LA-UR-04-0506

Approved for public release;
distribution is unlimited.

Title: LANL Policy for Upgrading Stack Sampling Systems

Author(s): Fuehne, David P.

Submitted to: Health Physics Society Mid-Year Meeting &
2004 Rad-NESHAP National Meeting

Feb 8-11, 2004
Augusta, Georgia

Risk Reduction & Environmental Stewardship Division
Meteorology & Air Quality Group
PO Box 1663, MS J978
Los Alamos, New Mexico 87545
(505) 665-8855/Fax: (505) 665-8858

Date: November 14, 2003
Refer to: RRES-MAQ:03-296

Mr. George P. Brozowski
US EPA
1445 Ross Avenue (6 PDT)
Suite 1200
Dallas, TX 75202

RE: LANL'S POLICY ON UPGRADING STACK SAMPLING SYSTEMS

Dear George:

Attached is memo RRES-MAQ:03-287, "LANL Policy for Upgrading Stack Sample Systems." This memo was developed to document the policy that LANL will use to determine when a change to an emissions source will require upgrading the sampling system to ANSI N13.1-1999 criteria.

Please review the memo at your convenience. If you disagree with any of the points or conclusions, please let us know as soon as possible. There are several project reviews on the horizon for which this type of documented upgrade policy is needed.

If you require any further information or clarification of statements in the memo, feel free to contact me.

Sincerely,

Dave Fuehne
RRES-MAQ

Att: a/s

Cy:
Jean Dewart, RRES-MAQ, J978
Jackie Hurtle, RRES-MAQ, J978
Steve Fong, DOE/LAAO, A316
Karlisa Benally, DOE/LAAO, A316
RRES-MAQ File

Los Alamos
NATIONAL LABORATORY

memorandum

Risk Reduction & Environmental Stewardship Division
Meteorology & Air Quality Group

To/MS: Rad-NESHAP Position Papers, J978
From/MS: Dave Fuehne, RRES-MAQ, J978
Phone/Fax: 5-3850/7-5006
Symbol: RRES-MAQ:03-287
Date: November 7, 2003

LANL POLICY FOR UPGRADING STACK SAMPLE SYSTEMS

The attached document describes LANL's policy for evaluating new and modified emissions sources for stack sampling system upgrades. Upgrades are required in certain situations when existing sampling systems do not meet design criteria put forth in ANSI N13.1-1999.

This document was developed to be a reference for air quality reviews and to document the decision process that RRES-MAQ's Compliance Team used in 2003.

This document is designed for general use at Laboratory stacks which emit radioactive material. Source-specific guidance that will supersede this document may be developed for individual source(s) as appropriate.

DF:alb

Att: a/s

Cy:
Jean Dewart, RRES-MAQ, J978
Jackie Hurtle, RRES-MAQ, J978
Susan Terp, RRES-MAQ, J978
Margie Stockton, RRES-MAQ, J978
Bill Blankenship, RRES-MAQ, J978
Victor Martinez, RRES-MAQ, J978
Harold Martinez, RRES-MAQ, J978
Steve Fong, DOE-LA-AO, A316
Karlisa Benally, DOE-LA-AO, A316
RRES-MAQ File

Policy on Upgrading Stack Sample Systems to ANSI N13.1-1999 Design Criteria

The 2003 revisions of 40 CFR 61, Subpart H, incorporates guidance from ANSI N13.1-1999 for all sources of emissions of radioactive material. There are two aspects of this incorporation. First, there are inspection and maintenance requirements that apply to all sources that are continuously monitored for radionuclide emissions. Second, there are design requirements that must be met for the location and performance of sampling systems that measure emissions from new and modified emissions sources. This analysis examines this second aspect, regarding the design requirements put forth in ANSI N13.1-1999.

There are two goals to this analysis.

(1) Determine what constitutes a source modification.
(2) Determine when a modification requires an existing stack sampling system to meet ANSI N13.1-1999 criteria.

Note - quotations from regulations or regulatory guidance documents are highlighted in yellow. **Bold type** in these quotations indicates emphasis added in support of this analysis.

The following sections appear in this document.

A: For which sources do ANSI N13.1-1999 design criteria apply?
B: For which sources do ANSI N13.1-1999 design criteria NOT apply?
C: When does an existing sampling system need to meet ANSI N13.1-1999 design criteria?
D: Conclusions
E: Implementation plan
F: References

A: For which sources do ANSI N13.1-1999 design criteria apply?

The Federal Register promulgating the revised Rad-NESHAP was issued Monday, September 9, 2002. As stated on Page 57160, in the third column:

> *C. Description of Today's Action*
> With today's action, EPA amends 40 CFR part 61, subparts H and I to require the use of ANSI/HPS N13.1-1999 in place of the older ANSI N13.1-1969 for all applicable newly constructed **or modified sources**.

The revised Rad-NESHAP regulation incorporates the ANSI standard in 40CFR61.93(c), for "new point sources." However, the definition of "new source" given in 40 CFR 61.02 includes modifications to the source:

> *New Source* means any stationary source, the construction **or modification** of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

Under additional guidance in the Federal Register from September 9, 2002, however, not all changes to a source would require the use of ANSI N13.1-1999 design criteria. The following clarification appears on page 57162, in the first column, near the end of the first paragraph under "*B. Proposed Rule*."

> Based on this analysis, EPA proposed amendments to require that ANSI/HPS N13.1-1999 be used for sampling any newly constructed source and **any source undergoing a modification that would result in an effective dose equivalent to any member of the public greater than 1% of the standard**.

Therefore, a modification to a source which would result in an increase in the effective dose equivalent to a member of the public of greater than 0.1 millirem per year requires a sampling system that meets the design requirements of ANSI N13.1-1999. The methods used to evaluate this dose impact from a modification are described in Section C, below.

B: For which sources do ANSI N13.1-1999 design criteria NOT apply?

Along with determining when ANSI N13.1-1999 design criteria are applicable, it is important to clarify the types of changes for which the new criteria do not apply. Certain activities are specifically not considered modifications, as described in §61.15(d).

> **§61.15 Modifications**
> (a) Except as provided under paragraph (d) of this section, any physical or operational **change to a stationary source which results in an increase in the rate of emission** to the atmosphere of a hazardous pollutant to which a standard applies shall be considered a modification.
> (b) Upon modification, an existing source shall become a new source for each hazardous pollutant for which the rate of emission to the atmosphere increases and to which a standard applies.
> (c) … (n/a)
> (d) The following shall not, by themselves, be considered modifications under this part:
> (1) Maintenance, repair, and replacement which the Administrator determines to be routine for a source category.
> (2) An increase in production rate of a stationary source….
> (3) An increase in the hours of operation.
> (4) Any conversion to coal….
> (5) The relocation or change in ownership of a stationary source….

Since the Federal Register requires ANSI N13.1-1999 compliance for "any source undergoing a modification…," the types of changes described in §61.15(d) are therefore exempt from meeting the design requirements of ANSI N13.1-1999.

Also, it is important to note the difference between source changes versus sampling system changes. The EPA has published the "White Paper for Streamlined Development of Part 70 Permit Applications" (July 10, 1995). This guidance is designed to simplify the permitting process for states. As part of the guidance, Attachment A is list of certain types of "trivial" or short-term activities that are excluded from the permit application process. One item in this guidance specifically addresses stack sampling equipment:

> - Equipment used for quality control / assurance or inspection purposes, including **sampling equipment** used to withdraw material for analysis.

Using this EPA guidance, it is apparent that for an operational change to be considered a modification, it must be a change to the source of emissions and increase the rate of emissions. Changes limited to the source's emissions sampling system do not meet the definition of modification and do not increase the rate of emissions from a facility. Therefore, these sampling system changes do not affect the need for a point source to meet ANSI N13.1-1999 design criteria.

C: When does an existing sampling system need to meet ANSI N13.1-1999 design criteria?

As stated above, the Federal Register states that ANSI N13.1-1999 design criteria apply to sources undergoing modifications which would result in an increase in the effective dose equivalent to a member of the public of greater than 0.1 millirem per year. To determine the off-site dose impact from a change, a calculation may be made according to §61.93(f),

> **§61.93**
> (f) To determine whether a release point is subject to the emission measurement requirements of paragraph (b) or (c) of this section, it is necessary to evaluate the potential for radionuclide emissions for that release point. In evaluating the potential of a release point to discharge radionuclides into the air for the purposes of this section, **the estimated radionuclide release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal**.

This use of engineering calculations and other technical information is supported in ANSI N13.1-1999, section 4.2.1. The final paragraph of this section on page 14 states,

> Other approaches to estimating potential emissions might include the use of aerosol release fractions for the processes of concern, measurements of the material accumulated on the ventilation filters, or air sampling upstream of the ventilation filters.

To evaluate whether a source modification requires that an existing sampling system be upgraded to meet ANSI N13.1-1999 criteria, LANL will use the following methods.

1) The change or additional process must be considered a modification under §61.15, as described above. Exempted activities will not be considered for sampling system upgrading.
2) Engineering calculations will be used to determine potential emissions from the source modification.
3) No credit will be taken for HEPA filtration or other engineering controls that are not integral to the process.
    - Note- certain types of engineering controls serve purposes critical to the process, such as a wet tower scrubber used to lower the effluent air temperature to levels acceptable to the exhaust system. Without these controls, the process could not take place, and these controls are not considered add-on pollution controls. These integral controls will be considered when determining potential emissions from the modification.
4) Operational data (throughput, etc.) will be based on normal operations for the new or modified process for a one-year period.
5) The emissions source term estimated will be used as input to CAP88 or another EPA-approved dispersion and dose assessment model.
6) If the resulting off-site dose impact is greater than 0.1 millirem, the source sampling system must meet ANSI N13.1-1999 design criteria. If the resulting dose is less than or equal to 0.1 millirem, the source sampling system does not need to meet the design criteria found in ANSI N13.1-1999 and the existing system is sufficient.

D: Conclusions

From these references, RRES-MAQ interprets the following guidance.

1) The changes to a facility must qualify as a modification under §61.15 in order to trigger a review of ANSI N13.1-1999 requirements. Changes which meet the exemptions put forth in §61.15(d) do not in themselves require a source sampling system to meet ANSI N13.1-1999 design criteria.

2) Modifications or construction must occur on the source of emissions, not the sampling system which measures the emissions. A replacement of the sampling system alone does not constitute a modification to the source and does not increase the long-term rate of emissions from the facility.

3) The dose from the modification to the source must result in an increase to the facility's off-site dose of greater than 0.1 millirem. This dose is calculated based on normal operations, without taking credit for pollution controls, as described in section C, above.

4) Any time a new sampling system is installed into a stack or vent which was previously not monitored, the new system shall meet all applicable design requirements in ANSI N13.1-1999.

Therefore, if a source undergoes a change that meets all of the the modification criteria above, the sampling system from that source must meet the design criteria put forth in ANSI N13.1-1999.

Conversely, if a source is modified and the modification results in an off-site effective dose equivalent increase of less than or equal to 0.1 millirem, the source does not need to meet ANSI N13.1-1999 design criteria.

A final RRES-MAQ policy point is described in number (4) above. If any new sampling system is installed in a point source that has not been previously monitored, this system will meet the design criteria of ANSI N13.1-1999.

The next section describes an implementation plan for reviewing new or modified processes. This section includes a table describing some likely scenarios for review and when a stack upgrade to ANSI N13.1-1999 criteria is required. Not all scenarios are included on this table. Interpretation guidance described in this document is to be used when the scenario does not exist in the table.

E: Implementation Plan

When a new or changed process undergoes review under the RRES-MAQ air quality review (AQR) process, three separate reviews are conducted. This process will be folded into procedure RRES-MAQ-103 at the next revision.

(1) An "**EPA notification**" determination must be made according to §61.96. The outcome of this determination will be one of three conclusions.
   a. The change is not considered a modification under §61.15, and no EPA notification is required.
   b. The change is a modification, but does not result in an increase in emissions causing 0.1 millirem to an off-site receptor. This dose is calculated according to §61.96 and Appendix D of 40 CFR 61. EPA notification is provided via the annual Rad-NESHAP report issued in June of the year following start-up of radiological operations.
   c. The change is a modification, and results in an increase in emissions causing 0.1 millirem per year or more to an off-site receptor. This dose is calculated according to §61.96 and Appendix D of 40 CFR 61. EPA pre-construction notification & approval is required.

(2) A "**stack monitoring**" determination for the total source emissions, including dose from the new or modified process and all other radiological operations venting from the same point source, must be made according to §61.93(f). If total radiological emissions from a source result in an off-site dose of greater than 0.1 millirem per year, monitoring of that source is required. At 0.1 millirem per year or below, monitoring is not required. If the source is already monitored for the radionuclides of interest, proceed directly to the third review.

(3) A "**stack system upgrade**" determination must be made based on the new or modified process, according to §61.93(f) methods described above. If the changes are not considered modifications under §61.15, this determination is skipped. There are four possible outcomes of this determination.
   a. The source is not currently monitored, and the total off-site dose impact from the modification and any existing radiological operations exhausted from the source is less than 0.1 millirem per year. Monitoring of this source is not required.
   b. The source is not currently monitored, but the additional off-site dose impact from the modification puts the total emissions from the source over 0.1 millirem per year. A new emissions sampling system must be installed, in accordance with §61.93(c-f). This system will meet ANSI N13.1-1999 design criteria.
   c. The source is already monitored, and the off-site dose impact from the new or modified process alone is less than 0.1 millirem. The source sampling system is sufficient and does not need to be upgraded.
   d. The source is already monitored, and the off-site dose impact from the new or modified process alone is 0.1 millirem per year or more. The source sampling system must meet ANSI N13.1-1999 design criteria. If the existing system does not meet this criteria, the system must be upgraded to meet the criteria.

Table 1:
Determining if a source change requires an ANSI N13.1-1999 compliant sampling system

Scenario	EPA Pre-Construction notification required?	Stack monitoring required?	Sampling system must meet ANSI N13.1-1999?	Example:
1	Yes	Yes	Yes	New process line with significant emissions potential added to existing source.
2	Yes	No	No	Appendix D calculations require pre-construction approval; engineering calculations for monitoring (e.g., mass balance recovery rates) indicate insignificant emissions rates, and stack monitoring is not required.
3a	No	Yes	No	Operation relocated to a different stack that is already monitored, or an existing sampling system undergoes maintenance, repair, or replacement. This is not a modification, so the existing sampling system does not have to meet ANSI N13.1-1999 criteria.
3b	No	Yes	Yes	The hours of operation of a **non-monitored** source are increased. This does not constitute a modification, but if the new rate of operations have potential emissions > 0.1 mrem/year, the source must be monitored with an ANSI N13.1-1999 compliant system.
4	No	No	No	Minor operation relocated to new stack, or maintenance, repair, or replacement activities on an existing source.

If the sampling system for the source must meet ANSI N13.1-1999 design criteria and does not currently do so, than that system must be upgraded to meet these design criteria. Several LANL stacks already have systems in place which meet the design criteria from the new ANSI standard. Specifically, TA-48-1-7, TA-48-1-54, TA-48-1-60, TA-50-37-1, and TA-53-7-2 all meet ANSI N13.1-1999 design requirements.

F: References

Federal Register, volume 67, number 174. Monday, September 9, 2002. Rules and Regulations section, pages 57159 to 57169. Available on the RRES-MAQ web site at:
http://www.airquality.lanl.gov/pdf/NewNESHAP-fedregister.pdf

Code of Federal Regulations, Title 40, Chapter 61, Subpart H., National Emission Standards for Radionuclides Other Than Radon From Department of Energy Facilities. This subpart is located on RRES-MAQ web site at:
http://www.airquality.lanl.gov/pdf/40CFR61-Subpart-H-Feb2003.pdf
Citations from 40CFR61 Subpart A quoted in this document are not on the RRES-MAQ web site, but can be found at
http://www.access.gpo.gov/nara/cfr/cfr-table-search.html .

White Paper for Streamlined Development of Part 70 Permit Applications, U. S. Environmental Protection Agency, July 10, 1995. Located on the EPA web site at:
http://www.epa.gov/ttn/oarpg/t5/memoranda/fnlwtppr.pdf

Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities. An American National Standard. Approved January 12, 1999, and published by the Health Physics Society as ANSI/HPS N13.1-1999. Referenced in this document as ANSI N13.1-1999.

RRES-MAQ-103, "Review of New or Modified Radioactive Air Emission Sources." This procedure is currently under revision from Rev 3 to Rev 4 to reflect operational changes. The most recent official version is located on the RRES-MAQ web site at
http://www.airquality.lanl.gov/QADocs/P103-R3.pdf