

Rocky Mountain Arsenal Medical Monitoring Program

Odor Monitoring Program

- I. Objective:** The Environmental Monitoring Subcommittee selected as its mission statement: “To understand, review and evaluate environmental monitoring procedures for the RMA/surrounding community and develop recommendations concerning their adequacy for meeting human health and environmental criteria during remediation.” These recommendations are intended to enhance the air quality monitoring program for the Rocky Mountain Arsenal (RMA) environmental remediation.
- II. Background:** The Subcommittee began its work by studying the RMA’s air, ground water and surface water quality environmental monitoring programs. Experts in each discipline were sought out and site tours were conducted. This allowed the Subcommittee to become informed of programmatic technical methods, goals and environmental compliance requirements. The Subcommittee concluded that its investigation and resulting recommendations should focus on the air quality and odor monitoring programs. During the RMA soil remediation, the air pathway has the greatest potential for impact on human health due to potentially harmful levels of airborne contaminants or enjoyment of personal property due to nuisance odors.

The Subcommittee gathered background information about current odor science and monitoring techniques. A special workshop with presentations by two nationally-recognized odor experts was hosted for the group last year. Information was furnished about current sources of odors in the surrounding communities (RMA Draft Baseline Odor Monitoring Plan, 7/97), the Northeast Metro Industrial Council and TriCounty Health Department (TCHD) odor complaint response capabilities. The primary document that describes the Remediation Venture Office’s (RVO) approach for odor monitoring is called the RMA Site Wide Odor Monitoring Plan (SWOMP), February 1998. It describes in general the odor monitoring locations, methods and frequencies. Response actions and communication and reporting protocols are also presented. Site-specific odor monitoring plans are produced for each individual remediation project (e.g., the Burial Trenches and Munitions or Basin A Consolidation projects). While the site specific plans are tailored to accommodate the requirements of each project, they follow the conceptual approach outlined in the SWOMP.

Asoian Associates, a consulting firm specializing in air quality, was contracted by the Colorado Department of Public Health and Environment at the recommendation of a Subcommittee working group to provide independent technical advice to the Subcommittee. The Subcommittee assigned Asoian Associates to review the SWOMP and provide recommendations, if appropriate, for any needed improvements to the RVO’s proposed monitoring approach. In addition to attending Subcommittee and air pathway analysis working group meetings, Asoian Associates was provided with a variety of background materials including excerpts from the Record of Decision and technical documents, RMA air pathway analysis information, and site-specific odor monitoring plans.

The Subcommittee has reviewed the Rocky Mountain Arsenal's Site-Wide Odor Monitoring Program Plan (SWOMP), Version 1, February 1998, as well as the recommendations provided by Asoian Associates (7/98). Three new odor action level/response documents (originally distributed at the May 1998 RMA Restoration Advisory Board meeting) were also made available.

The RVO is responsible for producing a revised version of the SWOMP along with additional supporting documents which incorporate the Medical Monitoring Advisory Group's (MMAG) recommendations. The RVO, along with the public health agencies which provide regulatory oversight, are responsible for ensuring the recommendations are implemented.

III. Recommendations: The Subcommittee accepts Asoian Associates' recommendations and submits additional recommendations. The recommended actions are intended to improve the odor monitoring program by enhancing community assurance that every effort is being made to minimize RMA-related nuisance odors. They are also intended to improve the readability and completeness of the SWOMP document.

A. Subcommittee Recommendations:

1. Community Odor Reporting Contingency Plan: Design a contingency plan for a community odor reporting program as part of the Site Wide Odor Monitoring Plan. The program design should incorporate the following components:

When would the program be implemented? The community odor reporting program should be implemented under conditions as defined below and as a supplement to the RMA's odor monitoring program. It is not intended as a substitute for a rigorous odor monitoring program that includes odor patrols at the RMA fence line and interior. It does not supplant established odor regulations or TCHD's response capabilities in the event of off-post complaints.

Implement the contingency plan in response to an increase in the frequency or duration of RMA-related odors and heightened community concern. The contingency plan can be triggered through a request to the RVO from community members, TCHD, Denver Department of Environmental Health, CDPHE or EPA.

Who would participate? RVO will recruit interested community members in the neighborhoods surrounding RMA. An attempt will be made to recruit participants from those who register odor complaints with TCHD. RVO will train participants to detect and identify odors (with training lasting a few hours

to half day). RVO will provide and maintain n-butanol kits, provide log forms and data feedback to participants.

Why community odor reporting? Community odor reporting has been used at industrial facilities, sewage treatment facilities, refineries and hazardous waste sites where persistent odors caused an unfavorable community response. Community involvement in areas where odor is a problem has become more common internationally. The Subcommittee anticipates that this community odor reporting program will not need to be implemented due to the careful planning of the RVO under the watchful eye of concerned citizens and the oversight of regulatory agencies. However, planning for an unanticipated event demonstrates the importance that the RVO places on preventing and mitigating objectionable odors.

How does the program work? RVO trains participants in odor character recognition (description of smell), odor measurement (measured with an abbreviated version of the n-butanol odor intensity scale) and wind speed estimation and wind direction reporting. Any time an odor is detected, the citizen uses a log form to record this information. Participants are also encouraged to report the odor by telephone to TCHD. This activity is usually performed while the participant is at home. A mechanism will be set up to provide feedback to participants: was the odor RMA-related?, did the report(s) result in a response action? A number of feed-back methods may be used including personal communication, reports, meetings, lunches/dinners. The RMA Medical Monitoring Program bulletin can also be used in a summary fashion.

What are the geographic boundaries? Site-specific factors are considered in designing the spatial extent of the odor reporting program; it is usually based on odor complaints.

2. *Odor Intensity Action Level:* Amend the SWOMP to adopt a goal of no RMA-related nuisance odors in the communities. The odor goals and corresponding response criteria proposed in the draft site wide odor monitoring plan are inadequate. The Subcommittee understands the RVO has revised its approach and adopted a new fence line odor intensity action level 3 or greater, thus lowering the trigger level. This level elicits an immediate response action to reduce the odor. We believe this is a very positive step toward the desired goal and we support the RVO's revised approach. If RMA-related odor complaints are received in the future using the revised fence-line odor action intensity level of greater than 3, the RVO should reevaluate this action level.

3. *Community Information:*

a. Use the RMA Medical Monitoring Program quarterly community bulletin to provide information about the odor monitoring program. This communication tool may be used to furnish facts about the community odor surveillance and reporting contingency program, the frequency of RMA-related odor complaints, odor characteristics and serve as a communication feedback mechanism for odor episodes. It may also be used to address the common misperception that exposure to an unpleasant odor produces an associated health threat.

b. Provide information periodically about the odor monitoring program at community events such as the Commerce City and Montbello community picnics.

4. *Air Quality Sampling and Odors:* Collect an ambient air “grab” sample (in a canister or tedlar bag) when an RMA odor is detected at the fence line with an intensity level greater than 5. This may assist in addressing concerns that a health threat may be associated with a perceptible odor.

5. *Odor Complaints:* If Rocky Mountain Poison and Drug center receives an odor complaint, it should be redirected to TriCounty Health Department.

6. *Denver Odor Complaint Coordination with TriCounty Health Department:* Improve response to RMA-related odor complaints that originate in Denver County.

a. TCHD and Denver Department of Environmental Health (DDEH) will communicate regularly so that TCHD’s response capabilities can be utilized to augment DDEH’s investigation of RMA-related odor complaints originating in Montbello. If RMA-related odor complaints are received by the Denver Fire Department, DDEH will notify the Fire Department of TCHD’s capabilities, so they may also utilize this resource. The Northeast Metro Industrial Council meetings are also an opportunity for coordination between the local health departments.

b. Ensure that information about TCHD’s RMA odor hotline is made available to Montbello residents. The Medical Monitoring Program quarterly bulletin can be used along with other communication tools already identified by the Public Involvement and Education Subcommittee.

B. Asoian Associates’ Recommendations :

The following is an excerpt of the key elements of the report submitted by Asoian Associates. A copy of the full report is available upon request.

1. General Observations:

Based on the community's experience with past remedial activities and our understanding of their concerns, it is our opinion that the community will tolerate few if any incidences of nuisance odors being detected.

After reviewing the SWOMP we find that it is extremely general and too vague. Even the site-specific plan for the Complex Trenches and Shell Section 36 Trenches Groundwater Barrier Project (RVO, 1998) does not contribute to the overall specificity. The reader can only infer what is or may be the rationale for the criteria that have been established, the monitoring frequencies and locations that have been chosen, the monitoring methods that have been chosen, how the data will be reported, and how the corrective action process will be implemented.

2. Assessment Criteria:

C Evaluate whether or not the SWOMP is consistent with the data quality objectives of maintaining fence line criteria and minimizing nuisance odor.

The SWOMP has established a dilution to threshold ratio of seven as the fence line criteria. This is consistent with Colorado Air Regulation No. 2. There are no other applicable regulations. Because it is possible to detect odors at and below the criteria of 7 D/T (Draviniaks and Jarke, 1979), the surrounding community may still perceive that a nuisance odor problem exists, even assuming that the fence line criteria are never exceeded. However, the SWOMP implies that fence line criteria will be exceeded, at least periodically. Additionally, Table 4.1 of the SWOMP indicates that fence line sampling will only be done during odor monitoring category (OMC) 1 activities. There is no mention of what level, if any, of expanded monitoring will take place or what control actions might be implemented if the criteria at the Central Remediation Area (CRA) or The Central Remediation Area Boundary (CRAB) are exceeded. Given these issues, and others, the SWOMP cannot assure that fence line criteria will not be exceeded, nor can it be said that the SWOMP is minimizing nuisance odors to the extent possible.

C Evaluate whether or not the SWOMP's stated objectives are adequate.

The SWOMP's stated objectives are not adequate. The primary objective should be

to have no confirmed incidences of nuisance odors in the surrounding community. The remaining objectives should support this objective. Our understanding of Objective 4 implies that a potentially lengthy process may be employed to confirm community reports of nuisance odors before corrective actions may be implemented. This does not support what we believe should be the primary objective.

C Evaluate whether or not the SWOMP’s approach can be implemented for a complex Superfund site remediation.

The SWOMP’s approach, or at least what we believe the SWOMP’s approach to be, can be implemented for the RMA remedial activities. We will elaborate in our recommendations.

C Evaluate whether or not the SWOMP’s approach is consistent with state (Regulation 2) and federal air monitoring procedures and protocols.

We believe the SWOMP’s approach is consistent with Regulation 2, see above. Although we believe it is appropriate to maintain Regulation 2 criteria at on-site visitor locations, we do not believe that it is expressly required under Regulation 2.

C Evaluate whether or not the SWOMP satisfies the community concerns about odor.

In its current state, the SWOMP will not satisfy community concerns or expectations about odor. On the contrary, it all but states that nuisance odors will occur. It is our assessment from our involvement with the project that the community will accept very few if any incidents of nuisance odor. Even if the SWOMP could assure that it would minimize nuisance odors from a technical standpoint, it does not clearly state or demonstrate its ability to do so.

C Evaluate whether or not more meteorological stations are needed near RMA to ensure that noxious odors are controlled.

More meteorological stations are not needed to assure that noxious odors are controlled. Refer to our review of the SWAQMP (Asoian Associates, 1998).

C Assess the potential for odors to “loft” and “touch down” remotely from the RMA and the potential need for placement of offpost monitoring stations to evaluate the effects, if any, of this “lofting”.

There is little if any potential for odors to loft or touch down remotely from the RMA, so an offpost monitoring station is not needed to evaluate offpost odors resulting from this phenomenon. Refer to our review of the SWAQMP (Asoian Associates, 1998). However, as outlined below, offpost monitoring should be conducted.

3. Recommendations:

Version 2 of the SWOMP should incorporate CDPHE's and Tri-County Health Department's (TCHD) recommendations, which we have recently received (May 19, 1998) and reviewed. Their comments should be integrated with the comments we have presented below.

- C The SWOMP needs to be expanded and elaborated upon. The minimum requirements for a monitoring plan which we presented in our review of the SWAQMP should be used as a basis for Version 2, modified as appropriate for odor monitoring. As we stated for the SWAQMP, the objectives and purpose of the SWOMP and the foundation for the document should be presented and clearly stated in the introduction. Additionally, the primary objective should be to achieve zero incidences of nuisance odors. This objective should be added and clearly stated and support by the rest of the objectives and the rest of the document.
- C The same flow chart which we suggested for the SWAQMP should be included in the SWOMP. It is particularly important to establish and show the relationships and interdependencies of the various aspects of the air pathways analysis program, especially how the SWOMP fits into the overall scheme of the program and how the lines of communication for reporting odor incidences, verifying odor reports, and initiating control strategies will work. Again, it would be helpful to introduce the concept of the Interactive Comprehensive Air Pathway Analysis (IC-APA) in the introduction, taking pains to clearly show the relationship and interdependencies of the six tasks. This could be achieved by referencing the SWAQMP.
- C An organization chart/list of responsible parties should be provided, e.g. who will be contacted at the TriCounty Health Department.
- C A list/table of the documents that are referred to but have yet to be completed should be provided. This list/table should include the expected date(s) of completion, e.g. Sampling and Analysis Plan/Quality Assurance Project Plan and who will be responsible for reviewing these documents.

- C A glossary of terms should be included in the SWOMP.
- C The table/matrix we recommended for the SWAQMP should be modified to incorporate odor criteria. This table/matrix should be keyed to a map. It is our recommendation that this table/matrix be incorporated into the new interactive data management system which we have recently (April 15, 1998) seen a demonstration of. This will allow queries about odor levels and incidences to be made simply by clicking on the map that is already incorporated into the system. Since it is our understanding that the public will have access to the system, this will provide a straightforward way for the information to be obtained.
- C The map provided, Figures 4-1, should be a larger fold out or fold up map showing the RMA and the surrounding community. It should specifically include other sources of odor which have been identified in the community. It is our recommendation that the map cover a broader area out from the fence line. In light of the new interactive data management system, we recommend that the RVO implement innovative ways of representing air quality data, including odor, throughout the remediation. If Figure 4-1 clearly depicted the remediation areas, RMA structures and boundaries, monitoring locations, the surrounding community and a wind rose, then there would be less confusion and questions regarding the appropriateness of monitoring locations.

With the new data management system, the information imbedded behind the map would allow for virtually any type of information to be queried and a report generated. For example, if a nuisance odor report were received, real time meteorological data could be evaluated to determine whether or not the RMA was the potential source of the odor. This methodology also allows for quick and easy comparison of the IC-APA's performance in odor prediction. Similarly, an interested agency or the public would have the ability to click on a monitoring site and compare monitored data with the odor criteria. As we have said before, incorporating the capabilities of this new system into the SWOMP and the rest of the air pathways program resolves a lot of the issues which have arisen during the review process. To name just a few, it goes along way to solving the relationship issues between the SWOMP and the rest of the program and solving the end user/public information concerns issues and requirements.

- C One of the site-specific plans should be included as an appendix.
- C A statement should be made that the RVO will consult annually with the

regulatory agencies on the need to update the SWOMP. This will allow for the SWOMP to be modified as the remedial activities evolve, as the community evolves, and as new monitoring and assessment techniques evolve.

- C There has been a desire to link odor and odor detection limits to health risk criteria since we have been involved in this project. The information that is currently available indicates that this attempt would not be productive. A table which we have recently received from Mr. Scott Klingensmith (RVO, 1998) indicates that in some cases the published odor detection limit is below health criteria while in some cases the published detection limit is above the health criteria. The SWOMP should discuss this issue and describe the limitations of comparing individual odor detection limits to chemical-specific health criteria. It should explain that total odor is the most commonly used method of monitoring odor and why this approach is expected to be protective of the surrounding communities and on-post visitors.
- C The concept of how the IC-APA will be utilized in the design process is alluded to in the text and should be elaborated upon to show how the IC-APA will be used to help establish such monitoring criteria as location and frequency.
- C The SWOMP does not clearly address if and how monitoring will be conducted during off or non work hours. The SWOMP should address this issue. At a minimum, periodic sampling should be conducted during non working hours to confirm IC-APA predictions for off hours odors.
- C The SWOMP leaves the issue of sampling frequency open, pending input of the IC-APA. However, we believe that sampling should be conducted continuously during the startup period of a new remediation activity to confirm the results of the IC-APA, unless compelling reasons can be otherwise demonstrated. This is especially important for Tier 1 and 2 projects and should also be implemented for Tier 3 projects, as appropriate. Enhanced frequency should also be implemented in response to unexpected field conditions during project execution.
- C Off-site monitoring should be conducted. We understand that TCHD will be conducting off-site monitoring, at least on a periodic basis. We also recommend that a provision be made for a community or neighborhood odor monitoring program. Community members could be selected from around the RMA.

Odor issues have been and are likely to be the biggest issue, whether emotionally or in

reality, associated with the RMA remediation effort and Version 1 of the SWOMP simply does not do it justice. The SWOMP can and should be revised substantially so that it meets the needs and expectations of the community.