COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

October 13, 2016

Mr. Laramie Dorris
Vice President, Design & Construction
CyrusOne, LLC
21111 Ridgetop Circle
Sterling, Virginia 20166

Location: Loudoun County
Registration No.: 74109

Dear Mr. Dorris

Attached is a permit to construct and operate emergency diesel engine-generator sets at CyrusOne Northern Virginia Data Center – Shaw Road in accordance with the provisions of the Virginia State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution.

In the course of evaluating the application and arriving at a final decision to approve the project, the Department of Environmental Quality (DEQ) deemed the application complete on September 12, 2016.

This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

This permit approval to construct and operate shall not relieve CyrusOne, LLC of the responsibility to comply with all other local, state, and federal permit regulations.

The proposed emergency diesel engine- generator sets are subject to 40 CFR 63, Maximum Achievable Control Technology, (MACT) Subpart ZZZZ and 40 CFR 60, New Source Performance Standard (NSPS), Subpart IIII. Virginia has not accepted delegation of these rules. In summary, the units are required to comply with certain federal emission standards and operating limitations. The Department of Environmental Quality (DEQ) advises you to review the referenced MACT and NSPS to ensure compliance with applicable emission and operational limitations. As the owner/operator you are also responsible for any monitoring, notification, reporting and recordkeeping requirements of the MACT and NSPS. Notifications shall be sent to EPA, Region III.

To review any federal rules referenced in the above paragraph or in the attached permit, the US Government Publishing Office maintains the text of these rules at www.ecfr.gov, Title 40, Part 60 and 63.

The Board's Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. Please consult the relevant regulations for additional requirements for such requests.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director
Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

If you have any questions concerning this permit, please contact Gary Beeson at (703) 583-3969.

Sincerely,

James B. LaFratta
Regional Air Permit Manager

TAF/JBL/HGB/74109-10/13/2016

Attachment: Permit

cc: Mr. Chris Napier (electronic file submission)
Ms. Kate Graf (electronic file submission)
Regional Air Compliance Manager (electronic file submission)

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Thomas A. Faha
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STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

CyrusOne, LLC
1649 W. Frankford Rd.
Carrollton, TX 75007
Registration No.: 74109

is authorized to construct and operate

emergency diesel engine-generator sets

located at

CyrusOne Northern Virginia Data Center – Shaw Road
511 Shaw Road
Sterling, VA 20166

in accordance with the Conditions of this permit.

Approved on October 13, 2016

Thomas A. Faha
Regional Director

Permit consists of 11 pages.
Permit Conditions 1 to 25.
Source Testing Report Format

INTRODUCTION

This permit approval is based on the permit application dated July 22, 2016 (received by DEQ on July 25, 2016) and supplemental information dated September 7, 2016 (received by DEQ on September 12, 2016). Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-20 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

Equipment List – Equipment at this facility consists of:

Equipment to be Constructed:				
Reference No.	Equipment Description	Rated Capacity	Delegated Federal Requirements	Original Permit Date
GEN-A, GEN-B, GEN-C, GEN-D, GEN-E, GEN-F, GEN-G, GEN-H, GEN-J, GEN-K, and GEN-L	Eleven (11) MTU, 16V4000G83 emergency diesel engine-generator sets	2,250 ekW (generator power output) 3,351 bhp (per engine)	None	10/13/2016
GEN-HOUSE	One (1) MTU, 18V2000G76S emergency diesel engine-generator set	1,250 ekW (generator power output) 1,838 bhp	None	10/13/2016

Specifications included in the above table are for informational purposes only and do not form enforceable terms or conditions of the permit.
(9 VAC 80-1180 D 3)

PROCESS REQUIREMENTS

1. **Emission Controls** – Nitrogen oxides (NO_X) emissions from the emergency diesel engine-generator sets shall be controlled by electronic fuel injection, turbocharged engines, and after coolers. The permittee shall maintain documentation that demonstrates the control devices have been installed on the diesel engine-generator sets.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

2. **Emission Controls –** Visible emissions, particulate emissions (PM/PM-10/PM-2.5), carbon monoxide (CO) emissions, volatile organic compound (VOC) emissions, and nitrogen oxide (NO_X) emissions from the emergency diesel engine-generator sets shall be controlled by the use of good operating practices and performing appropriate maintenance in accordance with the manufacturer recommendations. In addition, the permittee may only change those settings that are permitted by the manufacturer and does not increase air emissions.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

3. **Monitoring Devices** – Each emergency diesel engine-generator set shall be equipped with a non-resettable hour metering device to monitor the operating hours. The non-resettable hour meter used to continuously measure the hours of operation for each diesel engine-generator set shall be observed by the owner with a frequency of not less than once each day the engine-generator set is operated. The owner shall keep a log of these observations.

   Each monitoring device shall be installed, maintained, calibrated (as appropriate) and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the diesel engine-generator sets are operating.
   (9 VAC 5-80-1180 D)

OPERATING/EMISSION LIMITATIONS

4. **Operation of the Emergency Diesel Engine-Generator Set** – The permittee shall operate and maintain each emergency diesel engine-generator set and control device according to the manufacturer's written instructions or procedures developed by the permittee that are approved by the engine manufacturer. In addition, the permittee may only change those settings that are permitted by the manufacturer and does not increase air emissions.
(9 VAC 5-80-1180)

5. **Emergency Power Generation** – The emergency diesel engine-generator sets shall only be operated in the following modes:

a. In situations that arises from sudden and reasonably unforeseeable events where the primary energy or power source is disrupted or disconnected due to conditions beyond the control of an owner or operator of a facility including:

   i. A failure of the electrical grid;

   ii. On-site disaster or equipment failure; or

   iii. Public service emergencies such as flood, fire, natural disaster, or severe weather conditions.

b. For participation in an ISO-declared emergency, where an ISO emergency is:

   i. An abnormal system condition requiring manual or automatic action to maintain system frequency, to prevent loss of firm load, equipment damage, or tripping of system elements that could adversely affect the reliability of an electric system or the safety of persons or property;

   ii. Capacity deficiency or capacity excess conditions;

   iii. A fuel shortage requiring departure from normal operating procedures in order to minimize the use of such scarce fuel;

   iv. Abnormal natural events or man-made threats that would require conservative operations to posture the system in a more reliable state; or

   v. An abnormal event external to the ISO service territory that may require ISO action.

c. For periodic maintenance, testing (including readiness testing), and operational training.

(9 VAC 5-80-1180)

6. **Operating Hours –** The emergency diesel engine-generator sets shall not operate more than a combined total of 4,200 hours per year, and no single emergency diesel engine-generator set shall operate more than 500 hours per year, calculated monthly as the sum of each consecutive 12-month period.

   Compliance for the consecutive 12 month period shall be demonstrated monthly by adding the total operating hours for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
   (9 VAC 5-80-1180)

7. **Fuel –** The approved fuel for the emergency diesel engine-generator sets is diesel fuel. The diesel fuel shall meet the ASTM D975 specification for S15 diesel fuel oil with maximum sulfur content per shipment of 0.0015%. A change in the fuel may require a new or amended permit.
   (9 VAC 5-80-1180 and 9 VAC 5-50-260)

8. **Fuel Certification** – The permittee shall obtain a certification from the fuel supplier with each shipment of diesel fuel. Each fuel supplier certification shall include the following:

   a. The name of the fuel supplier;

   b. The date on which the diesel fuel was received;

   c. The quantity of diesel fuel delivered in the shipment;

   d. A statement that the diesel fuel complies with the American Society for Testing and Materials specifications (ASTM D975) for S15 diesel fuel oil; and

   e. The sulfur content of the diesel fuel.

   Fuel sampling and analysis, independent of that used for certification, as may be periodically required or conducted by DEQ may be used to determine compliance with the fuel specifications stipulated in Condition 7. Exceedance of these specifications may be considered credible evidence of the exceedance of emission limits.
   (9 VAC 5-80-1180)

EMISSION LIMITS

9. **Process Emission Limits** – Emissions from the operation of each specific emergency diesel engine-generator set shall not exceed the limits specified below:

Ref. No.	PM (lb/hr)	PM-10 (lb/hr)	PM-2.5 (lb/hr)	Nitrogen Oxides (as NO_2) (lb/hr)	Carbon Monoxide (CO) (lb/hr)	Volatile Organic Compounds (VOC) (lb/hr)
GEN-A, GEN-B, GEN-C, GEN-D, GEN-E, GEN-F, GEN-G, GEN-H, GEN-J, GEN-K, AND GEN-L	0.7	0.7	0.7	44.3	7.16	0.91
GEN-HOUSE	0.12	0.12	0.12	24.3	2.19	0.84

Compliance with these pollutant limits shall be based on the proper operation and maintenance of the diesel engines or by testing, if required.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

10. **Annual Engine Generator Emission Limits** – Total emissions from all emergency diesel engine-generator sets shall not exceed the limits specified below:

PM (tons/yr)	PM-10 (tons/yr)	PM-2.5 (tons/yr)	Nitrogen Oxides (as NO_2) (tons/yr)	Carbon Monoxide (CO) (tons/yr)	Volatile Organic Compounds (VOC) (tons/yr)
1.47	1.47	1.47	93.03	15.04	2.42

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Condition 6.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

11. **Visible Emission Limit** – Visible emissions from each emergency diesel engine-generator exhaust shall not exceed 5% opacity except during one 6-minute period in any one hour in which visible emissions shall not exceed 10% opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown and malfunction.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

INITIAL COMPLIANCE DETERMINATION

12. **Stack Test** – Initial performance tests shall be conducted for NO_X and CO from the stacks of two of the MTU Model # 16V4000G83 emergency diesel engine-generator sets using EPA reference method 7E and 10 (40 CFR Part 60, Appendix A-4), respectively, to determine compliance with the emission limits contained in Condition 9. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30, and the test methods and procedures contained in each applicable section or subpart listed in 9 VAC 5-50-410. The details of the tests are to be arranged with the Regional Air Compliance Manager of DEQ's Northern Regional Office (NRO). The permittee shall submit a test protocol at least 30 days prior to testing. One hard copy and an electronic copy of the test results shall be submitted to the Regional Air Compliance Manager of DEQ's NRO within 60 days after test completion and shall conform to the test report format enclosed with this permit.

    a. Emissions testing of each pollutant for each selected emergency diesel engine-generator set shall consist of three one-hour test runs under load. The average of the three runs shall be reported as the short-term emission rate for that engine-generator.

    b. Testing shall be conducted with the engines operating at greater than 90% electrical capacity, unless multiple load band testing is approved by DEQ.

    c. Recorded information shall include, but not be limited to:

        i. Generator load/kilowatt output.

        ii. Fuel consumption and fuel sulfur content of the diesel fuel oil.

    (9 VAC 5-50-30 and 9 VAC 5-80-1200)

13. **Visible Emissions Evaluation** – Concurrently with the initial performance tests required by Condition 12, Visible Emission Evaluations (VEE) in accordance with 40 CFR Part 60, Appendix A-4, Method 9, shall also be conducted by the permittee on the two MTU Model # 16V4000G83 emergency diesel engine-generator sets selected for the stack tests of Condition 12. Each test shall consist of 30 sets of 24 consecutive observations (at 15 second intervals) to yield a six minute average. The details of the tests are to be arranged with the Regional Air Compliance Manager of DEQ's NRO. The permittee shall submit a test protocol at least 30 days prior to testing. The evaluations shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Should conditions prevent concurrent opacity observations, the Regional Air Compliance Manager of DEQ's NRO shall be notified in writing, within seven days, and visible emissions testing shall be rescheduled within 30 days. Rescheduled testing shall be conducted under the same conditions as possible as the initial performance tests. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test result shall be submitted to the NRO within 60 days after test completion and shall conform to the test report format enclosed with this permit. (9 VAC 5-50-30 and 9 VAC 5-80-1200)

CONTINUING COMPLIANCE DETERMINATION

14. **Emissions Testing –** The emergency diesel engine-generator sets shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. This includes constructing the facility/equipment such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and providing a stack or duct that is free from cyclonic flow. Sampling ports shall be provided when requested at the appropriate locations and safe sampling platforms and access shall be provided.
(9 VAC 5-50-30 F and 9 VAC 5-80-1180)

RECORDS

15. **On Site Records** – The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Regional Air Compliance Manager of the DEQ's NRO. These records shall include, but are not limited to:

    a. Annual hours of operation of each emergency diesel engine-generator set, calculated monthly as the sum of each consecutive 12 month period and the combined annual hours of operation for the diesel-engine generator sets calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12 month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

    b. All fuel supplier certifications.

c. Engine information including make, model, serial number, model year, maximum engine power (bhp), and engine displacement for each emergency diesel engine-generator set.

d. The manufacturer's written operating instructions or procedures developed by the owner/operator that are approved by the engine manufacturer for each emergency diesel engine-generator set.

e. Records of the reasons for operation for each emergency diesel engine-generator set including, but not limited to, the date, cause of operation, cause of the emergency, the ISO-declared emergency notification, and the hours of operation.

f. Results of all stack tests and visible emission evaluations.

g. Scheduled and unscheduled maintenance and operator training.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.
(9 VAC 5-80-1180 and 9 VAC 5-50-50)

NOTIFICATIONS

16. **Initial Notifications** – The permittee shall furnish written notification to the Regional Air Compliance Manager of the DEQ's NRO of:

    a. The actual date on which construction of the emergency diesel engine-generator sets commenced within 30 days after such date. Along with this notification, the information below shall be included:

        i. Name and address of the permittee;

        ii. The address of the affected source;

        iii. Engine information, including make, model, engine family, serial number, model, year, maximum engine power and engine displacement.

        iv. Fuel used.

    b. The anticipated start-up date of the emergency diesel engine-generator sets postmarked not more than 60 days nor less than 30 days prior to such date.

    c. The actual start-up date of the emergency diesel engine-generator sets within 15 days after such date. The actual start-up date for each emergency diesel engine-generator set shall be the date on which each engine completes manufacturer's trials, but shall be no later than thirty days after the initial start up for manufacturer's trials.

d. The anticipated date of the performance tests and visible emissions evaluation of the emergency diesel engine-generator sets postmarked at least 30 days prior to such date.

(9 VAC 5-50-50 and 9 VAC 5-80-1180)

GENERAL CONDITIONS

17. **Permit Invalidation** – This permit to construct the emergency diesel engine-generator sets shall become invalid, unless an extension is granted by the DEQ, if:

    a. A program of continuous construction is not commenced within 18 months from the date of this permit.

    b. A program of construction is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.

    (9 VAC 5-80-1210)

18. **Permit Suspension/Revocation** – This permit may be suspended or revoked if the permittee:

    a. Knowingly makes material misstatements in the permit application or any amendments to it;

    b. Fails to comply with the conditions of this permit;

    c. Fails to comply with any emission standards applicable to a permitted emissions unit;

    d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or

    e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emissions limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

    (9 VAC 5-80-1210 G)

19. **Right of Entry** – The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:

    a. To enter upon the permittee 's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;

    b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;

c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and

d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.
(9 VAC 5-170-130 and 9 VAC 5-80-1180)

20. **Maintenance/Operating Procedures** – At all times, including periods of start-up, shutdown, soot blowing, and malfunction, the permittee shall, to the extent practicable, maintain and operate the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions.

a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.

b. Maintain an inventory of spare parts.

c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.

d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.
(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

21. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9 VAC 5-20-180 J and 9 VAC 5-80-1180 D)

22. **Notification for Facility or Control Equipment Malfunction** – The permittee shall furnish notification to the Regional Air Compliance Manager of the DEQ's NRO of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour. Such notification shall be made as soon as practicable but no later than four daytime business hours after the malfunction is

discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within two weeks of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Regional Air Compliance Manager of the DEQ's NRO.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)

23. **Violation of Ambient Air Quality Standard** – The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)

24. **Change of Ownership** – In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current minor NSR permit issued to the previous owner. The new owner shall notify the Northern Regional Office of the change of ownership within 30 days of the transfer.
(9 VAC 5-80-1240)

25. **Permit Copy** – The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

SOURCE TESTING REPORT FORMAT

Report Cover
1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Test Dates.
4. Tester; name, address and report date

Certification
1. Signed by team leader/certified observer (include certification date)
2. Signed by responsible company official
3. *Signed by reviewer

Copy of approved test protocol

Summary
1. Reason for testing
2. Test dates
3. Identification of unit tested & the maximum rated capacity
4. *For each emission unit, a table showing:
    a. Operating rate
    b. Test Methods
    c. Pollutants tested
    d. Test results for each run and the run average
    e. Pollutant standard or limit
5. Summarized process and control equipment data for each run and the average, as required by the test protocol
6. A statement that test was conducted in accordance with the test protocol or identification & discussion of deviations, including the likely impact on results
7. Any other important information

Source Operation
1. Description of process and control devices
2. Process and control equipment flow diagram
3. Sampling port location and dimensioned cross section Attached protocol includes: sketch of stack (elevation view) showing sampling port locations, upstream and downstream flow disturbances and their distances from ports; and a sketch of stack (plan view) showing sampling ports, ducts entering the stack and stack diameter or dimensions

Test Results
1. Detailed test results for each run
2. *Sample calculations
3. *Description of collected samples, to include audits when applicable

Appendix
1. *Raw production data
2. *Raw field data
3. *Laboratory reports
4. *Chain of custody records for lab samples
5. *Calibration procedures and results
6. Project participants and titles
7. Observers' names (industry and agency)
8. Related correspondence
9. Standard procedures

* Not applicable to visible emission evaluations