UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX AIR DIVISION

Technical Support Document for EPA's Notice of Proposed Rulemaking for the California State Implementation Plan

South Coast Air Quality Management District,
Rule 1127, Emission Reduction from Livestock Waste

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Agency:	South Coast Air Quality Management District (SCAQMD)
Submitted Rule:	Rule 1127 - Emission Reductions from Livestock Wastes Submitted – October 5, 2006
Completeness Determination:	October 24, 2006
SIP Approved Rule:	N/A

I. RULE SUMMARY

South Coast Air Quality Management District (SCAQMD) Rule 1127 was adopted on August 6, 2004. The purpose of the rule is to reduce emissions of ammonia, volatile organic compounds (VOC) and particulate matter under 10 microns (PM10) from dairy livestock waste. Applicable operations include dairies, heifer, and calf farms within the SCAQMD's jurisdiction. The rule also applies to manure processing operations, such as composting operations and anaerobic digesters.

Rule 1127 was designed to implement the 2003 Air Quality Management Plan (AQMP) control measure, WST-01 and establish Best Available Control Measure (BACM) requirements for dairies pursuant to Senate Bill 700 (Florez) signed by California governor Gray Davis on September 22, 2003, which required applicable non-attainment areas to remove exemptions for certain agricultural operations from permitting requirements. EPA is evaluating the rule provisions for conformance with reasonable available control technology (RACT) requirements pursuant to Clean Air Act (CAA) Section 182(b)(2).

Rule 1127 applies to applicable dairy farms with 50 or more cows, heifers and/or calves and includes Best Management Practices (BMPs) for manure disposal and manure processing. Table 1 summarizes the dairy cow population according to the most recent information from the district. There has been a continual decline in both the number of dairies and total number of dairy cows since 2002. Table 1 lists base year (2002) and future year dairy cow population, based on a district-projected 2% per year decrease.[1] The district also bases the estimated emission reductions from these projected dairy cow population figures. The rule evaluation that follows assesses the rule effectiveness without regard to decrease and relocation of the dairy cow population or the impact of manure disposal requirements pursuant to water quality regulations.

[1] Reproduced Rule 1127 Staff Report inventory in email communication between Tuyet-Le Pham and La Weeda Ward, November 30, 2012. Also see estimated decline in milk production from 1999 to 2009, Technology Assessment – 2007 AQMP CM# MCS-05, "Updated Emissions Inventory and Recommendations Regarding Implementation of 2007 AQMP Control Measures MCS-05-Emission Reductions from Livestock Waste", South Coast Air Quality Management District, October 2011 (2011 Technology Assessment), Industry Trends and Projections, pages 6-7.

Table 1 – Dairy Cow Population and Projected Decrease in the South Coast Air Management District Jurisdiction

	2002[2]	2004	2006	2008	2010
Milking Cows	204,846	196,652	188,458	180,264	172,071
Dry Cows	36,201	34,753	33,305	31,857	30,409
Heifers	75,582	72,559	69,535	66,512	63,489
Calves	77,320	74,227	71,134	68,042	64,949
Total Cows	393,949	380,195	364,438	348,683	332,928

Following are the major requirements of Rule 1127.

Best Management Practices (BMP)

1. Implement at least one of the following manure harvesting protocols to minimize fugitive dust emissions:
   a) Scrape or harrow before 9 a.m. unless the moisture content is greater than 20% (as determined by specified test method); OR
   b) Clear corrals of manure such that an even surface of compacted manure remains on top of the soil. Do not scrape down to soil level; OR
   c) Water corral before manure harvesting to reduce dust through increased surface moisture. This measure is not required for lactating cows.
2. Minimize excess water in corrals by:
   a) Identifying and eliminating water leaks from trough and trough piping: and
   b) Complying with corral drainage standards in the Engineered Waste Management Plan.
3. Pave feedlanes at least 8 feet on the corral side of the feedlane fence.
4. Clear corrals of accumulated manure in excess of 3 inches in height at least 4 times per year with at least 60 days between clearings.
5. Remove all on-dairy stockpiles within 3 months of the last corral clearing day and no more than 3 months after the date that the previous stockpiles were last completely cleared.

Manure Disposal Requirements

Remove or contract to remove manure from the dairy only to:

[2] Baseline data from Rule 1127 Staff Report, page 9.

1) A manure processing operation designed to reduce ammonia and VOC emissions from unprocessed manure (according to approval requirements as specified in the rule which allow one or a combination of anaerobic digester, a composting operated in compliance with Rule 1133 and Rule 1133.2; or an alternative composting operation according to specific provisions); or
2) Agricultural land within the SCAQMD approved for the spreading of manure; or
3) A combination of the above options.

Reporting, Recordkeeping and Test Methods

Reporting and recordkeeping requirements include initial notifications and annual reports to include the amount of annual manure removed to various destinations. Test methods for measurement of moisture content in manure shall be determined with an electrical conductivity or microwave moisture meter, or other method approved by the SCAQMD, California Air Resources Board and U.S. EPA.

II. RULE EVALUATION

Rule 1127 was evaluated on basis of enforceability, stringency, and relaxation.

A. Enforceability - The Bluebook (*Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations*, EPA, May 25, 1988) and the Little Bluebook (*Guidance Document for Correcting Common VOC & Other Rule Deficiencies*, EPA Region 9, August 21, 2001) were used to help evaluate compliance with the CAA §110(a)(2)(A) requirement for enforceability. Rule 1127 contains provisions that provide for clear, unambiguous and measurable testing, monitoring and recordkeeping requirements such that the rule is enforceable in practice.

B. Stringency – RACT – CAA Section 182(b)(2) requires moderate areas (and higher level non-attainment areas) like SCAQMD to adopt and submit SIP provisions implementing Reasonably Available Control Technology (RACT) for all stationary sources of VOC that emit more than 10 tons per year of VOC. According to the district, there is at least one dairy that meets this threshold.[3] RACT is defined as "the lowest emission limitation that a particular source can meet using control technology that is reasonably available, considering technological and economic feasibility (44 FR 53762, September 17, 1979)." Additionally, CAA Section 172(c)(1) requires nonattainment areas to implement all reasonably available control measures (RACM), including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of RACT, as expeditiously as practicable.

There is no federal policy or guidance (e.g., EPA Control Technique or Alternative Control Technology Guidelines) describing reasonably available controls for livestock waste. In

[3] Email communication between Tracy Goss (SCAQMD) and Wienke Tax, (USEPA Region 9), May 3, 2011.

absence of guidance or policy, an evaluation for RACT compliance was done in part by comparing Rule 1127 with the level of stringency achieved by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rule 4570, Confined Animal Facilities, for control measures that pertain to manure management. EPA approved Rule 4570 as meeting RACT in January 2012.[4] While such an evaluation is relevant, we note that the source operations and District rules have significant differences that make a strict limitation-by-limitation comparison difficult. For instance, SJVUAPCD Rule 4570 applies to all types of confined animal facilities, while Rule 1127 applies only to dairies. In addition, dairies in South Coast are largely dry feed lot operations, [5] in contrast with larger diaries in the San Joaquin Valley that use flushing and lagoon operations.[6] Another difference is the specific focus on corral waste control in SCAQMD versus other categories of dairy emissions (e.g. feed and silage operations, milk parlor, etc.) in SJVUAPCD Rule 4570.[7] In particular, while silage is a major dairy VOC source in the San Joaquin Valley, most South Coast dairies do not use silage.[8] Still another major difference is the significantly lower applicability threshold for SCAQMD Rule 1127.

As part of our consideration of RACT, we have compared Rule 1127 with the subset of Rule 4570 provisions that relate to corral livestock waste.[9] Rule 1127 is less stringent than Rule 4570 where Rule 4570 requires seven measures for managing corral livestock waste while Rule 1127 requires four of the seven measures. However, that is partly mitigated by SCAQMD Rule 223, Emission Reductions for Large Confined Animal Facilities, which contains a menu from which operators must select among six options that include the remaining three measures.[10] In addition, Rule 1127 is significantly more stringent than Rule 4570 in its minimum regulatory threshold of 50 cows, heifers and/or calves compared to Rule 1127's threshold of 500 milk cows or 7,500 heifers, calves and/or other support stock.[11]

Rules 4570 and 1127 are similar in terms of projected percent of emission reductions achieved related to manure management in corrals, with SCAQMD projecting a slightly greater percent reduction. Table 2 lists the actual and projected future-year emissions

[4] SJVUAPCD Rule 4570 Confined Animal Facilities (Adopted June 15, 2006; Readopted June 18, 2009; Amended October 21, 2010) Approved January 17, 2012, 77 FR 2228.
[5] SCAQMD Rule 1127 Staff Report, page 9.
[6] Rule 4570 Staff Report, VII, A. page 9.
[7] SCAQMD Rule 223 Emission Reduction Permits for Large Confined Animal Facilities is similar to SJVUAPCD Rule 4570 in this regard. Rule 223 is currently in effect in the district and was submitted to EPA for approval on March 17, 2009.
[8] "…In the Basin, much of the feed is dried, bailed, and shipped to local dairies, as opposed to adjacent farming. This feed, including grains, has extremely low moisture content, and thus negligible VOC emissions from the feed itself. In addition, according to a Milk Producers Council representative, approximately 10% of the dairy farms in the Basin grow their own silage, which is stored in bags to prevent fermentation and retain nutrients. The silage bags are kept on-site for only a few days at a time. Dairymen who purchase feed (silage, alfalfa, corn, grain, etc.) on an as-needed-basis also store it on-site for only few days at a time, thus minimizing VOC emissions from the facility," SCAQMD Board Meeting, Agenda No. 22, October 7, 2011, Rule and Control Measure Forecast, Attachment E, South Coast Air Quality Management District Technology Assessment– 2007 AQMP CM# MCS-05, Updated Emissions Inventory and Recommendations Regarding Implementation of 2007 AQMP Control Measure MCS-05 – Emission Reductions from Livestock Waste, page 18, October 2011.
[9] See Rule 4570, Table 4.1, E. Corrals.
[10] Rule 223, Table 1, D. Corrals.
[11] Rule 4570, Section 4.0, Table 2 – CAF Thresholds for Regulation, October 21, 2010.

estimates derived by multiplying an emissions factor of 12.8 lb/head/year[12,13] by the dairy cow population figures. Table 3 lists the emission estimates without the implementation of Rule 1127 (e.g., due to the implementation of water quality regulations). Table 4 describes the emissions reduction that is due to implementation of Rule 1127 alone (e.g., without the impact of relocation and water quality regulations). Emissions reductions from Rule 1127 implementation alone are only considered when they achieve reductions above and beyond the waste disposal requirements required by the Santa Ana Regional Water Quality Control Board, and not due to relocation or movement of dairies out of the SCAQMD jurisdiction.[14]

Table 5 contains a list of baseline and emission reduction rates that SJVUAPCD estimates are achieved by Rule 4570 manure management measures also applicable to dairies. As described in Table 5, SJVUAPCD achieves 32.3% (which we determined previously met the RACT criteria)[15] compared to 34.8% emissions reduction projected for Rule 1127.

Table 2 - Estimated Emissions Associated with SCAQMD Rule 1127 (tons/day)[16]

	2002	2004	2006	2008	2010
Emissions	6.91	6.63	6.35	6.08	5.80

Table 3 – Emission Estimates from Current Practices in SCAQMD (tons/day) [17,18]

	2002	2006	2010
Local land application	0.51	0.56	0.49
Out of region	0.66	0.66	0.66
Windrow composting	0.44	___	___
Rule 1133.2 Composting	___	0.02	0.02
Digester	___	0.14	0.14
VOC Reduction	1.61	1.38	1.31

[12] The district uses a VOC emission factor of 12.8 lb/head/yr across the board for all types of cows based on a metabolism study conducted by Ritzman and Benedict, Rule 1127 Staff Report, page 12.
[13] The district justifies the use of this emissions factor in a 2011 Technology Assessment as follows: "District staff believes that 12.8 lb/head/yr for milking cows is still relevant to the SCAB for the following reasons: (1) there are no known "freestall barn" dairies in the SCAB; instead dairies in the Basin are mostly "dry lot corral" facilities; (2) land application of liquid manure is not a known practice in the Basin. Without those two sources of emissions, the adjusted SJVAPCD would be 12.6 lbs/head/yr; therefore, the 12.8 lbs/head/yr factor that staff is using remains relevant for sources in the District." 2011 Technology Assessment, page 12.
[14] On August 20, 1999, the Santa Ana Regional Water Quality Control Board (SARWQCB), re-evaluated the dairy and other animal feeding operations and developed Order No. 99-11, which prohibits stockpiling of manure at a dairy for more than 180 days. SCAQMD Rule 1127 requires four coral cleanings per year which exceeds the two cleanings per year required by SARWQCB regulations.
[15] EPA approved SJVUAPCD Rule 4570 into the California SIP on January 17, 2012 (77 FR 2228).
[16] Reproduced Rule 1127 Staff Report inventory in email communication between Tuyet-Le Pham and La Weeda Ward, November 30, 2012.
[17] Rule 1127 Staff Report, pages 18-20.
[18] Reproduced Rule 1127 Staff Report inventory in email communication between Tuyet-Le Pham and La Weeda Ward, November 30, 2012.

Remaining VOC	5.30	4.97	4.49
Baseline VOC	6.91	6.35	5.80
% Reduction	23.3	21.7	22.6

Table 4 – Emission Estimates from Rule 1127 Implementation Alone (tons/day) [10, 11]

	2006	2010
Local land application	0.64	0.54
Out of region	0.99	0.99
Windrow composting		
Alternative Composting	0.77	0.77
Rule 1133.2 Composting	0.03	0.03
Digester	0.14	0.14
VOC reduction with Rule 1127	2.57	2.47
VOC Remaining with Rule 1127	3.79	3.33
VOC reduction from Rule 1127 Alone	1.19	1.16
% Reduction from R 1127 Alone	31.3	34.8

Table 5 – Baseline and Emissions Reduction Estimates for SJV Rule 4570

SJ Rule 4570 Manure Management Corral Measures for Dairies	Estimated Emissions Reductions[19]
1. Pave feedlanes for a width of 8 feet (milk & dry cows) or 6 feet (heifers).	___
2. Clean manure from corrals at least 4 times per year with at least 60 days between cleanings or clean corrals at least once between April and July and once between September and December.	___
3. Inspect water pipes and troughs and repair leaks at least once every 7 days.	5%
4. Slope the surface of the corrals a specified percentage or maintain proper drainage so as to prevent water from standing more than 48 hours or scrape corrals to maintain a dry surface.	___
5. Scrape, vacuum or flush concrete lanes in corrals at least once every day (mature cows) or once every 7 days (support stock) or clean concrete lanes so manure does not exceed 12 inches at any point or time.	10%
6. For facilities with shade structures, install structures with permeable roofing, or uphill of any slope, or with a North/South orientation, or clean manure from under shades at least once every 14 days.	2.3%
7. Managing corrals such that manure depth does not exceed 12 inches.	5%
8. Cover dry manure piles during certain periods	10%
Total % of Emissions Achieved	32.3%

[19] SJVUAPCD Rule 4570 Staff Report (Appendix B, Table 14), October 21, 2010.

Based on the foregoing comparison to SJV Rule 4570, SCAQMD's analysis in support of Rule 4570 and consideration of general national RACT policy and precedent, as well as the lack of specific state or national guidance regarding RACT for CAFs (e.g., a national Control Techniques Guidance or a California Suggested Control Measure), and the lack of other more stringent SIP requirements or other evidence demonstrating widely available more stringent controls, we conclude that Rule 1127 fulfills the RACT criteria by implementing control technology that is reasonably available, considering technological and economic feasibility.

C. SIP Relaxation - We have evaluated this SIP revision to determine whether it would interfere with any applicable requirement concerning attainment and reasonable further progress (RFP) or any other applicable requirement of the Act (CAA §110(l)) or modify, in a nonattainment area, any SIP-approved control requirement in effect before November 15, 1990 (CAA §193). Rule 1127 reduces emissions and strengthens the SIP because there is no previous version of the rule in the SIP. Furthermore, it does not undermine other existing SIP provisions. Therefore, we propose to determine that an approval of the submittal would comply with CAA sections 110(l) and 193 because (1) the proposed SIP revision would not interfere with the on-going process for ensuring that requirements for RFP and attainment of the National Ambient Air Quality Standards are met, and (2) the submitted SIP revision is more stringent than the existing SIP requirements.

III. Additional Recommendations for Next Rule Revision

1. Rule 1127 can be improved by adding the following applicable provisions from Rule 223 (Emission Reduction Permits for Large Confined Animal Facilities)[20] directly into Rule 1127 for large CAFs. These provisions do not affect our determination of RACT for the activities addressed by Rule 1127, but would strengthen the rule and clarify requirements for large CAFs by including all corral-related waste measures in one rule.
    a. Slope the surface of the corrals a specified percentage or maintain proper drainage so as to prevent water from standing more than 48 hours or scrape corrals to maintain a dry surface.
    b. Scrape, vacuum or flush concrete lanes in corrals at least once every day (mature cows) or once every 7 days (support stock) or clean concrete lanes so manure does not exceed 12 inches at any point or time.
    c. For facilities with shade structures, install structures with permeable roofing, or uphill of any slope, or with a north/south orientation, or clean manure from under shades at least once every 14 days.
    d. Manage corrals such that manure depth does not exceed 12 inches or apply lime (or similar absorbent material in the corrals or thymol to feedlot soil in accordance with the manufacturer's recommendation.

2. While we understand that VOC emissions from other CAF activities (e.g., feed and silage operations, milk parlor, etc.) are addressed in SCAQMD Rule 223, we encourage you to

[20] SCAQMD Rule 223 establishes permit requirements for Large CAF dairy and poultry operations.

consider moving all controls affecting CAFs into SCAQMD Rule 1127 to simplify and streamline requirements for sources, regulators and the public. While we also understand that silage is used much less in SCAQMD than in SJVUAPCD, we encourage you to consider adopting SJVUAPCD's more stringent silage controls[21] in South Coast to the extent that silage is used.

3. Section (f)(3)(A)(i) requires the use of in-vessel compost systems but the rule does not define this term. SCAQMD should insert a definition for in-vessel compost systems to improve enforceability of rule requirements.

IV. EPA Action

Rule 1127 is enforceable, strengthens the SIP, and meets CAA requirements for RACT. Therefore, EPA staff recommends approval of Rule 1127.

V. References

1. SCAQMD Rule 1127, Emission Reductions from Livestock Waste, adopted August 6, 2004.
2. "Draft Final Staff Report, Proposed Rule 1127 – Emission Reductions from Livestock Waste," SCAQMD, August 6, 2004.
3. Technology Assessment – 2007 AQMP CM# MCS-05, "Updated Emissions Inventory and Recommendations Regarding Implementation of 2007 AQMP Control Measures MCS-05-Emission Reductions from Livestock Waste", South Coast Air Quality Management District, October 2011.
4. California Senate Bill 700 (Florez), "Air quality: emissions: stationary sources: agricultural operations," signed by California Governor Gray Davis, September 22, 2003.
5. "California Regional Water Quality Control Board, Santa Ana Region, "General Waste Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region. Order No. 99-11, NPDES No. CAG018001," August 20, 1999.
6. Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations," (Bluebook) EPA OAQPS, May 25, 1988.
7. "Guidance Document for Correcting Common VOC & Other Rule Deficiencies," (Little Bluebook), EPA Region 9, August 21, 2001.
8. Portions of the proposed post-1987 ozone and carbon monoxide policy that concern RACT, 52 FR 45044, November 24, 1987.
9. "State Implementation Plans, General Preamble for the Implementation of Title I of the Clean Air Amendments of 1990" 57 FR 13498, April 16, 1992.
10. "Preamble, Final Rule to Implement the 8-hour Ozone National Ambient Air Quality Standard" 70 FR 71612; November 29, 2005.
11. "Reasonably Available Control Technology (RACT) Demonstration for Ozone State

[21] SJVUAPCD Rule 4570, Confined Animal Facilities, Table 4.1.(B), adopted October 21, 2010.

Implementation Plans (SIP)" SJVUAPCD, April 16, 2009 (pages 4-99 to 4-169).
12. Letter from William T. Harnett to Regional Air Division Directors, "RACT Qs & As – Reasonable Available Control Technology (RACT): Questions and Answers," EPA, May 18, 2006.
13. SJVUAPCD Rule 4570, Confined Animal Facilities, adopted October 21, 2010.
14. "Final Staff Report for Revised Proposed Amendments to Rule 4570 - Confined Animal Facilities," SJVUAPCD, October 21, 2010, and its appendices