RECOMMENDATIONS FOR A UNIFORM PROTOCOL FOR PERIODIC CONFIRMATORY MEASUREMENTS OF "MINOR" AIR EMISSIONS SOURCES SUBJECT TO 40 CFR Part 61, SUBPART H

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1.0 BACKGROUND

Title 40, Part 61, Subpart H of the Code of Federal Regulations (CFR) contains the Environmental Protection Agency's (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) for radionuclide emissions from Department of Energy (DOE) facilities (EPA 1989). According to 40 CFR 61.93(b)(4)(i) and 61.93(e), DOE facilities must perform periodic confirmatory measurements (PCM) to verify low emissions from point sources (stacks or vents) that have the potential[1] to discharge radionuclides into the air in quantities that could cause an effective dose equivalent (EDE) less than 1% of the 10 mrem/yr standard (that is, less than 0.1 mrem/yr). Such point sources are considered minor sources. Subpart H does not address how PCM is to be performed, but does require that minor sources be included in an annual NESHAP report to EPA Headquarters and regional offices.

A memorandum of understanding (MOU) in 1995 between DOE and the EPA allows the use of engineering calculations and/or representative measurements to comply with PCM requirements (DOE/EPA 1995). The MOU states: "The facility owner or operator should use best professional judgment, knowledge of the radionuclides and quantities being used in plant operations, and the potential for their release to determine when representative measurements should be made and/or engineering calculations should be utilized."

The 1995 MOU places the responsibility for establishing protocols for PCM on individual DOE facilities and requires protocols to be provided to the cognizant EPA regional office or delegated state. Because of this consignment of responsibility and the diversity of the DOE sites, there is an inconsistency in the comprehensiveness of DOE site protocols for minor sources. This became evident through a comparison of PCM protocols at six major DOE sites, two of which were visited by EPA's consultants for interviews with DOE staff. The review, summarized in Appendix B, showed that the PCM protocols submitted to the EPA regional offices and delegated states vary in format and level of detail. This is often reflective of differences in guidance from regulators.

The 1995 MOU also acknowledges that each DOE facility is unique and methods for confirming that minor source emissions are low may be tailored to each facility's operations. Similarly, each facility may choose to use confirmation results for various purposes. For example, while all DOE facilities are required to use PCM to verify low emissions, some facilities may also use PCM to quantify annual emissions, as input to annual EDE calculations, or to further classify minor sources into two or more classes.

[1] The potential radionuclide emission rates are based on the unabated discharges that would result as if all pollution control equipment did not exist, but facility operations were otherwise normal.

Both Subpart H and the 1995 MOU recognize that a graded approach to PCM is appropriate because of the minor contribution to the public dose from these sources. A graded approach allows DOE facilities to concentrate resources on measuring emissions from major sources (those point sources having a potential to discharge radionuclides into the air in quantities that could cause an EDE of 0.1 mrem/yr or greater).

In spite of differences that result from unique operations and the application of a graded approach, it is necessary that each site protocol contain the appropriate information in sufficient detail so that each regional office or delegated state can discern the degree of compliance of a site with Subpart H and the 1995 MOU for minor sources. To this end, this document recommends an approach for developing a protocol for submission to EPA regional offices and delegated states.

This document applies to minor sources and the use of PCM to verify their continued low emissions. There is no intention to replace or expand the requirements of Subpart H or the 1995 MOU. In addition, the document is not intended to supersede or replace existing compliance agreements or orders between DOE field offices, state regulators, and EPA regional offices concerning PCM or any other matters relating to Subpart H compliance.

The guidance contained in this document discusses the key elements that DOE facilities should include in a protocol for confirming minor sources. It suggests a format that includes "key elements" and provides a checklist to use in determining whether a protocol has incorporated all the key elements.

2.0 MODEL FOR PCM

To achieve consistency and uniformity in meeting the PCM requirement, EPA proposes a model protocol that can be adapted to the specific operations of individual DOE sites. It is not intended to be rigid in its approach by establishing a regulatory framework for compliance; rather, it proposes a flexible framework, consistent with a graded approach, that can be tailored to the diverse DOE sites. While allowing for flexibility in developing site protocols, there must be assurance that the actual emissions and doses reported for these sources are below 0.1 mrem/yr, and that sufficient documentation, including quality assurance data, exists to validate the PCM process and reported values.

It is desirable for all protocols to address certain key elements so that EPA's regional offices and delegated states can provide a review of PCM programs to verify they are being properly executed. These elements constitute important parameters or considerations that will allow EPA, delegated states, stakeholders, and the public to have confidence that emissions and doses reported for minor sources are accurate and compliant with Subpart H.

A principle that should be consistently applied to site protocols is that the magnitude of the potential dose sets the basic requirements. For a source where the potential offsite EDE approaches 0.1 mrem/yr, the most stringent requirements for each element should be considered. On the other hand, for sources with potential emissions that are only a small fraction of this dose, the requirements can be relaxed. This is consistent with the graded approach of American National Standards Institute/Health Physics Society (ANSI/HPS) N13.1-1999.

3.0 KEY ELEMENTS

3.1 Classification System for Minor Emission Sources

Consistent with a graded approach, minor sources may be divided into two or more categories. Such a classification system is contained in ANSI/HPS N13.1-1999 which defines four Potential Impact Categories (PIC), Categories I through IV, based on EDE. Categories I and II are considered major emission sources and Categories III and IV are for minor sources subject to PCM. The intent of this standard is to focus more resources of the NESHAP program on sources that result in higher doses to the public. While an example of a graded approach for point sources is provided in ANSI/HPS N13.1-1999, the standard recognizes that no one approach is appropriate for all facilities. Consistent with the graded approach in ANSI/HPS N13.1, the requirements for the key elements should be more stringent for Category III sources than for those in Category IV.

3.2 Basis of Source Data

Emission sources that are classified as minor sources subject to PCM should have a basis for determining that the annual potential emissions result in an EDE of less than 0.1 mrem/yr. It is not necessary (as specified in the MOU) that minor sources be sampled or monitored to determine the potential emissions. An explanation should be provided why a particular Basis of Source data is used, why it is appropriate for the case at hand and what assumptions, if any, have been used if the data are calculated. Radionuclide inventory and usage tracking are acceptable bases for estimating source terms, as is informed process knowledge. The important factor in establishing the basis for the source data is the reliability of these data and the system that tracks and reports them. It is the responsibility of the DOE facility to establish and have proof of data reliability. Establishing reliability includes a documented historical description of the source of the data. Evidence of data reliability includes ensuring that the data are subject to documented quality assurance procedures, as discussed below.

All the appropriate radionuclides should be included in the periodic confirmation.

While it is not necessary that sources subject to PCM be sampled or monitored, the basis of the primary source term data must be reliable, verifiable, documented, and capable of being evaluated by an independent party. The basis of source term data is likely to be radionuclide usage or inventory data, or related to radiological surveys. The protocol should identify the origin of data used for estimating potential doses and provide assurances that it is reliable and that acceptable quality control procedures are in place for verification.

3.3 Supportive Data

Radionuclide source data are only one set of data required to determine potential annual doses to offsite populations. Other critical data are required as input to the dose and dispersion models employed to determine the EDE for minor sources. Like radionuclide source terms, the reliability of the data sources for these secondary data should be established and maintained.

The origin of meteorological data for confirmation of PCM and emissions reporting should be provided and its applicability to the DOE site indicated, i.e., it should be stated if the data are

from site monitors or other local or regional sources. If data are from other than site monitors, the applicability of meteorological data to the site should be addressed.

Dispersion models may require that release fractions be input for the various physical forms of material containing radionuclides. A release fraction is the amount of a radionuclide released for inclusion in the source term relative to the amount in the total material, and it varies by physical form, i.e., solid, liquid, or gas. The selection of a release fraction for each physical form and the basis for the selection should be identified in the site protocol or supporting documentation.

The method of selecting the location of the maximally exposed individual (MEI) for the site and for individual sources should be addressed in the site protocol or supporting documentation. For example, depending on the location and magnitude of emissions for a given source, it may be appropriate to compare the dose at the site MEI to that at a location that is the MEI for that individual source.

The basis for supportive data may be included in an appendix to the protocol or by reference. If included by reference, it should be available to the EPA regional offices and delegated states upon request.

3.4 Dispersion/Dose Model Used for Confirmation

Computer models CAP-88 and AIRDOS-PC are approved for calculating EDE under Subpart H. The COMPLY model may also be used, depending on the location of the MEI (40 CFR 61.93(a)). The preferred model for dose calculation is CAP-88 version 3. Site-specific models that have historic precedence and have produced results considered to be valid may also be considered.

3.5 Quality Assurance

It is beyond the scope of this document to describe the quality control process and the development of quality control documents in detail; these have been amply addressed in EPA documents readily available at http://www.epa.gov/quality/index.html. Guidance for ensuring data quality for minor sources is also provided in documents referenced in Subpart H. The appropriate quality assurance activities will vary from facility to facility depending on the unique operations of each. What follows is only a general outline.

One of the most important aspects of a PCM protocol is the assurance that quality control procedures are implemented to validate the entire data gathering and reporting process. Confidence in minor source emissions and attendant doses is directly related to the adequacy and comprehensiveness of quality assurance associated with the data leading to their determination.

The purpose of quality control processes and procedures related to source data is to assess and document the accuracy, precision, and completeness of the data. This should be done as part of the PCM protocol to the degree of specificity possible, employing accepted quality assurance techniques, to maximize the actual and perceived reliability of emissions data. Supportive data, while not as critical or subject to variability, should also be covered by the quality control process. At the crux of the quality process for sources subject to PCM is the ability to validate the source term data. Due to the great diversity among DOE sites, quality processes will vary

widely between the sites. The number of operations that generate reportable emissions and the information available for these could also lead to a variety of quality processes.

As with any defensible quality process, standard operating procedures (SOPs) should be implemented for the entire data generation, acquisition, manipulation, storage, review, reporting, and validation process. Personnel involved in these activities should be trained in their usage and their proficiency documented and periodically refreshed. SOPs should be reviewed and updated on a routine basis and should be referenced in the protocol and available to EPA regional offices and delegated states when requested.

An important part of the quality process is the implementation of a corrective action procedure, which includes documentation of the root cause of failures in the quality system. The corrective action process identifies systematic weaknesses in the measurement and reporting processes, and opens the way for correction. The corrective action process should also be covered by a SOP.

As part of the quality control process there should also be internal peer review of some predetermined fraction of the reported data. This review should be comprehensive for the entire reporting process and conducted by qualified personnel. The peer review process should be documented and available to the EPA regional offices and delegated states upon request.

At many DOE facilities, a quality assurance program is conducted for minor sources that meets the performance requirements described in 40 CFR Part 61, Appendix B, Method 114 (EPA 1989) for existing sources [40 CFR 61.93(b)(2)(iv)] and ANSI/HPS N13.1-1999 (ANSI/HPS 1999) for new or modified sources [40 CFR 61.93(c)(2)(iv)]. The 1995 MOU discusses implementation of a quality assurance program, where appropriate, for continuous and periodic monitoring.

A quality assurance plan specifically for minor sources may not be required since both Subpart H and the 1995 MOU recognize that minor sources present the lowest EDE to the public. If all aspects of PCM verification and reporting are included, a facility's general quality assurance program and key components could be applied to PCM data to identify and ensure the appropriate level of precision, accuracy, and completeness. At facilities where minor sources are not addressed in a specific quality assurance program, Method 114 (EPA 1989) and ANSI/HPS N13.1-1999 (ANSI/HPS 1999) may be used as guidance to determine the frequency of maintenance, calibration, and field checks.

At DOE facilities, overall quality assurance is provided by many required, standardized processes, such as procedure development and implementation, training courses, corrective action programs, peer review systems, and auditing processes. In addition, all DOE facilities are required to maintain formality of operations which dictates that activities are conducted in accordance with written procedures. These and other required DOE programs may well provide overall quality assurance for all activities, including PCM for minor sources.

3.6 Frequency of Confirmation

The 1995 MOU requires that each facility determine when confirmatory methods will be used. The frequency at which minor sources are verified depends on the source and the unique

operations at each facility. For example, confirmation of some minor sources may be performed initially to categorize the source; thereafter, process knowledge may be adequate to ascertain that it remains minor. For other minor sources, confirmation may be ongoing, such as annually or more often to confirm proper categorization.

At some facilities, confirmatory methods and frequency are established with concurrence from EPA regional offices or delegated states. Flexibility is important to ensure that the confirmatory methods and frequency at each facility are most appropriate for its unique operations, and to best ensure that minor sources are properly categorized.

Each site should conduct a biennial review of the site PCM protocol and procedures. In keeping with the graded approach, more frequent confirmatory sampling or monitoring of emissions may be appropriate for sources whose potential EDE is near 0.1 mrem/yr and have a high degree of variability in the source data and/or annual emissions. This may also be applicable for sources whose annual potential emissions indicate a significant increase over the previous year and are approaching the 0.1mrem/yr limit.

The biennial review for the site should consider all aspects of the protocol, but focus on those features that have the most impact on projecting potential offsite doses. These would include features in the discussion above under Elements 3.2, 3.3, and 3.5.

Many DOE facilities have submitted protocols and are performing PCM under existing approved compliance agreements. An EPA regional office or delegated state may elect to forgo the submission of a new protocol if the existing protocol is deemed appropriate and consistent with the model. If a facility's protocol changes (for example, when minor source categories and/or chosen methods are no longer appropriate for a facility's operations), a new or revised protocol should be submitted to the EPA regional office or delegated state. EPA, delegated states, and DOE are expected to jointly agree on the need for revising existing protocols and the preparation of new protocols when conditions change.

4.0 PCM MODEL PROTOCOL

A model is proposed to provide a framework for site protocols that meet the needs of EPA and its regional offices and delegated states. In addition, the protocol provides a valuable tool for documenting the DOE site's approach for classifying and confirming minor sources. A PCM protocol for a DOE site should discuss the above key elements and the approach to addressing the intent of the element. The suggested model is a recommendation and individual facilities, in concert with the EPA regional offices and delegated states, may develop alternative protocols as appropriate for their unique operations and in keeping with the 1995 MOU and Subpart H.

Introduction

The introduction should contain a general discussion of the site's NESHAP program and specifically how it treats minor sources. Organizational responsibilities for the program should be presented.

Depending on operations at a particular DOE facility and the type of minor sources, the protocol may also include the following:

- Information specifically required by federal or state regulators
- Discussion of the relative risk from minor sources
- Discussion of the facility's unique needs and how methods for PCM meet them
- Plans for discontinuing or curtailing reporting after the facility has been through decontamination and decommissioning (D&D) or shutdown

(1) Graded Approach to Classification System

This section should describe how the facility applies the graded approach to classifying minor sources. If appropriate, describe how minor sources are subdivided and the basis for each classification (for example, corresponding dose ranges and the type of dose, potential or actual, used). A listing of the site's minor sources by PIC, the basis for the classification (e.g., actual measurement or user/inventory survey), and the date of last verification of classification, should be included.

(2) Methods for PCM

This section should describe the methods used to confirm that minor sources are correctly categorized. These methods may include emission measurements, engineering calculations, or other means of evaluation (such as radionuclide use or inventory). Also included may be the frequency of evaluation and how these results are used to verify that minor sources are correctly categorized. If appropriate, information on how data from these evaluations are documented should be included.

(3) Supportive Data

This item should address how the following data are obtained and used:

- Meteorological measurements
- Release fractions for the various physical forms of materials
- Materials volatilization temperatures
- Method of selecting the location of the MEI for the source and site

Assumptions and references should be discussed and presented.

(4) Dispersion/Dose Model Used

The reason for using any code other than CAP-88 version 3 should be explained.

(5) Quality Control Aspects

This section should describe how the facility ensures the quality of PCM data. The rigor of quality assurance activities performed on a minor source should be consistent with a graded approach. If applicable, the facility's graded approach to PCM data quality should be discussed, taking account of both facility-wide and NESHAP quality assurance processes. NESHAP-specific processes may include inspection and maintenance activities for measured minor sources and data review for calculated minor sources.

(6) Frequency of Confirmation

The frequency at which actual source emissions will be confirmed, either by sampling or by other means, should be stated in the protocol. The criteria used to assess the necessity for confirmatory measurements or validation of the source term values should also be addressed, particularly the treatment of sources whose potential emissions increase significantly approach the PCM limit.

Each site should conduct a biennial review of the protocol and procedures inherent in it and verify the adequacy of the protocol or provide an amended version to the EPA regional office or delegated state for review. The results of the biennial review should be available for inspection by regional office and delegated state personnel when requested.

A checklist of elements is included as Appendix A to assist those preparing or reviewing PCM protocols. The checklist is intended to ensure that key elements are included in site protocols. Appendix B contains a CY 2006 snapshot of PCM protocol summaries at selected DOE facilities and evaluates the degree to which they address the key elements in the Model Protocol.

5.0 REFERENCES

ANSI/HPS 1999: American National Standards Institute, *Sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities,* ANSI/HPS Standard N13.1–1999, Health Physics Society (January 12, 1999).

DOE/EPA 1995: U.S. Department of Energy and U.S. Environmental Protection Agency, *Memorandum of Understanding Between the U.S. Environmental Protection Agency and the U.S. Department of Energy Concerning the Clean Air Act Emission Standards for Radionuclides 40 CFR Part 61 Including Subparts H, I, Q and T,* joint DOE/EPA agreement (April 5, 1995).

EPA 1989: U.S. Environmental Protection Agency, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*, Title 40, Code of Federal Regulations, Part 61, Subpart H (December 15, 1989, as amended).

APPENDIX A

CHECKLIST OF ELEMENTS

CHECKLIST OF ELEMENTS

This checklist is intended to assist those preparing or reviewing PCM protocols that key elements listed in Section 3.0 are included.

Methods for PCM

- ☐ Are the methods used to confirm that minor sources are correctly categorized described?
- ☐ Are minor sources subdivided into two or more classes?
- ☐ Is the basis for minor source categories (potential EDE, actual EDE, other) specified?
- ☐ Is the nature of minor source emissions discussed?

Basis of Source Data

- ☐ Are minor source emissions measured?
- ☐ Are minor source emissions calculated based on process knowledge?
- ☐ Are minor source emissions calculated based on radionuclide inventory?
- ☐ Are minor source emissions quantified by other methods?
- ☐ Are explanations of the basis of data choice included?
- ☐ Are the frequencies of measurements, calculations, or other methods specified?

Supportive Data

- ☐ Is information on meteorological data (source, averaging period, etc.) included?
- ☐ Are all the applicable radionuclides included?
- ☐ Are release fractions given by physical form (solid, liquid, and gaseous)?
- ☐ Is the treatment of source physical parameters (volatilization) included?
- ☐ Is the location of the MEI by source or source groups defined?

Dispersion/Dose Model Used for the Confirmation

- ☐ Is CAP 88, Version 3 used to model doses?
- ☐ If CAP 88, Version 3 is not used, is the selected model verified?

Quality Control Aspects

- ☐ Are SOPs, or equivalent documents, referenced?
- ☐ Is there a validation process for source term data?
- ☐ Is there a validation process for Supportive Data?
- ☐ Is the corrective action process documented?
- ☐ Are audit or peer review processes in place and documented?
- ☐ Are outside audits conducted?
- ☐ At what frequencies are measurements, calculations, or other methods performed?

APPENDIX B

SUMMARY OUTLINE OF EXISTING PCM PROTOCOLS AT SELECTED DOE FACILITIES

Shown below is a CY 2006 snapshot of PCM protocol summaries at selected DOE facilities and an evaluation of the degree to which the protocols address the "Key Elements" in the Model Protocol in Section 3.0 above.

Oak Ridge Office (ORO)

Includes Y-12 National Security Complex (Y-12), East Tennessee Technology Park (ETTP), Oak Ridge National Laboratory (ORNL) & Oak Ridge Institute of Science and Education (ORISE)

Classification System for Site Emission Sources

- No tiered system other than greater than and less than 0.1mrem/year. Several minor sources at ORNL and Y-12 are continuously monitored as our major sources due to the nature of the operations at these facilities that may cause the potential dose to shift upward, placing these facilities into the Amajor source@ category. Potential dose calculations for these sources are performed to confirm their minor source status. All of the maintenance and quality assurance measures performed on our major sources are performed on these continuously monitored minor sources as well.

Basis of Source Data

Because of the large number and diversity of minor sources at ORR, it is impractical to list each individual minor source on the annual report since these sources contribute insignificantly to off-site dose. Minor sources are grouped to reduce the administrative burden on estimating releases. For the purpose of estimating releases and submitting the annual report as required by Part 61.94, minor sources are grouped according to similar characteristics (e.g., general location, type of activity, or type of control). The minor sources are so grouped that the estimated actual doses resulting from any one group does not exceed 0.1 mrem/year.

- Continuous stack sampling on some minor sources either permanently or during a representative sampling period is performed. Continuous sampling systems on minor sources use the same methodologies as the major sources, which are specified by EPA and/or ANSI N13.1-1969

- Periodic grab samples are performed for some minor sources. Sampling methodology used generally complies with EPA Methods 1 through 5 in Appendix A of 40 CFR Part 60, with several modifications as specified in DOE/ORO/2196, *Compliance Plan, National Emission Standards for Hazardous Air Pollutants for Airborne Radionuclides on the Oak Ridge Reservation, Oak Ridge, Tennessee*, March 30, 2005.

- Air samples taken on a periodic basis in selected areas for ongoing worker protection programs, where available, along with estimated room air exchange rates, are used to estimate releases of radionuclides.

- Emissions from release points with resulting potential doses less than 0.1mrem/year are estimated using EPA-approved methods, as described in the protocol or otherwise approved by EPA.

- For minor sources (<0.1 mrem/yr), engineering estimates and other technically justified methods including using surrogate emissions are used to periodically confirm that emissions are low.

- A mass balance approach may be used to make an estimate of annual emissions from research and development laboratories. They maintain records of various isotopes purchased, used, and stored. These amounts generally vary but are generally small and most of the radioactive material is consumed and/or absorbed in the experiment or discarded as liquid or solid waste.

- Core samples from High Efficiency Particulate Air (HEPA) filters used at some minor sources can be analyzed to determine the quantity of radionuclides collected. HEPA filter sampling is a very effective technique on minor sources since the 99.97 % particulate collection efficiency and long sampling time, which concentrate the sample for laboratory analysis

- Appendix D of Part 61, "Methods for Estimating Radionuclide Emissions" calculations is used to estimate radionuclide emissions for many minor sources.

- ORISE handles extremely small quantities of radionuclides for research and training purposes. As indicated in the ORR Compliance Plan, compliance with the Rad NESHAP regulations for ORISE activities is demonstrated by maintaining annual possession quantity levels below those listed in Appendix E, Table 1, of 40 CFR Part 61.

Supportive Data

- Site-specific parameter values are used, if possible, in all calculations. If site-specific data are unavailable, default values suggested in the CAP-88 codes, NRC Regulatory Guide 1.109, or the NESHAP background information documents are used.

Dispersion/Dose Model Used for Confirmation

- CAP-88 – Potential EDEs attributed to potential source terms are calculated at the MEI location for each source.

- Potential doses are calculated by using the dose to source term ratio method. For each source, the potential dose is calculated by multiplying the radionuclide potential activity by the radionuclide- specific dose/radionuclide activity ratio. The radionuclide-specific dose/radionuclide activity ratios are developed for each sources maximally exposed individual location. These radionuclide specific potential doses are summed to give a source specific potential dose. The potential doses per source are estimated annually, using annual meteorological data.

- Where administrative procedures are in place, they may be used to demonstrate that potential emissions from certain operations are extremely low.

Quality Assurance

- As a commitment item of the FFCA each ORR facility submitted a QA Plan to EPA Region IV. EPA subsequently acknowledged that the submittals satisfied the requirements in 40 CFR, Part 61, Method 114, for QA Plans. Method 114 specifies that a QA Plan must ensure that the emission measurements are representative, are of known precision and accuracy, and include administrative controls to ensure prompt response when emission measurements indicate an increase over normal radionuclide emissions rates.

- Each site's QA Plan references site procedures that are specific to the radionuclide emission measurements for NESHAP compliance. Over time, the site procedures may be revised, but the QA Plans will not be reissued to reflect minor changes in the procedures. However, the updated QA Plans and site procedures will be maintained by the Environmental Management Organizations at each facility and are available for inspection.

Frequency of Confirmation

- New emission estimates are generated each year for all minor sources except for sources where grab sampling, HEPA filter sampling, or surrogate emissions are used. Confirmation of low emissions from these sources is revised at least every 5 years depending upon the variability of the source and the potential emissions. However, the operational activities of these source areas are reviewed annually to ensure there are no significant changes that could increase emissions.

Los Alamos National Lab (LANL)

Classification System for Site Emission Sources

- Graded approach consistent with ANSI N13.1-1999 (Four "Tiers") : for PCM, Tier III (0.001mrem < = EDE < 0.1 mrem) and Tier IV (EDE < 0.001 mrem)

Basis of Source Data

- Radioactive Materials Usage Survey (RMUS)

Supportive Data

- Multi-year average, site specific, meteorological data are used for making these calculations. Each PCM source is run using the closest receptor to that source as the maximally exposed individual. Release fractions for the various physical states (solid, liquid, and gaseous) are taken from 40 CFR 61, Appendix D, unless documented data exist for these release fractions.

Dispersion/Dose Model Used for Confirmation

- CAP 88 (Each PCM source is run using the closest receptor to that source as the maximally exposed individual.)
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Quality Assurance

- All RMUS data for Tier III sources requires a secondary source of documentation. MAQ staff verifies the data and secondary documentation sources on RMUS operating data submitted by operational personnel. Peer review within MAQ is performed on 100% of these RMUS evaluations. Starting in 2003, all Tier III source usage information is verified by a knowledgeable party from the facility operating group or within MAQ. Additionally, approximately 5 % of the source evaluations are spot-checked by MAQ staff and the source point-of-contact**.**

Frequency of Confirmation

- The primary differences in the requirements for sources classified as Tier III and Tier IV are that Tier III sources are evaluated each year. Tier IV sources are evaluated at least every two years and no secondary documentation of RMUS data is required beyond user estimates; however, upper bound estimates of radionuclide data are requested.

Lawrence Berkeley National Lab (LBNL)

Classification System for Site Emission Sources

- Graded approach consistent with ANSI N13.1-1999 (Four Categories): for PCM, Category 3 (0.01 mrem < = EDE < 0.1 mrem) and Category 4 (EDE < 0.01 mrem)

Basis of Source Data

- At LBL, the data sources depend on the purpose of the dose calculation.

- For the 2005 annual NESHAP report, emissions from 10 stacks were measured, either by sampling or real-time monitoring. At 111 other stacks, emissions were calculated based on quantities 1) received by the Radioactive Material Transportation Office and entered

into the Radiation Database and Reports (RADAR) system, 2) used and sent to the Hazardous Waste Handling Facility, or 3) produced by air activation.

- To evaluate the potential for radionuclide emissions, potential dose from each research project is calculated based on 1) the maximum annual quantity that is authorized for use by each project, as documented in the RADAR system; 2) actual annual quantities used in specific locations, as estimated by the principal investigator; or 3) quantities assigned to the project's inventory, as documented in the RADAR system.

Supportive Data

- Meteorological data are collected from a 20-m tower located near the center of the LBNL site. The time period used depends on the purpose of the dose calculation. For the annual NESHAP report, meteorological data for the calendar year covered by the report are used. To evaluate the potential for radionuclide emissions (and thereby determine a stack's measurement category), meteorological data averaged over a recent 5-year period are used.

- Dispersion factors from 40CFR61, Appendix D, are used for calculated emissions (both for the annual NESHAP report and to evaluate the potential for radionuclide emissions).

- Local MEIs are identified as the closest member of the public to each source, and the site-wide MEI is identified as the local MEI that receives the greatest dose from all sources. This is true for both the annual NESHAP report and evaluation of potential for radionuclide emissions.

Dispersion/Dose Model Used for Confirmation

- At LBL, CAP88-PC is used for both the annual NESHAP report and evaluation of potential for radionuclide emissions. In addition, we use COMPLY to confirm the annual dose calculated using CAP88-PC for receptors that are much less than 100 m from the source.

Quality Assurance

- Additional procedures governing NESHAP compliance activities are EHS Procedures 252, 253, 254, 255, 256, 268, 280, 286, 287, and 291. Laboratories where samples are analyzed also have multiple procedures.

Frequency of Confirmation

- At LBL, the measurement category assigned to each source is confirmed at least every 12 to 18 months, as each moderate- to high-hazard project's authorization is amended or renewed. The annual NESHAP report provides additional confirmation.

Idaho National Lab (INL)

Classification System for Site Emission Sources

- Graded approach consistent with ANSI N13.1-1999 (Three Categories) (Category II : 0.01 < EDE < 0.1 and Category III: EDE< 0.01)

Basis of Source Data

Category I

- > 0.1 mrem/yr

Category II

- Annual grab samples to confirm unabated emissions below the 0.1 mrem/year standard; however, more conservative approaches are acceptable (e.g., continuous proportional sampling). Annual grab samples must be collected during steady-state operation and result in a representative sample. If used, continuous proportional sampling will require that the sampling ratio be well defined. The sampling ratio can be based on well defined average temperature and pressures for a given RARP.

Category III

- Submission of an annual report based upon process knowledge and the last 12 months of operations (actual stack emissions measurements although they are preferred are not necessary).

Supportive Data

Category II

- Quarterly grab samples.

Category III

- Process knowledge and the last 12 months of operations

Dispersion/Dose Model Used for Confirmation

- CAP 88

Quality Assurance

Category II

Sample management, following controlled chain-of-custody procedures.

- Performance of all analyses following DOE Order 5700.6B QA/QC protocol

Category III

- If samples are collected they follow the QC of Category II.

Frequency of Confirmation

Category II

- Quarterly grab samples.

Category III

- When associated data indicates upward trend.

HANFORD

Classification System for Site Emission Sources

- Three categories, two for stacks and vents and one (Category III) for diffuse and fugitive emissions (Category I for > 0.1 mrem/yr and Category II for < 0.1 mrem/yr.)

Basis of Source Data

- For stacks that have an inventory of radiological material, which based on good engineering judgment, could produce measurable (above detection level) emissions from the stacks. Stack record sampling for four weeks per year, one week per quarter, or Appendix D calculations based on measured inventory are used to provide periodic confirmatory measurements to verify low emissions.
- For stacks with an inventory of radiological material which based on good engineering judgment could not produce measurable (above detection level) emissions (e.g. fixed contamination) at the stack using stack record sampling (minimum of one week). For these stacks, periodic confirmatory measurement to verify low emissions is recommended once per year.
- Diffuse and fugitive emissions sources are monitored with a network of ambient air samplers located around the Hanford Site perimeter. The ambient air monitoring confirms on an annual basis low emissions from diffuse and fugitive sources on the Hanford Site.

Supportive Data

Not addressed in protocol.

Dispersion/Dose Model Used for Confirmation

- CAP 88 PC

Quality Assurance

Not addressed in protocol.

Frequency of Confirmation

(See “Basis of Source Data)

Savannah River Site (SRS)

Classification System for Site Emission Sources

- Graded approach consistent with ANSI N13.1-1999 (Four Tiers)

- PCM Tiers :

PIC 3 (PEDE = > 0.1 and EDE = > 1E-05 mrem/yr)

PIC 4 (PEDE = > 0.1 and EDE = < 1E-05 mrem/yr)

Basis of Source Data

The graded approach to establish air emission monitoring criteria is an integrated approach that utilizes three years of actual emissions, potential emissions[4], 40 CFR 61 Appendix D calculations, regulator-approved alternative calculation methods, and facility environmental evaluation checklists. The last three calendar years of emission data are used to perform the evaluation. The PEDE is determined by mathematically removing control devices.

Supportive Data

- PIC 3:
  Periodic quarterly sampling and offline analysis

- PIC 4:
  Annual administrative review of facility uses to confirm absence of radioactive materials in forms and quantities not conforming to prescribed specification and/or limits.

Dispersion/Dose Model Used for Confirmation

- CAP 88

Quality Assurance

Not contained in protocol.

Frequency of Confirmation

- PIC 3: Periodic quarterly sampling and offline analysis

- PIC 4: Annual administrative review of facility uses