APPENDIX A:
TECHNICAL SUPPORT DOCUMENT

Standards of Performance for Existing Municipal Solid Waste Landfills

Division of Environmental Quality

Office of Air Quality

I. Executive Summary

The technical support document demonstrates how the proposed Chapter 17 of APC&EC Rule 19 meets applicable requirements for establishing standards of performance for existing municipal solid waste landfills pursuant to emission guidelines promulgated by the United States Environmental Protection Agency. The standards of performance are expected to limit potential future increases in nonmethane organic compound (NMOC) emissions from existing municipal solid waste landfills.

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II. Introduction

In 2016, the Environmental Protection Agency (EPA) revised the Emission Guidelines (EG) for Municipal Solid Waste (MSW) Landfills, now codified at 40 CFR Part 60, Subpart Cf.[1] The MSW landfill EG is based on the Administrator's determination that MSW landfills cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. The Clean Air Act (CAA) Section 111(d) requires states to develop standards of performance for existing stationary sources of air pollution, including MSW landfills. This plan addresses existing MSW landfills subject to the updated EG.

The primary change to the MSW landfill EG was the lowering of the emission thresholds that trigger the requirement for subject landfills to install controls. Under the previous EG, landfills were required to install gas collection and control systems (GCCS) to control landfill gas emissions when nonmethane organic compound (NMOC) emissions reached fifty Megagrams per year (Mg/yr). Under the new EG, this threshold has been reduced to thirty-four Mg/yr.

Additionally, EPA developed a subcategory for closed landfills, which do not produce as much landfill gas as active landfills. Under this subcategory, closed landfills will remain subject to the fifty Mg/yr emissions threshold to determine when controls must be installed. EPA also provides criteria by which an active landfill that closes may cap, remove, or decommission the GCCS.

Section 111(d) of the CAA requires that states demonstrate that the state has the legal authority to adopt and implement the standards of performance and that the standards are quantifiable, permanent, verifiable, and enforceable. The plan must also include a description of how the standards were determined for each designated facility.

Standards of performance and associated monitoring, reporting, and recordkeeping requirements included in state plans are subject to approval by EPA. Upon approval by EPA, these plan elements will be codified in the Code of Federal Regulations (CFR) and become enforceable by both the state and EPA.

III. Scope

The Arkansas Pollution Control and Ecology Commission (APC&EC) proposes changes to Rule 19 to adopt standards of performance, monitoring, recordkeeping, and reporting requirements, and compliance schedules for all MSW landfills in Arkansas that meet the applicability conditions in 40 CFR § 60.31f. The amendments to Rule 19 will be implemented through

[1] Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. https://www.federalregister.gov/documents/2016/08/29/2016-17700/emission-guidelines-and-compliance-times-for-municipal-solid-waste-landfills

incorporation of requirements applicable to each subject municipal solid waste landfill into permit conditions in a new or revised permit.

Table 1 and Table 2 identify where each requirement of the emission guidelines for municipal solid waste landfills (40 CFR Part 60, Subpart Cf) and additional general requirements for 111(d) state plans contained at (40 CFR Part 60 Subpart Ba) are addressed in the proposed revisions to Rule 19.

Table 1: 40 CFR Part 60 Subpart Cf Regulatory Requirements

40 CFR Part 60 Subpart Cf Citation	Location in APC&EC Rule 19 *Proposed*
§ 60.31f Designated facilities	19.1703 19.1704 19.1705
§ 60.32f Compliance times	19.1709
§ 60.33f Emission Guidelines for municipal solid waste landfill emissions	*Detailed below:*
(a) Landfills	19.1708(A)
(b) Collection system	19.1708(B)
(c) Control system	19.1708(C)
(d) Design Capacity	19.1706
(e) Emissions	19.1707
(f) Removal criteria	19.1708(D)
§ 60.34f Operational standards for collection and control systems	19.1711
§ 60.35f Test methods and procedures	19.1717
§ 60.36f Compliance provisions	19.1711
§ 60.37f Monitoring of operations	19.1711
§ 60.38f Reporting guidelines	*Detailed below:*
(a) Design capacity report	19.1706
(b) Amended design capacity report	19.1706
(c) NMOC emission rate report	19.1707
(d) Collection and control system design plan	19.1710
(e) Revised design plan	19.1710
(f) Closure report	19.1713
(g) Equipment removal report	19.1713
(h) Annual report	19.1712
(i) Initial performance test report	19.1712
(j) Electronic reporting	19.1716
(k) Corrective action and the corresponding timeline	19.1718
(l) Liquids addition	19.1714

(m) Tier 4 notification	19.1707
(n) *24-hour high temperature report*	19.1711(B)(1)
§ 60.39f Recordkeeping guidelines	19.1715
§ 60.40f Specifications for active collection systems	19.1708(B)(1)
§ 60.41f Definitions	19.1702

Table 2: 40 CFR Part 60, Subparts B and Ba Regulatory Requirements

40 CFR Part 60 Subpart B Citation	Location the Requirements are Addressed
§ 60.24 (Emission standards and compliance schedules)	19.1709, 19.1711
§ 60.24(e)	19.1709
§ 60.25 (Emission inventories, source surveillance, reports)	19.1715, 19.1716, 19.1717
§ 60.26 (Legal Authority)	Ark. Code Ann. § 8-4-311

The following EPA-approved provisions from Arkansas's state implementation plan will apply to designated sources subject to the state's 111(d) plan for MSW landfills. These provisions provide for DEQ's periodic inspection and testing of designated facilities required under 40 CFR 60.25(b)(2), and requirements under 40 CFR 60.25(c) to correlate information obtained to applicable emission standards and make this information available to the general public:

- Rule 19.705 provides that the record-keeping and reporting requirements for stationary sources subject to Rule 19. Rule 19.705 outlines how records of air emissions are to be maintained and how information and data should be submitted to DEQ.
- Rule 19.702 provides guidelines and timelines for air emissions sampling necessary to enable Arkansas to determine whether the sources are in compliance.
- Authority to administer and enforce all laws relating pollution of the air is granted to DEQ under Ark. Code Ann. § 8-4-311. Ark. Code Ann. § 8-4-310 makes unlawful to violate any rule or order of the APC&EC pursuant to the Arkansas Water and Air Pollution Control Act.
- Rule 19.703 requires any stationary source subject to Rule 19 to install, calibrate, operate, and maintain equipment to continuously monitor or determine federally-regulated air pollutant emissions in accordance with federal specification and in accordance with any joint specifications outlined by DEQ, with concurrence of EPA.
- Ark. Code Ann. § 8-4-304 specifically applies the provisions at Ark. Code Ann. § 8-4-201 to the Arkansas air pollution control program administered by DEQ. Ark. Code Ann. § 8-4-201 generally outlines the powers and duties of DEQ and the APC&EC related to water pollution control. Ark. Code Ann. § 8-4-201(a)(2)(A) and (B) grants DEQ the authority to investigate the extent, character, and effect of the pollution of the waters of

this state and to conduct investigations, research, surveys, and studies and gather data and information necessary or desirable in the administration or enforcement of pollution laws. Ark. Code Ann. § 8-4-201(a)(4) specifies that DEQ may conduct inspections for the purposes of verifying compliance with DEQ-approved plans for pollution control within a facility. These statutes provide for DEQ's periodic inspection and testing of designated facilities subject to this plan.

- Rule 19.701 states that DEQ will use any credible evidence based on sampling, monitoring, and reporting, to determine violations of applicable emissions limitations.
- Rule 19.706 requires correlation of emissions data to applicable emissions limitations and requires DEQ to make this data publicly available.

A. Identification of Designated Facilities

MSW landfills that will be subject to the proposed Rule 19, Chapter 17, are those MSW landfills in Arkansas that:

(1) Accepted waste after November 8, 1987, or have capacity for future waste deposition, and

(2) Commenced construction on or before July 17, 2014, and have not been modified or reconstructed since then;[2]

DEQ identified subject facilities through review of DEQ Title V and solid waste permits, inspection reports, and correspondence between DEQ and subject facilities, as well as review of the EPA facility inventory developed to aid in development of the revised EG. Table 3 lists the subject facilities and provides the information used to determine that they are subject to the EG. Five facilities included in the EPA landfill inventory are not subject due to modification or reconstruction after July 17, 2014.

[2] 40 CFR § 60.751 defines modification as it pertains to municipal solid waste landfills. https://www.ecfr.gov/cgi-bin/text-idx?node=sp40.7.60.www

Table 3: Subject MSW Landfills

Name	AFIN	County	Design Capacity	Expected Closure Year	GCCS Installed	Subcategory
Little Rock Municipal Landfill	60-01071	Pulaski	7.03 million Mg	2073	Yes	Open
Cherokee Village Landfill	25-00028	Fulton	8.17 million m^3	2059	Yes	Open
Two Pine Landfill	60-00438	Pulaski	18.58 million m^3	2053	Yes	Open
Jefferson County Landfill	35-00170	Jefferson	4.13 million m^3	2037	Yes	Open
Ozark Ridge Landfill	75-00046	Yell	6.53 million m^3	2051	Yes	Open
City of Conway Sanitary Landfill	23-00010	Faulkner	7.55 million m^3	2040	No	Open
Northeast Arkansas Regional Solid Waste District	28-00077	Greene	4.70 million m^3	2028	No	Open
Fort Smith Sanitary Landfill	66-00226	Sebastian	55.51 million m^3	2061	Yes	Open
Craighead County Solid Waste Disposal	16-00199	Craighead	4.30 million Mg	2030	Yes	Open
Saline County Regional Waste Management District Landfill	63-00155	Saline	7.19 million m^3	2030	Yes	Open
Union County Recycling and Disposal	70-00364	Union	5.02 million m^3	2037	Yes	Open
ModelFill Landfill	60-00565	Pulaski	5.13 million Mg	2011	Yes	Closed[3]
Eaton-Moery Environmental Services	01-00117	Arkansas	1.81 million m^3	Unknown	No	Open
Shannon Rd. Landfill	35-00153	Jefferson	Unknown	1992	No	Closed
Ashley County Landfill	02-00038	Ashley	0.95 million m^3	Unknown	No	Open
North Arkansas Board of Reg. Sanitation	03-00051	Baxter	2.13 million m^3	2015	No	Open
Fulton Landfill-Cloverdale	04-00162	Benton	Unknown	Unknown	No	Closed
City of Warren Landfill	06-00050	Bradley	Unknown	Unknown	No	Closed[4]

[3] Email from Owen Carpenter to C McW: BFI Closure Report, ID 66287. https://www.adeq.state.ar.us/sw/permits/facility_data.aspx

City of Morrilton	15-00034	Conway	1.90 million m^3	2050	No	Open
Drew County	22-00040	Drew	Unknown	Unknown	No	Closed
City of Hope Landfill	29-00034	Hempstead	2.29 million m^3	Unknown	No	Open
Jackson County	34-00082	Jackson	1.07 million m^3	Unknown	No	Open
Little River County	41-00038	Little River	Unknown	Unknown	No	Closed
City of West Helena	54-00086	Phillips	2.91 million m^3	Unknown	No	Open

[4] Currently operated as a transfer station

B. Standards of Performance

The owner or operator of each of designated facility with greater than 2.5 million Mg and 2.5 million cubic meter design capacity must install and operate a GCCS if the designated facility:

- Has accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition;
- Commenced construction, reconstruction, or modification on or before July 17, 2014; and
- Emits greater than or equal to the following thresholds:
    - For open landfills, an NMOC emission rate of thirty-four Mg/year or Tier 4 surface emissions monitoring (SEM) concentration of 500 parts per million methane; and
    - For landfills that closed prior to September 27, 2019, an NMOC emission rate of fifty Mg/year.

The requirement to install and operate a GCCS is triggered by the first annual report in which the emissions rate is equal to or greater than the thresholds listed above. Emissions standards for designated facilities required to install and operate GCCS are discussed in Section III.B.2.

1. Approved Methods for Calculating NMOC Emission Rate and Surface Air Monitoring Demonstrations

The owner or operator must calculate the NMOC emissions rate included in annual reports to DEQ using one of two approved emission rate equations. There are four options (Tiers) that, if the MSW landfill meets the Tier criteria, the owner or operator may use to determine equation inputs. Rule 19.1717, as proposed, incorporates by reference the methods and procedures for calculating emission rates and conducting surface emission monitoring demonstrations codified at 40 CFR § 60.35f.

2. Standards for MSW Landfills Required to Install and Operate a GCCS

Requirements for collection and control systems for GCCS in 40 CFR § 60.33f are proposed for incorporation into Rule 19.1708(B) and (C), as briefly described below.

GCCS installed to comply with this plan may use either an active or a passive collection system. Active collection systems include gas moving equipment to remove gases from the landfill. Passive collection systems rely entirely on positive gas pressure due to gas generation within the

landfill to remove the gas. In the case of both active and passive systems, the collection system must:

- Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that requires gas collection for the entire expected life of the system;
- Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of five years or more if active; or two years or more if closed or at final grade; and
- Be designed to minimize off-site migration of subsurface gas.

GCCS installed to comply with this plan may control the gas collected by:

- Using a non-enclosed flare designed and operated in accordance with the parameters established in 40 CFR § 60.18 except as noted in 40 CFR § 60.37f(d);
- Using a control system designed and operated to reduce NMOC by ninety-eight weight percent or to reduce outlet NMOC concentration to less than twenty parts per million by volume, dry basis as hexane at three percent oxygen or less; or
- Routing collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use.[5]

The requirements for GCCS installation and operation under 40 CFR § 60.34f are proposed for incorporation into Rule 19.1711. Specifications for active collection systems, if used, under 40 CFR § 60.40f are proposed for incorporation into Rule 19.1708(B)(1).

3. Removal criteria

A GCCS installed to comply with this plan may be capped, removed, or decommissioned if certain criteria are met. Removal criteria under 40 CFR § 60.33f(f) are proposed for incorporation into Rule 19.1708(D), as summarized below.

The following criteria must be met prior to capping, removing, or decommissioning a GCCS:

- The landfill is a closed landfill as defined in 40 CFR § 60.41f and a closure report has been submitted to DEQ;
- The GCCS has been in operation a minimum of fifteen years or the landfill owner or operator demonstrates that the GCCS will be unable to operate for fifteen years due to declining gas flow;

[5] Beneficial uses include without limitation fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process.

- The NMOC emission rate at the landfill is less than thirty-four Mg/year on three successive test dates[6]; and
- For the closed landfill subcategory as defined in 40 CFR § 60.41f, the NMOC emission rate at the landfill is less than fifty Mg/year on three successive test dates[7].

4. Monitoring, Recordkeeping, and Compliance Requirements

Each subject facility must submit a design capacity report to DEQ within ninety days of the effective date of this plan, following EPA approval. The design capacity report must contain all information required by 40 CFR § 60.38f.[8] Subject facilities with design capacities above 2.5 million megagrams and 2.5 million cubic meters are required to perform annual NMOC emissions monitoring as provided in 40 CFR § 60.38f(c). The reporting guidelines specified in 40 CFR § 60.38f are proposed for incorporation into Rule 19 as listed below:

40 CFR § 60.38f(a) Design capacity report, Rule 19.1706

(b) Amended design capacity report, Rule 19.1706

(c) NMOC emission rate report, Rule 19.1707

(d) Collection and control system design plan, Rule 19.1710

(e) Revised design plan, Rule 19.1710

(f) Closure report, Rule 19.1713

(g) Equipment removal report, Rule 19.1713

(h) Annual report, Rule 19.1712

(i) Initial performance test report, Rule 19.1712

(j) Electronic reporting, Rule 19.1716

(k) Corrective action and the corresponding timeline, Rule 19.1718

(l) Liquids addition, Rule 19.1714

(m) Tier 4 notification, Rule 19.1707

(n) 24-hour high temperature report, Rule 19.1711(B)(1)

[6] Test dates must be no less than ninety days apart and no more than 180 days apart.
[7] Test dates must be no less than ninety days apart and no more than 180 days apart.
[8] 40 CFR 60.38(f) Reporting guidelines. https://www.ecfr.gov/cgi-bin/text-idx?node=sp40.7.60.c_0f#se40.7.60_138f

Allowed methods for calculating NMOC concentrations are specified in Section III.B.1. Monitoring, recordkeeping, and reporting requirements are contained in Section III.B.3.

Owners and operators of facilities that have not reached the thirty-four Mg/yr threshold must comply with the following monitoring, recordkeeping, and compliance requirements:

- If the initial NMOC emission report shows emissions less than thirty-four Mg per year (fifty Mg for landfills in the closed landfill subcategory), the owner or operator must recalculate the NMOC emissions and submit a report annually.

- If the NMOC emission rate is below thirty-four Mg/yr for each of the subsequent five years, the owner/operator may elect to submit an estimate of NMOC emissions for the next five years in lieu of annual reports.

- If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year of the five-year emissions estimate report, the owner-operator must submit a revised five year estimate beginning with the year in which actual waste acceptance exceeded estimated waste acceptance.

Owners or operators of MSW landfills that have met or exceeded the thirty-four Mg/yr NMOC emission threshold and are required to install GCCS must comply with the following monitoring, recordkeeping, and compliance requirements:

- The landfill GCCS is required to be equipped with a sampling or access port. The owner/operator must periodically monitor gauge pressure in the gas collection header, nitrogen or oxygen content in the landfill gas, and temperature of the landfill gas.

- If a flare is used for gas destruction, the owner/operator must monitor the flare using a heat sensing device that indicates the presence of a flame and a device that records gas flow to the flare and any bypass lines.

- If an enclosed control device is used, the owner/operator must conduct an initial performance test and then operate the device according to the manufacturer's specifications. A temperature monitoring device is not required for boilers or process heaters with a design capacity of forty-four megawatts or greater.

Owners/Operators must retain records of all required monitoring results. Owners/Operators must submit certain required performance test reports, NMOC emission rate reports, and annual reports documenting compliance and any deviations from the operating standards to DEQ. Owners or Operators will also be required to submit the reports to EPA's Central Data Exchange using the Compliance and Emissions Data Reporting Interface (CEDRI).

Test methods and procedures under 40 CFR § 60.35f are proposed for incorporation into Rule 19.1717; Monitoring requirements under 40 CFR § 60.37f are proposed for incorporation into Rule 19.1711; recordkeeping requirements under 40 CFR § 60.38f are proposed for incorporation into Rule 19 as listed in Section III.B.4.; compliance provisions under 40 CFR § 60.36f are proposed for incorporation into Rule 19.1711; and reporting guidelines under 40 CFR § 60.39f are proposed for incorporation into Rule 19.1715.

C. Compliance Schedules and/or Increments of Progress

If monitoring indicates that NMOC emissions have reached or exceeded thirty-four Mg/yr, (fifty Mg/yr for landfills in the closed landfill subcategory), owners or operators must install GCCS at the facility within thirty months. The compliance schedule requirements under 40 CFR § 60.32f and the increments of progress are proposed for incorporation into Rule 19.1709. Table 4 summarizes the compliance schedule and increments of progress.

Table 4: Increments of Progress

Increment	Date if Using Tiers 1, 2, or 3	Date if Using Tier 4
Increment 1: Submit final collection and control system design plan to the Division in accordance with Rule 19.1710	Twelve (12) months after initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions equal to or exceeding thirty-four (34) megagrams per year for active landfills or NMOC emissions equal to or exceeding fifty (50) megagrams for closed landfills	Twelve (12) months after the first measured concentration of methane of five hundred (500) parts per million or greater from the surface of the landfill
Increment 2: Submit notice to the Division that on-site construction of collection and control system has begun	Twenty-four (24) months after initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions equal to or exceeding thirty-four (34) megagrams per year for active landfills or NMOC emissions equal to or exceeding fifty (50) megagrams for closed landfills	Twenty-four (24) months after the first measured concentration of methane of five hundred (500) parts per million or greater from the surface of the landfill

Increment 3: Submit notice to the Division that on-site construction of collection and control system is complete	Thirty (30) months after initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions equal to or exceeding to thirty-four (34) megagrams per year for active landfills or NMOC emissions equal to or exceeding fifty (50) megagrams for closed landfills	Thirty (30) months after the first measured concentration of methane of five hundred (500) parts per million or greater from the surface of the landfill
Increment 4: Final compliance with Rule 19.1708	Thirty (30) months after initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions equal to or exceeding to thirty-four (34) megagrams per year for active landfills or NMOC emissions equal to or exceeding fifty (50) megagrams for closed landfills	Thirty (30) months after the first measured concentration of methane of five hundred (500) parts per million or greater from the surface of the landfill

IV. Demonstration of Adequacy

A. Emissions Performance

EPA developed a 2019 MSW landfill emissions inventory based on databases used in the development of the 2016 EG. The estimates are based on the modeled emissions remaining after considering controls required by 40 CFR Part 60, subparts WWW and Cc, and do not include any additional emissions reductions from voluntary actions, such as early installation of the GCCS. Some facilities included have installed GCCS but have no reported collected NMOC emissions because the facilities were not yet required to install GCCS. EPA modeled City of Conway Sanitary Landfill as having GCCS and estimated collected NMOC in their inventory. DEQ disagrees with the collected annual NMOC modeled by EPA for City of Conway Sanitary Landfill because this facility does not have a GCCS installed.

Although nineteen facilities are listed in EPA's modeled inventory, five of the facilities listed are not subject to Rule 19 Chapter 17 due to modification or reconstruction after July 17, 2014. Several older, smaller subject landfills were not included in the EPA inventory, and may contribute additional NMOC emissions to Arkansas's inventory. In addition, NMOC emission reductions achieved by one facility that had voluntarily installed GCCS were not captured in EPA's inventory. Table 5 lists modeled 2019 NMOC generated and collected and potential emission reductions achievable under the proposed standards of performance.

Table 5: MSW Landfill Generated NMOC, Collected NMOC, and Remaining NMOC for 2019 from Subject Facilities[9]

Landfill ID	Landfill Name	Sub-Category	Generated Annual NMOC (Mg)	Collected Annual NMOC (Mg)	Remaining Emitted Annual NMOC (Mg)	Potential NMOC Emissions Reduction Based on Estimated Control Efficiency (Mg)
523059	Cherokee Village Landfill	Open	25.27	Not Applicable	25.27	Not Applicable
528095	City of Conway Sanitary Landfill	Open	27.18	Not Applicable	27.18	Not Applicable
528096	Northeast Arkansas Regional Solid Waste District	Open	24.22	Not Applicable	24.22	Not Applicable
528097	Fort Smith Sanitary Landfill	Open	119.19	82.15	37.04	Not Applicable
558358	Morrilton Sanitary Landfill	Open	7.19	Not Applicable	7.19	Not Applicable
528109	Craighead County Solid Waste Disposal	Open	25.42	Not Applicable	25.42	Not Applicable
530255	Saline County Regional Solid Waste Management District	Open	48.28	35.35	12.93	Not Applicable
526799	Little Rock City Solid Waste Landfill	Open	27.01	Not Applicable	27.01	Not Applicable
526800	Union County Recycling and	Open	28.68	23.85	4.83	Not Applicable

[9] Developing a Federal Plan Source and Emission Inventory, Appendix B: Source and Emission Inventory 06.25.16. https://www.regulations.gov/document?D=EPA-HQ-OAR-2019-0338-0006

	Disposal					
525555	Shannon Road Landfill	Closed	9.93	Not Applicable	9.93	Not Applicable
525145	Jefferson County Landfill	Open	34.80	27.56	7.24	Not Applicable
525148	Ozark Ridge Landfill	Open	28.35	22.95	5.40	Not Applicable
523381	Modelfill Landfill[10]	Closed	37.24	31.02	6.22	Not Applicable
525124	Two Pine Landfill	Open	127.71	100.33	27.38	Not Applicable

None of the subject facilities is expected to immediately trigger the requirement for installation and operation of a GCCS. Therefore, emission reductions are not anticipated at this time as a result of adoption of standards of performance into Rule 19. Should a facility trigger the GCCS requirement in the future, resulting emission reductions will be calculated at that time. Since NMOC is used as a surrogate for total emissions from MSW landfills, any future NMOC reductions will be accompanied by additional reductions of carbon dioxide, methane, and hazardous air pollutants.

B. Standards are Quantifiable, Non-duplicative, Permanent, Verifiable, and Enforceable

CAA Section 111(d) requires that standards implemented by states are quantifiable, non-duplicative, permanent, verifiable, and enforceable.

The standards proposed for adoption into Rule 19 are consistent with the EG requirements for MSW Landfills, 40 CFR Part 60, Subpart Cf. Monitoring of NMOC and/or methane levels at the facilities, both before and after installation of GCCS will allow emissions and emission reductions to be quantified.

The standards apply only to NMOC emissions for landfills that have not been modified since July 17, 2014. The standards are not necessary to comply with any other Clean Air Act requirement. Therefore, the measures in the plan are non-duplicative.

Once GCCS is installed at a facility based on NMOC emissions, the GCCS must continue to operate until the owner or operator can demonstrate that emissions are below thirty-four Mg/yr

[10] The Modelfill landfill has a GCCS system in place. The system was installed voluntarily and was not required to comply with 40 C.F.R. Part 60, Subpart WWW. Should the facility exceed the fifty Mg/yr NMOC emission threshold for closed landfills in the future, the facility would become subject to monitoring, recordkeeping, and reporting requirements associated with the GCCS system in accordance with 40 C.F.R. Part 60, Subpart Cf.

(fifty Mg/yr for the closed landfill subcategory) on the three consecutive test dates. In addition, the owner or operator of the facility must continue to submit annual reports quantifying NMOC emissions. If NMOC emissions increase above the thirty-four Mg/yr threshold (fifty Mg/yr for the closed landfill subcategory), the owner or operator is required to resume operation of the GCCS. These requirements ensure permanent reductions in NMOC emissions from designated facilities even if, as provided by Rule 19, the facility is no longer required to operate GCCS based on reduced NMOC emission rates.

Once the GCCS is installed and operational, the owner or operator of each facility will be required to submit performance test reports, NMOC emission reports, annual reports documenting compliance, and reports of any deviation from operating standards required by the Rule 19. These requirements will allow DEQ to verify compliance by each designated facility.

The standards of performance; compliance schedules; monitoring, recordkeeping, and reporting requirements for MSW landfills proposed for adoption into Rule 19 are identical to the requirements of 40 CFR Part 60, Subpart Cf.

C. Consideration of Factors in Exercise of Powers

Pursuant to Ark. Code Ann. § 8-4-312, the Arkansas Pollution Control and Ecology Commission and APC&EC and DEQ must consider the factors listed in Ark. Code Ann. § 8-4-312, when exercising their powers and responsibilities. Table 6 provides DEQ's assessment of the statutory factors as applied to the incorporation of applicable elements of 40 CFR Part 60, Subpart Cf into Rule 19.

Table 6: Consideration of Ark. Code Ann. § 8-4-312 factors

Ark. Code Ann. § 8-4-312 Factors	Consideration of the Factors
(1) The quantity and characteristics of air contaminants and the duration of their presence in the atmosphere that may cause air pollution in a particular area of the state	Breakdown of waste materials in landfills produces methane, which is a greenhouse gas, and NMOC, which are volatile organic compounds. Methane is a potent greenhouse gas that can impact the atmosphere's ability to retain or shed heat. Methane's global warming potential is approximately 25 times stronger than that of carbon dioxide. On average methane remains in the atmosphere for about a decade.[11] NMOCs are also volatile organic compounds

[11] EPA's Overview of Greenhouse Gases. https://www.epa.gov/ghgemissions/overview-greenhouse-gases

		that may react with nitrogen oxides in the presence of sunlight to form ozone. EPA has identified thirteen specific hazardous air pollutants that are emitted from municipal solid waste landfills.[12] HAP, also known as air toxics, are pollutants that may cause cancer or other serious health effects, such as reproductive problems, as well as adverse environmental and ecological effects.[13] Control of landfill gas as required by the plan will also reduce emissions of HAP into the atmosphere.
(2)	Existing physical conditions and topography	This factor is not applicable to implementing the EG for municipal solid waste landfills.
(3)	Prevailing wind directions and velocities	VOCs emitted from landfills may contribute to ozone formation, and prevailing wind direction and velocity could impact where the VOCs are transported. In Arkansas, ozone formation is primarily controlled by variations in NOx concentrations rather than VOC concentrations. Biogenic (naturally-occurring) VOCs dominate the VOC inventory in Arkansas and only contribute to ozone formation when sufficient NOx is also present. For this reason, VOC emissions in Arkansas are not expected to play a major role in ozone impacts within the state.
(4)	Temperatures and temperature-inversion periods, humidity, and other atmospheric conditions	Temperature, humidity, and other atmospheric conditions play a role in photochemical reactions that produce ozone. Higher temperatures and solar radiation are conducive to ozone formation, and temperature inversions may lead to ground-level ozone being trapped near the surface where it may result in adverse health impacts.
(5)	Possible chemical reactions between air contaminants or between such air contaminants and air gases, moisture, or sunlight	Volatile organic compounds released from landfills can react with nitrogen oxides to form ozone.

[12] National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills. https://www.govinfo.gov/content/pkg/FR-2000-11-07/pdf/00-28415.pdf

[13] EPA Technology Transfer Network Air Toxics Web Site. https://www3.epa.gov/airtoxics/pollsour.html

(6)	The predominant character of development of the area of the state such as residential, highly developed industrial, commercial, or other characteristics	The majority of subject facilities in Arkansas are located in rural or lightly-developed industrial areas at considerable distance from densely populated residential areas.
(7)	Availability of air-cleaning devices	Gas collection and control systems are used to collect landfill gases for destruction or beneficial use. The systems may be passive, relying on positive pressure within the landfill to move the gases into the system for destruction or beneficial use. Active systems use gas moving equipment to remove the gases from the subsurface for destruction or beneficial use. Both passive and active systems help to prevent off-site migration of landfill gases. Operation of GCCS reduces emissions of NMOC, carbon dioxide, methane, and HAP from landfills.
(8)	Economic feasibility of air-cleaning devices	DEQ does not anticipate an economic impact from adopting standards of performance for municipal solid waste landfills into Rule 19. Based on DEQ's analysis, affected landfills in the State do not emit greater than the thresholds under which additional controls would be required by the amendments to Rule 19. However, significant increases in emissions from municipal solid waste landfills subject to the proposed standards of performance in the proposed revisions to Rule 19 could trigger a requirement to install and operate a GCCS. The emissions controls that would be required are no more stringent or costly than required under federal law. EPA has determined that GCCS is the most cost-effective option for controlling landfill gases at MSW landfills. The estimated capital cost (in 2012 dollars) to install a forty acre collection system is $897,000, assuming one well is installed per acre. Typical operation and maintenance costs for a forty-acre system (in 2012 dollars) are $100,000. Some of the costs required to install and operate the system may be offset by the

		beneficial use or sale of electricity generated from collected landfill gas.[14]
(9)	Effect on normal human health of particular air contaminants	The EG for MSW landfills are based on the EPA Administrator's determination that that MSW landfills cause or contribute to air pollution that may reasonably be anticipated to endanger public health and welfare. EPA has identified thirteen hazardous air pollutants commonly emitted from MSW landfills that may adversely affect human health.[15] Methane is a strong greenhouse gas. EPA has issued a finding that greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations.[16]
(10)	Effect on efficiency of industrial operation resulting from use of air-cleaning devices	The proposed standards may reduce demand for electricity as landfills generate electricity from landfill gases.[17]
(11)	The extent of danger to property in the area reasonably to be expected from any particular air contaminant	Methane and other volatile organic compounds contribute to ozone formation. High ozone levels have been shown to adversely impact crops and other vegetation. Additionally, methane is a strong greenhouse gas. EPA has issued a finding that greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations.[18]

[14] Regulatory Impact Analysis for the Final Revisions to the Emission Guidelines for Existing Sources and the Final New Source Performance Standards in the Municipal Solid Waste Landfills Sector. https://www3.epa.gov/ttn/ecas/docs/ria/landfills_ria_final-eg-nsps_2016-07.pdf

[15] Federal Plan Requirements for Municipal Solid Waste Landfills That Commenced Construction On or Before July 17, 2014, and Have Not Been Modified or Reconstructed Since July 17, 2014. https://www.govinfo.gov/content/pkg/FR-2019-08-22/pdf/2019-17822.pdf

[16] Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act. https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf

[17] [Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills 59280 https://www.federalregister.gov/documents/2016/08/29/2016-17700/emission-guidelines-and-compliance-times-for-municipal-solid-waste-landfills

[18] Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act. https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf

(12)	Interference with reasonable enjoyment of life by persons in the area and conduct of established enterprises that can reasonably be expected from air contaminants	The standards will in not interfere with reasonable enjoyment of life or conduct of established enterprises. Hazardous air pollutant levels near the affected landfills will decrease as a result of the plan. Additionally, nuisance odors typically emitted from the affected landfills are likely to decrease due to gas collection and control activities.
(13)	The volume of air contaminants emitted from a particular class of air contamination sources	Subject facilities in Arkansas emitted 247.28 Mg of nonmethane organic compounds in 2019.[19]
(14)	The economic and industrial development of the state and the social and economic value of the air contamination sources	The standards are no more stringent than those required under federal law. The requirements are not anticipated to have a negative impact on the economic and industrial development of the state or the social and economic value of the sources of air contaminants addressed by the plan.
(15)	The maintenance of public enjoyment of the state's natural resources	Volatile organic compounds emitted from MSW landfills have the potential to contribute to ozone formation. Methane is a potent greenhouse gas. Both excessive ozone and methane have the potential to adversely impact public enjoyment of the State's natural resources.
(16)	Other factors that the Division or the commission may find applicable	DEQ has not identified any additional relevant factors.

V. State Recordkeeping and Reporting Requirements

The proposed amendments to Rule 19 require all subject facilities to submit all GCCS monitoring and performance tests, NMOC emission rate reports, and annual reports documenting operational compliance and any deviations from the operating standards to EPA via the CEDRI database. Additionally, facilities are required to maintain all monitoring and performance test results for at least five years. Facilities subject to the requirement to calculate NMOC emission rates that are not yet required to install GCCS must also submit to EPA and retain NMOC emission annual reports.

[19] Developing a Federal Plan Source and Emission Inventory, Appendix B: Source and Emission Inventory 06.25.16. Emission data was adjusted based on voluntary GCCS at ModelFill and lack of GCCS at City of Conway that was incorrectly listed in the Appendix B inventory.
https://www.regulations.gov/document?D=EPA-HQ-OAR-2019-0338-0006

In addition, DEQ will provide a progress report to EPA Region 6 on an annual (calendar year) basis commencing with the first full reporting period following EPA approval of a state plan submittal included the proposed standards in accordance with 40 CFR 60.25. Facility reports are publicly available on the DEQ web site through the DEQ Facility and Permit Summary Permit Data System (PDS).[20]

[20] DEQ Facility and Permit Data System (PDS). http://www.adeq.state.ar.us/home/pdssql/pds.aspx#Display