U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

May 11, 2015

Exemption No. 11538
Regulatory Docket No. FAA–2015–0394

Ms. Rebecca MacPherson
Counsel for Xcel Energy, Inc.
Jones Day
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Washington, DC 20001-2113

Dear Ms. MacPherson:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

The Basis for Our Decision

By letter dated February 11, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Xcel Energy, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct inspections of energy infrastructure.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Spreading Wings S1000+.

In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Xcel Energy, Inc. is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Xcel Energy, Inc. is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Spreading Wings S1000+ when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised

documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with

14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Xcel Energy, Inc.'s Petition for Exemption
Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012

Applicant:

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I. SUMMARY OF PETITION

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 ("Section 333"), Xcel Energy, Inc. hereby respectfully requests expedited approval to use Small Unmanned Aircraft Systems ("sUAS") under the terms and conditions described in this Petition for Exemption ("Petition") to conduct inspections of energy infrastructure. Xcel Energy also requests the exemptions that are necessary to such approval pursuant to 49 U.S.C. § 44701(f), and 14 C.F.R. § 11.81.[1] As a matter of clarification, Xcel Energy is not requesting exemptions from §§ 21, 27, 45.24, 91.9(b)(2) and 91.203(b) because, based on previous FAA exemptions, Xcel Energy believes the FAA has determined these regulatory provisions do not apply to sUAS operations at this time.[2] In addition, Xcel Energy believes that no relief is needed from §§ 91.7, 91.103, 91.119 and 91.1501 because it can comply with the regulations as drafted.[3] (Note: A summary of Xcel Energy's petition suitable for publication in the Federal Register is provided in Appendix B.)

Xcel Energy, whose principal subsidiaries are operating companies Northern States Power Company – Minnesota (NSPM), Northern States Power Company – Wisconsin (NSPW), Public Service Company of Colorado (PSCO), Southwestern Public Service Company (SPS), and service company Xcel Energy Services, Inc., initially seeks to conduct feasibility studies/pilot projects to

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[1] As described in Appendix A to this Petition, Xcel Energy requests an exemption from the following regulations: 14 C.F.R. §§ 61.113 (a) and (b); 61.133(a); 91.109; 91.121; 91.151(a); ; 91.405(a); 91.407(a)(1); 91.409 (a)(2); and 91.417 (a) and (b).

[2] Xcel Energy notes that the FAA has previously held that relief is not required from § 91.109 if the sUAS, and its related training program, does not utilize dual controls (see Exemption No. 11062). To the extent the FAA continues to believe this is a proper reading of § 103, Xcel Energy suggests §91.103 is not applicable to this exemption request.

[3] Xcel Energy notes that the FAA appears to require an exemption from § 91.119(c) even when the sUAS appears to qualify as a helicopter, as defined in § 1.1, under the provisions of § 91.119(d). To the extent the FAA finds that § 119(c) applies to Xcel Energy's contemplated operations using a rotorcraft sUAS, Xcel Energy requests an exemption from this provision.

assess the applicability, practicability and potential for implementing sUAS for tasks including visual inspections of vital energy infrastructure such as electric transmission and distribution lines, power plants (including renewable energy facilities), substations, natural gas transmission and distribution pipelines, compressor stations, storage facilities and valves in order to further the public interest in the safe and reliable delivery of electricity and natural gas to customers. The specific locations on Xcel Energy's system targeted for the pilot projects are identified in Appendix C to this petition. Confidential treatment is requested for the information provided in Appendix C. Xcel Energy intends to expand the scope of operations beyond those identified in Appendix C upon receipt of the appropriate Certificate of Authorization (COA). The expanded scope of operations will be limited to 10 states (Colorado, Kansas, Michigan, Minnesota, New Mexico, Oklahoma, North Dakota, South Dakota, Texas and Wisconsin) within which Xcel Energy owns electric and/or gas facilities. Accordingly, Xcel Energy requests that any grant of an exemption not be limited to the feasibility studies/pilot projects identified in Appendix C. Xcel Energy recognizes that it will need to secure a new or amended COA when seeking to expand its sUAS operations beyond the areas identified in Appendix C.

Small UAS are ideally suited for inspection of energy infrastructure—they can inexpensively, safely and quickly deliver high-quality photo and video and location data which eliminates the need for physical inspection thus speeding the process of trouble-shooting and, ultimately, increases the reliability of electricity and gas supply. In particular, sUAS allow utility workers to conduct inspections without placing themselves in potentially hazardous situations. They can also facilitate the safe inspection of hard-to-access or environmentally sensitive areas without the use of service trucks, helicopters or other utility vehicles that may have more impact than sUAS. In addition, because of the small size of the

craft, in many cases, sUAS can be more efficient and cost-effective than traditional methods which can help to reduce operations and maintenance costs and, perhaps most importantly, provide a means for faster resolution of problems on electric and gas systems. In short, approval of this request and the provision of the necessary exemptions will increase electric and gas system reliability, decrease customer costs and enhance worker safety.

Moreover, approving the requested use would represent a significant step forward in the FAA's ("Administration") efforts to integrate sUAS into the national airspace system. Xcel Energy's request provides the Administration with an opportunity to partner with a leading electric and gas energy provider as it works to develop its rulemaking pursuant to the FAA Reauthorization Act of 2012 while doing so for a compelling public purpose and under strict operational and safety guidelines. Given the uniqueness of Xcel Energy—the company has a diverse geographical and environmental footprint and a distinctive resource mix—it is ideally suited to help the Administration understand potential utility applications for sUAS.

Xcel Energy proposes to use sUAS that are rotorcraft, have a maximum takeoff weight of 24 pounds, operate at a speed of no more than 50 knots and contain built-in safety features. In addition, Xcel Energy proposes to use the aircraft at low altitudes, not in proximity to airports unless a Memorandum of Agreement (MOA) is first established with the airport authority or densely populated areas, on property owned or controlled by Xcel Energy or is utility right of way, within the visual line of sight of the operator and under controlled conditions. Accordingly, the requested exemptions satisfy the applicable statutory criteria and policies, will serve the public interest, will not adversely affect safety and will provide a level of safety at least equal to the existing airworthiness and related regulations. Approval of this Petition is, therefore, consistent with Section 333's directive to "establish requirements for the safe operation of

[unmanned aircraft systems] in the national airspace system" if the Secretary of Transportation determines that certain unmanned aircraft systems may operate safely in the national airspace system.[4]

II. APPLICANT BACKGROUND

Xcel Energy is a major U.S. electric and natural gas company based in Minneapolis, Minnesota. The company owns facilities in 10 states (Colorado, Kansas, Michigan, Minnesota, New Mexico, Oklahoma, North Dakota, South Dakota, Texas and Wisconsin) and provides a comprehensive portfolio of energy-related products and services to 3.4 million electricity customers and 1.9 million natural gas customers. Xcel Energy is a U.S. investor-owned company with regulated operations as four wholly-owned utility subsidiaries.

Xcel Energy works hard to deliver clean, safe, reliable energy at a competitive price. Recognizing that energy is fundamental to the quality of people's lives and the economic health of our communities, the company also knows that its customers rely on it around the clock. The company takes that responsibility seriously. Xcel Energy operates major generating facilities that use a variety of fuel sources including coal, natural gas, nuclear fuel, water (hydro), oil and refuse. Its portfolio includes facilities that generate electricity from the wind and sun. In total, Xcel Energy's plants are capable of producing more than 17,000 megawatts (MW) of electricity. Xcel Energy generates approximately two-thirds of its power and buys the remainder from other electricity suppliers to meet customers' energy needs.

[4] Section 333(c) of the FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, 126 Stat 11.

Owned Generating Plants		
Type	**Plants**	**Net Dependable Capacity** in Megawatts (MW)*
Coal	13	7,424 MW
Natural Gas	25	6,956 MW
Nuclear	2	1,594 MW
Hydro	26	377 MW
Diesel	2	305 MW
Refuse-Derived Fuel	3	52 MW
Wind	3	46 MW*
Solar	4	0.1 MW
Total	**78**	**16,754.1 MW**
*Net generating capacity is 327 MW for Xcel Energy-owned wind energy facilities. Summer net dependable capacity is determined to be lower because wind generation is an intermittent resource and is only available when ambient wind conditions exist.		

With ~12,500 employees as of January, 2014, Xcel Energy efficiently maintains electric transmission facilities comprised of ~87,600 conductor miles which equate to ~19,000 miles of transmission lines traversing 10 states. (Note: lines are composed of multiple conductors, hence the reason for the difference between conductor miles and miles of transmission line.) The company's electric distribution facilities are comprised of ~193,100 conductor miles, gas transmission facilities comprised of ~2,250 miles of pipeline and gas distribution facilities comprised of ~33,900 miles of pipeline.

Consistent with its effort to provide safe and reliable electric and gas service, Xcel Energy seeks to use sUAS to more efficiently and safely perform inspections of its energy infrastructure.

The name and mailing address of the applicant is:

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III. RELEVANT STATUTORY AUTHORITY

A. Section 333

Section 333(a) states that the Administration "shall determine if certain unmanned aircraft systems may operate safely in the national airspace before completion of the plan and rulemaking [to broadly integrate UAS into the national airspace] required by Section 332 of this Act." Section 333 is also described as a pathway for "expedited operational authorization."[5]

Section 333(b)(1) outlines the factors that the Administration shall use to determine whether UAS may be operated safely in the national airspace system: size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight. In addition, and importantly for this Petition, Section 333(b)(2) provides the Administration with the discretion to determine that a certificate of waiver, certificate of authorization, or airworthiness certification is not required to operate UAS that are found to be appropriate under Section 333(b)(1). Finally, Section 333(c) allows the Administration to establish requirements for safe operation of the UAS determined to be able to be operated safely in the national airspace system.

B. Section 44701(f)

In addition to its specific authority related to authorizing UAS operation under Section 333, the Administration has general authority to grant exemptions from its safety requirements and minimum standards if the Administration finds that the exemption is in the public interest.[6] Administration regulations set forth the information that must be included in the petition for exemption: (1) the applicant's name and mailing address; (2) the regulations from which the applicant seeks exemption; (3) the extent of relief sought and why; (4) the reasons why granting

[5] Section 332(b)(1).
[6] 49 U.S.C. § 44701(f).

the request would be in the public interest and how it would benefit the public as a whole; and (5) the reasons why granting the exemption would not adversely affect safety, or how the exemption would provide a level of safety at least equal to the rule from which the applicant seeks exemption.[7]

IV. DISCUSSION

A. Xcel Energy's Proposal Satisfies the Section 333 Criteria for Approval.

As described above, Section 333(b)(1) outlines the factors that the Administration shall use to determine whether UAS may be operated safely in the national airspace system: size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight. Applying the criteria outlined in Section 333(b)(1) and other relevant criteria to this case demonstrates that Xcel Energy's proposed terms and conditions of operation will result in the sUAS being operated safely in the national airspace system, consistent with Section 333. Based on the small size of the sUASs involved, the low altitude and restricted environment in which they will operate and the fact that they will be operated within the visual line of sight of the operator, there is more than sufficient basis to find that the sUAS can be operated safely under Xcel Energy's proposal without an airworthiness certificate.

1. Size, Weight, Speed, and Operational Capability

Xcel Energy seeks an exemption permitting operations of a DJI Spreading Wings S1000+. The S1000+ is an electric powered octocopter sUAS that has a maximum takeoff weight of 24 pounds and a diameter of approximately 41" (distance measured rotor to rotor across the center). The S1000+ will not be operated above 50 knots (The S1000+ has a velocity to never exceed limitation of 15 m/s, and a typical maneuvering speed of five m/s.). The S1000+ has an integrated

[7] 14 C.F.R. § 11.81.

GPS autopilot system. The integrated GPS autopilot provides stable, precise flight and stable hovering enabling field workers to focus on situational awareness *(e.g.*, proximity to equipment) and safety. In addition, the GPS autopilot system provides an automatic return to home capability in the unlikely case of signal loss with the operator. Additional detailed information regarding the characteristics and capabilities of the S1000+ is included in the Pilot Operating Handbook (POH) provided in Appendix D. Confidential treatment is requested for the information provided in Appendix D.

The S1000+ is ideally suited for inspection of power lines, generating plants, pipelines and other energy-related infrastructure because the aircraft has the capability to deliver high-quality photos and videos more efficiently and cost-effectively than traditional methods. Using sUAS can also be safer for utility workers because it will avoid putting utility workers in situations with potential hazards, eliminating the risk of injuries. They also allow the safe inspection of hard-to-access or environmentally sensitive areas without the use of trucks and other utility vehicles. Overall, sUAS can provide significant benefits to utility workers and customers over traditional energy infrastructure inspection methods.

2. Locations for Initial Feasibility Studies/Pilot Projects

The specific locations on Xcel Energy's system targeted for the feasibility studies/pilot projects are identified in Appendix C to this petition.

Xcel Energy will avoid operating the sUAS over densely populated areas and will operate at least five nautical miles away from the nearest airport unless a MOA is first established with the airport authority. The sUAS will be operated at low altitudes of 400 feet or less—much lower than the airspace in which manned vehicles operate. Finally, operations will occur over utility property or utility right of way.

In addition, Xcel Energy's sUAS flights will likely occur in airspace that is subject to a Notice to Airmen (NOTAM). The Administration has issued a standing notice to pilots to avoid loitering in the "airspace above, or in proximity to, sites such as nuclear power plants, power plants, dams, refineries, industrial complexes, military facilities, and other similar facilities." This NOTAM should further limit the potential interaction for any flights near Xcel Energy power generation facilities.

3. Visual Line of Sight

A trained operator will fly the sUAS during daylight hours, in good weather and within the operator's line of sight. In addition, the operator will be accompanied by a trained spotter/safety observer who also will be positioned in line of sight of the aircraft and will be in constant communication with the operator to identify and alert the operator to any potential obstacles. This eliminates the need for other "sense and avoid" capabilities during operation, as well as the need for any method of air traffic control communications.[8]

B. Xcel Energy's Proposal Also Satisfies the Standard for Exemption under Section 44701 and 14 C.F.R. § 11.81.

1 Granting Xcel Energy's Request Would Not Adversely Affect Safety and Would Provide a Level of Safety at Least Equal to Existing Rules.

Granting Xcel Energy's Petition will not adversely affect safety and Xcel Energy's proposed terms and conditions of operation would provide a level of safety at least equal to the use of traditional aircraft under existing rules. As discussed above with respect to Section 333(b)(I) criteria, the size, weight, speed and operational capability of the sUAS that will be used in the proposed operations indicate that the aircraft can be operated safely in the national airspace system. Moreover, the aircraft will be operated at low altitudes, not in proximity to

[8] *See Interim Operational Approval Guidance 08-01, Unmanned Aircraft Systems Operations in the U.S. National Airspace System* at 4 (Mar. 13, 2008).

airports unless a MOA is first established with the airport authority or densely populated areas and within the visual line of sight of the operator and safety observer. In addition, Xcel Energy proposes the following conditions to ensure the requested exemption would result in a level of safety at least equal to the rules from which Xcel Energy is seeking an exemption. More information regarding conditions and operational considerations that Xcel Energy proposes to ensure safety is include in Xcel Energy's sUAS Operations Manual provided in Appendix E and Xcel Energy's sUAS Safety Management System Manual provided in Appendix F. Confidential treatment is requested for the information provided in Appendices E and F.

a. Safety Systems

Xcel Energy will use sUAS that have a semi-autonomous navigation and control system comprised of a Ground Control Station and auto-pilot system. Automated safety functions and safety enhancing features of the sUAS that Xcel Energy will use include the following (Additional information about the safety enhancing features is included in thePOH provided in Appendix D.):

- **Precision Flight and Stable Hovering:** Integrated GPS autopilot system provides position holding, altitude lock and stable hovering allowing all field personnel to focus on situational awareness and safely getting the job done.
- **Auto Return-To-Home:** Fail-safe feature will automatically activate in case of signal loss with ground station using GPS-Enabled autopilot to automatically return and land the craft at the original take-off point.
- **Clearly Visible Battery and GPS Status:** Battery and GPS status will be available through airframe status lights clearly visible to the operator and available through the ground station display.
- **Controlled Airspace No-Fly Zone:** All flights will be preplanned and a GPS controlled autopilot will be used to enforce corporate policy and training prohibiting flights in proximity to airports unless a MOA is first established with the airport authority and densely populated areas.

b. Mandatory Operating Conditions

In addition to the safety features described above, Xcel Energy proposes its exemption be subject to the following mandatory conditions to ensure safe operation:

- Operations will avoid densely populated areas.
- Operations will be conducted over property owned or controlled by Xcel Energy or is utility right of way.
- Maximum total flight time for each flight will be 30 minutes. Flights will be terminated at 25% battery power reserve, should that occur before this time limit.
- Operations will occur during Visual Flight Rules Meteorological Conditions.
- Aircraft to remain within Visual Line of Sight ("VLOS"). VLOS will be guaranteed with a cylinder of operation around operator of 1/2 nautical mile.
- Operations will occur during daylight hours.
- Flights will be operated at an altitude of no more than 400 feet Above Ground Level (AGL).
- The aircraft will not be operated at above 50 knots.
- All operations to remain more than five nautical miles from centerline azimuth of runway centerline measured from runway thresholds unless a MOA) is first established with the airport authority.
- Operators will possess a private pilot's license and a 2nd class medical certificate.
- Operators and safety observers will meet the operator training and certification requirements proposed below.
- Operators and safety observers will be in communication at all times.
- Operator will perform required maintenance per the manufacturer's recommendations and keep a log of any maintenance performed.
- Operator will perform any safety checks specified in the manufacturer's user guide prior to each flight.

c. Operator and Safety Observer Training and Certification

As discussed above, the sUAS Xcel Energy will use are characterized by a high degree of control and built-in technical capabilities that limit the potential for operation outside the operating conditions set forth in this Petition. Moreover, the mandatory operating conditions (maximum altitude, proximity to airfields, visual line of sight) minimize any potential weather impact and interactions with other aircraft.

Situational awareness around equipment, a thorough working knowledge of the sUAS, and strict adherence to corporate sUAS flight policy are key to safe sUAS operations. Given the significant differences between sUAS and piloted aircraft, the safety features inherent in the sUAS, and the strict operating conditions that will apply, Xcel Energy proposes that operators of the sUAS will be required to hold a private pilot license. Safety observers will be required to pass an FAA private pilot's aeronautical knowledge exam. In addition, Xcel Energy will train and internally certify operators and observers based on:

- Proven knowledge of Xcel Energy sUAS flight policy (including Mandatory Operating Conditions specified in this Petition);
- Proven working knowledge of safe sUAS operations, flight characteristics, safety features, GPS/Battery Status indicators and emergency procedures;
- Utility knowledge regarding safe operations around high voltage power equipment, power plants and natural gas facilities; and
- A 2nd class medical certificate.

Xcel Energy is receptive to modifying operator training and certification requirements based on future regulations and industry guidance on licensing sUAS pilots using training and testing relevant to operating sUAS in a limited flight area.

d. Privacy Considerations

Xcel Energy will not operate sUAS in any way that may invade personal privacy and will comply with any federal, state, or local privacy laws that may apply in areas where Xcel Energy operates sUAS. In addition, as a practical matter, flights will occur over utility property or utility right of way so privacy is unlikely to be a concern in relation to Xcel Energy's proposed use.

2. Granting Xcel Energy's Request Would Be in the Public Interest and Would Benefit the Public as a Whole.

Allowing the requested use will provide significant benefits to the public, Xcel Energy customers and Xcel Energy employees. Using sUAS to inspect energy infrastructure can be safer and more efficient than traditional methods of infrastructure inspection such as the use of fixed wing aircraft, helicopters, bucket trucks and other service vehicles. The increased safety and efficiency of using sUAS to inspect infrastructure following significant weather events is especially important to Xcel Energy, which serves millions of retail customers in areas where severe weather and other natural and manmade hazards occur with frequency. An infrastructure inspection process that is safer and more efficient can help to lower operations and maintenance costs and more quickly resolve problems in the delivery of electricity and natural gas, both of which will benefit customers.

Moreover, the requested use presents a compelling case for the Administration moving forward with efforts to integrate sUAS into the national airspace system as required by Section 333. The public has a significant interest in efficient and safe inspection of energy infrastructure to ensure reliable delivery of power and natural gas; and Xcel Energy has proposed using sUAS to further this public interest in a way that is at least as safe as operation of aircraft under existing regulations. Xcel Energy's request, therefore, provides the Administration an appropriate vehicle to further Congress' mandate to expedite integration of

UAS. In addition, Xcel Energy's operational experience resulting from the use of sUAS in utility operations may be valuable to the Administration in developing comprehensive rules governing sUAS for the electric industry.

C. Description of Relief Sought and Regulations from Which Exemption is Requested

Based on the foregoing, Xcel Energy's proposal satisfies the criteria for approval under Section 333. In addition, Xcel Energy's proposal meets the requirements and policies for exemptions from Administration regulations. Xcel Energy, therefore, respectfully requests the Administration grant exemptions from the regulations set forth in Appendix A to this Petition.[9]

V. CONCLUSION

For the reasons discussed above, Xcel Energy satisfies the relevant criteria for approval under Section 333 and exemptions from referenced regulations pursuant to Section 44701(f). Accordingly, Xcel Energy respectfully requests the Administration grant the relief requested in this Petition to allow the use of sUAS for the purposes and under the conditions set forth herein. Granting this Petition will not only further Congress' instruction to expedite the safe integration of UAS into the national airspace system but will also further the significant public interest in the safe and reliable delivery of electricity and natural gas to customers.

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Respectfully submitted,

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[9] Xcel Energy has attempted to identify the applicable regulations for which an exemption is required for the proposed use. To the extent that the Administration determines that any other safety regulations might apply to Xcel Energy's proposed use, Xcel Energy further requests that this Petition be deemed to seek an exemption from those requirements.

Appendix A Regulations from Which Exemption is Requested

Xcel Energy has attempted to identify the applicable regulations for which an exemption is required for the proposed use. To the extent the Administration determines any other safety regulations might apply to Xcel Energy's proposed use, Xcel Energy further requests this Petition be deemed to seek an exemption from those requirements.

1. 14 C.F.R. §§ 61.113(a) and (b); 61.133(a): Private Pilot Privileges and Limitations: Pilot in Command; Commercial Pilot Privileges and Limitations

Sections 61.113(a) and (b) limit private pilots to non-commercial operations. Section 61.133(a) requires an individual with a commercial pilot's license to be pilot in command of an aircraft for compensation or hire. Unlike a conventional aircraft that carries a pilot, passengers, and cargo, the sUAS proposed for use by Xcel Energy are remotely controlled with no passengers or cargo on board.

Xcel Energy respectfully requests exemptions from these requirements based on the particular characteristics of the sUAS that will be used. The risks associated with the operation of the sUAS described above (given the size, speed, operational capabilities and lack of combustible fuel) are much lower than the risks associated with commercial operations contemplated by Part 61 with conventional aircraft. Accordingly, a private pilot, adequately trained in the proper use of sUAS, possesses the requisite skills and knowledge of the NAS and FAA regulations to assure the safe operation of the sUAS. In addition, Xcel Energy will use sUAS with a high degree of control and various built-in technical capabilities that strictly limit the potential for operation outside of the operating conditions set forth in this Petition.

Given the inherently lower-risk nature of the sUAS and these safety features, Xcel proposes that operators be required to successfully complete the training described above.

2. 14 C.F.R. §§ 91.109: Flight Instruction

These regulations provide that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. The sUASs Xcel Energy will use are remotely-piloted aircraft and designed without fully-functioning dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The equivalent level of safety is provided as neither a pilot nor passengers will be carried in the aircraft, by the size and speed of the aircraft and the safety features of the aircraft limiting the potential for operation outside the operating conditions set forth in this Petition. Xcel Energy notes the FAA has previously found an exemption from § 91.109 is not needed when the training protocol does not specify the use of dual controls and the sUAS is not equipped with dual controls. Should the FAA continue to believe this is the case, Xcel Energy notes that no exemption would be needed from this requirement.

3. 14 C.F.R. § 91.121: Altimeter Settings

Section 121 requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS may not have a barometric altimeter but, instead, uses GPS technology, Xcel Energy requests an exemption from this requirement to the extent it operates sUAS without a barometric altimeter. An equivalent level of safety will be achieved by the operator confirming the acquisition of GPS signals and an initial ground level altitude of zero prior to take-off.

4. 14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Section 91.151(a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed — {1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

Xcel Energy requests an exemption from the 30 minutes of reserve fuel requirement. Given the limitations on flight locations and operations set forth in this Petition, a longer timeframe for flight is reasonable. Operating the sUAS in a tightly controlled area with less than 30 minutes of reserve fuel does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the sUAS.

Xcel Energy proposes that an equivalent level of safety can be achieved by limiting flights to 30 minutes or 25% of battery power, whichever happens first. This restriction would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area.

5. 14 C.F.R. §§ 91.405(a); 91.407(a)(1); 91.409(a)(2); 91.417(a) and (b): Maintenance Inspections

Sections 91.405(a), 91.407(a)(1), and 91.409(a)(1) and (2) specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. Section 417 requires an owner or operator of an aircraft to maintain specific types of maintenance records, including signatures of the person authorized to approve the aircraft's return to service, contemplated by Part 43. Given these sections and Part 43 apply only to aircraft with an airworthiness certificate; these sections will not apply to Xcel Energy's operation of sUAS. Maintenance will be accomplished by the

operator pursuant to the manufacturer specifications. An equivalent level of safety to existing regulations will be achieved because these sUASs are very limited in size, operate only in restricted areas for limited periods of time and carry no flammable fuel. If mechanical issues arise, the sUAS can land immediately and will be operating from no higher than 400 feet AGL. As described above, the operator will ensure the sUAS is in working order prior to initiating flight, perform a preflight safety checklist, perform required maintenance and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

Appendix B Summary Suitable for Publication in the Federal Register

Xcel Energy, Inc. petitions the Federal Aviation Administration for relief from compliance with 14 C.F.R.; §§ 61.113(a) and (b); 61.133(a); 91.109;; 91.121; 91.151(a); 91.405(a); 91.407(a)(1); 91.409 (a)(2); and 91.417 (a) and (b); for purposes of operating small unmanned aircraft with a takeoff weight of 24 pounds or less on property owned or controlled by Xcel Energy or in utility right of way to inspect energy infrastructure and identify problems in the delivery of electricity or natural gas to customers. Xcel Energy proposes its operation be subject to the operating conditions and safety standards set forth in the petition in lieu of the above-referenced regulations in order to provide a level of safety equivalent to those regulations.

Appendix C Locations for Initial Feasibility Studies/Pilot Projects

Confidential Treatment Requested

Appendix D Xcel Energy's Pilot Operating Handbook

Confidential Treatment Requested

Appendix E Xcel Energy's sUAS Operations Manual

Confidential Treatment Requested

Appendix F Xcel Energy's sUAS Safety Management System Manual

Confidential Treatment Requested