the activity;

21. The Responsible Person shall keep at its principal business office or at other places approved by the Administrator, and email the Administrator at [9-afs-820-Part107Reports@faa.gov](mailto:9-afs-820-Part107Reports@faa.gov) monthly, the information listed below. The Responsible Person must retain all such records for a period of 90 days after the expiration date of the Waiver.
- a. For each sUAS flight operation conducted under the terms of this waiver:
    - i. Date and location of operation
    - ii. Registration number of the sUA,
    - iii. Make and model of the sUA,
    - iv. Name and certificate number of the remote PIC's,
    - v. Name and location of the VO for the sUAS operation,
    - vi. The name and location of any additional persons who acted as VO(s),
    - vii. The distance flown and time duration of the sUA operation,
    - viii. Number of non-participant aircraft detected within 500 feet vertical and 6000 feet horizontal of the power line, and
    - ix. Number of avoidance maneuvers or sUA flight path changes made by the RPIC to remain well clear of other aircraft or avoid a mid-air collision;
  - b. For each sUAS flight conducted under this Waiver that includes any equipment degradation, malfunction, or failure, the Responsible Person must make a record of the degradation, malfunction, or failure by recording the date, time, and a description of the degradation, malfunction or failure. sUAS equipment degradations, malfunctions, or failures include, but are not limited to, the following:
    - i. Onboard flight control system,
    - ii. Any portion of the navigation system to include GPS functionality,
    - iii. Power plant malfunction or failure,
    - iv. Battery malfunction or failure,
    - v. Electrical power system malfunction,
    - vi. Control station malfunction or failure, and
    - vii. Loss of control link within the sUAS;

## TECHNICAL PROVISIONS

22. Operations conducted under this Waiver may only occur with the make and model sUAS described in the waiver application. Proposed operations of any other manufacturer, make or model of sUAS will require a new waiver application or a request to amend this Waiver;
23. All sUAS operations conducted in accordance with this Waiver must comply with all manufacturer recommendations and limitations for the sUAS;

24. The Responsible Person must maintain each sUAS and its components in accordance with manufacturer's instructions and recommendations. sUAS maintenance includes scheduled and unscheduled overhaul, repair, inspection, modification, replacement, and system software upgrades of the sUAS and its components necessary for flight. A log of all maintenance performed must be kept for each aircraft operated under this waiver. This log must be available to the remote PIC for review prior to conducting operations that are the subject of this waiver. Each sUAS maintenance log must be presented to the Administrator when requested. The log must contain the following information for each maintenance activity:
  - a. A description (or reference data acceptable to the Administrator) of work performed,
  - b. The date of completion of the work performed,
  - c. The name of the person who performed the work, and
  - d. The signature of the person who performed the work;
25. Any sUAS that has undergone maintenance must undergo a functional test flight prior to conducting operations under this Waiver. A log entry must be made for each functional test flight. The log entry must contain at minimum the:
  - a. Calendar date,
  - b. sUA registration number,
  - c. Remote PIC who performed the functional test flight,
  - d. Duration of the flight, and
  - e. The result of the functional flight test;
26. A functional test flight may only be conducted under the standard requirements of part 107 (without waiver);
27. The sUA must be equipped with high visibility markings and lighting to increase the conspicuity of the sUA to be visible for at least 1 statute mile;
28. All sUA operated under this Waiver must be capable of automatic operations. A preplanned flight path for the sUA to follow must be verified by the remote PIC and at least one other direct participant in the sUAS operation prior to sUA flight;
29. As described in the waiver application, sUAS ground control station must display in real time the following information: sUA altitude, sUA position, sUA direction of flight, and sUAS flight mode. This information must be available at all times to the remote PIC;
30. The sUAS must audibly or visually alert the remote PIC of degraded system performance, sUAS malfunction, or loss of Command and Control (C2) link between the ground control station and the sUA;
31. Prior to conducting operations under this Waiver, the remote PIC must determine all control links the used in the sUAS are sufficient to maintain control link within the sUAS at the maximum planned distance for the proposed operation. At all times during operations that are the subject of this Waiver, the remote PIC must maintain a command and control link with the sUA and the ability to direct the sUA to ensure compliance with the applicable provisions of this chapter;

32. If the remote PIC loses command or control link with the sUA, the sUA must follow a predetermined route to either reestablish link or immediately recover/land;
33. If communication between the VO and the remote PIC will occur by electronic device:
  - a. The device must be continuous full-duplex,
  - b. The remote PIC must be able to use the device hands-free, and
  - c. There must be a reliable back-up communication method;
34. ADS-B out (1090/978 MHz) may not be transmitted from the sUAS when operating pursuant to this Waiver;
35. All emitters used in sUAS must be in compliance with all applicable FCC regulations and all provisions of the FCC authorization granted for the emitter. A FCC experimental authorization may not be used for sUAS operations under this Waiver;

#### **ENVIRONMENTAL PROVISIONS**

36. Operations under this Waiver may only be conducted in Class G airspace;
37. Operations under this Waiver may not be conducted within 5 statute miles of a public or military use airport.
38. Except for sUA take-off, landing, and performing the "safe state" maneuver described in the waiver application, sUA operations are limited to within 100 feet vertically and 20 feet horizontally from the centerline of electrical power transmission line structures owned or controlled by Xcel Energy;
39. sUA operations may not occur over open air assemblies of persons; and
40. Operations conducted under this Waiver are limited to the sections of power line infrastructure Xcel Energy owns or controls, when the section of power line infrastructure meets the selection and operations criteria described in SRMD appendix B and C of the waiver application.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

**CERTIFICATE OF WAIVER**

**ISSUED TO;**  
**Xcel Energy**

**Responsible Person: Eileen Lockhart**  
**Waiver Number: 107W-2019-00055B**

**ADDRESS:**

**10001 W. Hampden Ave**  
**Lakewood, CO 80127**

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

**OPERATIONS AUTHORIZED**

Small unmanned aircraft system (sUAS) operations beyond the visual line of sight of the remote pilot in command (PIC) and Visual Observer (VO), in lieu of visual line of sight (VLOS) for the purpose of electrical power transmission line inspection.

**LIST OF WAIVED REGULATIONS BY SECTION AND TITLE**

**14 CFR § 107.31 — Visual line of sight aircraft operation,**  
**14 CFR § 107.33(b) and (c)(2) — Visual observer, and**  
**14 CFR § 107.39 — Operations over human beings.**

**STANDARD PROVISIONS**

1. A copy of the application made for this certificate shall be attached to and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Administrator of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.
4. This certificate is nontransferable.

NOTE—This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

**SPECIAL PROVISIONS**

Special Provisions Nos. 1 to 39, inclusive, are set forth on the attached pages.

This Certificate of Waiver is effective from August 16, 2019 to October 31, 2021 and is subject to cancellation at any time upon notice by the Administrator or an authorized representative.

Executive Director



Aviation Safety Flight Standards Service

**SPECIAL PROVISIONS ISSUED TO**

**Xcel Energy**



# FAA AFX Flight Standards Service

<b>Control Number:</b> AFX-190815-003	<b>Action Office:</b> AFX
<b>Document Date:</b> 8/15/2019	<b>Due Date:</b> 8/15/2019
<b>Correspondent:</b> Jeremy Grogan	
<b>Subject:</b> Certificate of Waiver	
<b>Action:</b> Action Memo	

**Comments:**

Date	Action
8/20/2019	To AFX-1 for signature.
8/15/2019	Approve Draft task created by Talita Young and assigned to Kyle Kruse
8/15/2019	File AFX-190815-003_-_Incoming_-_107W-2019-00055B_Eileen_Lockhart_CoW.pdf uploaded to the folder Incoming by Talita Young
8/15/2019	Folder created on 8/15/2019 11:40 AM by Talita Young

**Recommendation:**

Concur    Non-concur    Comments attached

Reviewed by: *Jill Clarity*

AFX- 003  
          8.22.19  
 Initials      Date

AFB-130  
*Talita Young*  
 8-20-19

8/21/19 *KAP*

## Young, Talita (FAA)

---

**From:** Scott, Gloria CTR (FAA)  
**Sent:** Friday, August 16, 2019 2:48 PM  
**To:** Sims, Morgan CTR (FAA); Allen, Debbie (FAA)  
**Cc:** Rochon, Everette (FAA); Fagan, Vincent (FAA); Morris, Rebecca (FAA); Giron, Mark E (FAA); Grogan, Jeremy (FAA); Ekmalian, Judy (FAA); Volpicelli, Ashley (FAA); Young, Talita (FAA); Chase, Taija CTR (FAA)  
**Subject:** FW: AFS-800 reviewed Xcel Energy amended waiver  
**Attachments:** 107W-2019-00055B\_Eileen\_Lockhart\_CoW amended.pdf

Good afternoon,

AFS-800 has reviewed the document for **Xcel Energy amended waiver**, and has been attached for your convenience. Document is ready for Safety Standards (AFS) coordination sign off and approval. Thank you.

Gloria Scott  
Administrative Support II, AFS -800  
General Aviation & Commercial Division  
DIGITALiBiz (TEAPSS II) Contract  
55 M St. SE, 8<sup>th</sup> Floor  
Email:[Gloria.CTR.Scott@faa.gov](mailto:Gloria.CTR.Scott@faa.gov)  
Direct: 202-267-2802

---

**From:** Scott, Gloria CTR (FAA)  
**Sent:** Friday, August 16, 2019 1:54 PM  
**To:** Young, Talita (FAA) <[talita.young@faa.gov](mailto:talita.young@faa.gov)>  
**Cc:** Ekmalian, Judy (FAA) <[Judy.Ekmalian@faa.gov](mailto:Judy.Ekmalian@faa.gov)>; Grogan, Jeremy (FAA) <[Jeremy.Grogan@faa.gov](mailto:Jeremy.Grogan@faa.gov)>; Chase, Taija CTR (FAA) <[Taija.CTR.Chase@faa.gov](mailto:Taija.CTR.Chase@faa.gov)>; Fagan, Vincent (FAA) <[Vincent.Fagan@faa.gov](mailto:Vincent.Fagan@faa.gov)>; Rochon, Everette (FAA) <[Everette.Rochon@faa.gov](mailto:Everette.Rochon@faa.gov)>; Morris, Rebecca (FAA) <[Rebecca.Morris@faa.gov](mailto:Rebecca.Morris@faa.gov)>; Giron, Mark E (FAA) <[Mark.E.Giron@faa.gov](mailto:Mark.E.Giron@faa.gov)>; Grogan, Jeremy (FAA) <[Jeremy.Grogan@faa.gov](mailto:Jeremy.Grogan@faa.gov)>; Volpicelli, Ashley (FAA) <[ashley.volpicelli@faa.gov](mailto:ashley.volpicelli@faa.gov)>  
**Subject:** AFS-800 reviewed Xcel Energy amended waiver

Good Afternoon Talita,

AFS-800 has reviewed the document for **Xcel Energy amended waiver**, and has been attached for your convenience. Thank you.

Gloria Scott  
Administrative Support II, AFS -800  
General Aviation & Commercial Division  
DIGITALiBiz (TEAPSS II) Contract  
55 M St. SE, 8<sup>th</sup> Floor  
Email:[Gloria.CTR.Scott@faa.gov](mailto:Gloria.CTR.Scott@faa.gov)  
Direct: 202-267-2802

---

**From:** Young, Talita (FAA) <[talita.young@faa.gov](mailto:talita.young@faa.gov)>  
**Sent:** Thursday, August 15, 2019 12:00 PM

**To:** Scott, Gloria CTR (FAA) <[Gloria.CTR.Scott@faa.gov](mailto:Gloria.CTR.Scott@faa.gov)>  
**Cc:** Ekmalian, Judy (FAA) <[Judy.Ekmalian@faa.gov](mailto:Judy.Ekmalian@faa.gov)>; Grogan, Jeremy (FAA) <[Jeremy.Grogan@faa.gov](mailto:Jeremy.Grogan@faa.gov)>; Chase, Taija CTR (FAA) <[Taija.CTR.Chase@faa.gov](mailto:Taija.CTR.Chase@faa.gov)>  
**Subject:** FW: Xcel Energy amended waiver

Hello Gloria,

Please get AFS-800 and AFS coordination for the attached and submit to us for AFX. EDMS tracking is AFX-190815-003

*Talita Young*

Aviation Safety  
Management and Program Analyst  
Flight Standards Service, Office of Foundational Business,  
Correspondence Services, AFB-130  
(O) 202-267-3888

---

**From:** Grogan, Jeremy (FAA) <[Jeremy.Grogan@faa.gov](mailto:Jeremy.Grogan@faa.gov)>  
**Sent:** Thursday, August 15, 2019 10:58 AM  
**To:** Young, Talita (FAA) <[talita.young@faa.gov](mailto:talita.young@faa.gov)>  
**Subject:** FW: Xcel Energy amended waiver

Jeremy Grogan  
Safety Standards, AFS-820  
Part 107 Waiver Team Lead

---

**From:** Grogan, Jeremy (FAA)  
**Sent:** Wednesday, August 14, 2019 1:48 PM  
**To:** Young, Talita (FAA) <[talita.young@faa.gov](mailto:talita.young@faa.gov)>  
**Cc:** Fagan, Vincent (FAA) <[Vincent.Fagan@faa.gov](mailto:Vincent.Fagan@faa.gov)>; Young, Talita (FAA) <[talita.young@faa.gov](mailto:talita.young@faa.gov)>  
**Subject:** Xcel Energy amended waiver

Talita,

Attached is a part 107 waiver ready for AFX-1 signature.

Jeremy Grogan  
Safety Standards, AFS-820  
Part 107 Waiver Team Lead