

Rhode Island House of Representatives

*Special Legislative Commission To Study
Naturally Occurring Arsenic in the Soil*

Findings and Recommendations

Report Submitted to the Rhode Island
General Assembly

May 2008

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MEMBERS

Members:

Representative J. Russell Jackson, Chair

Representative J. Patrick O'Neill, Vice Chair

Representative Joseph Amaral

Representative Joseph Almeida

Representative William McManus

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ACKNOWLEDGMENTS

The Special Legislative Commission to Study Naturally Occurring Arsenic in the Soil would like to thank the many individuals who contributed to our meetings and discussions on this topic. Their testimony, presented both orally and written, as well as the documentation provided during our hearings, ensured that all viewpoints of this important issue were fairly represented.

OVERVIEW

On June 21, 2006 the Rhode Island General Assembly authorized by Resolution the creation of a Special Legislative Commission to study the Requirements for the Remediation of Naturally Occurring Arsenic in the Soil. This resolution was extended on June 12, 2007. The commission was authorized to report its findings and recommendations to the House of Representatives no later than May 29, 2008.

Please see Appendix A for the Commission's meeting schedule and agendas.

Among the information and studies the Commission examined were:

- Documentation and testimony provided by the Rhode Island Department of Health
- Documentation and testimony provided by the Rhode Island Department of Environmental Management
- Documentation and testimony provided by Rhode Island Housing
- Documentation and testimony provided by Newport Housing Authority
- Documentation and testimony provided by Newport Naval Base
- Documentation and testimony provided by The Landings Group
- Documentation and testimony provided by Vanasse Hangen Brustlin, Inc.
- Documentation and testimony provided by the Town of Middletown
- Documentation and testimony provided by Aquidneck Island Planning Council
- Documentation and testimony provided by the Redwood Library
- Documentation and testimony provided by ENACT
- Documentation and testimony provided by Phil Brown, Ph.D., Director of Brown University's Superfund Basic Research Program
- Documentation and testimony provided by the Rhode island Builders Association
- Miscellaneous newspaper articles and national and statewide studies
- Testimony from other interested parties and the General Public

INTRODUCTION

On January 16, 2007 the Special Legislative Commission to Study the Requirements for the Remediation of Naturally Occurring Arsenic in the Soil initiated a series of meetings to identify how the state could address the current standard and remediation process for arsenic in the soil.

The intent of the commission was to examine background or naturally occurring arsenic levels throughout the state, and the application of the current arsenic thresholds and remediation requirements. Although the State's remediation requirements, under the Department of Environmental Management, do not specifically regulate naturally occurring conditions, the difficulty and cost to distinguish between elevated background conditions and an actual release warranted special review, given the prevalent and historic uses of substances containing arsenic. The commission's goal was to determine if the current requirements are the most appropriate and cost effective approach to protecting the health of the public and the environment.

On February 13, 2007 the Commission began its first of many meetings that continued through January 2008 (see Appendix A). The first meeting included testimony from the Newport Housing Authority, Newport Naval Base, Landings Group, Vanasse Hangen Brustlin, Inc., the Town of Middletown, Aquidneck Island Planning Council, and the Redwood Library. The presenters provided an overview of the concerns with the arsenic current standard and remediation process.

Because compliance with the current standard for remediation is a very intense process, the Commission sought to understand if Rhode Island has the best approach to how we test and report arsenic levels, what triggers remediation, and what activities are required before development on a site can occur.

At the later meetings of the Commission, the Department of Environmental Management described how the current standard was arrived at, how Rhode Island's standard compares to other states and to EPA thresholds. The Department of Health, provided information on the health risks associated with arsenic. Other stakeholders, including developers, contractors, consumer and environmental protection groups provided additional perspectives on the issue.

A sub-group of the Commission was formed to study standards in other states and make recommendations for arsenic remediation procedures that would be more equitable, less costly, and decrease unintended consequences. The recommendations of the working group are attached in Appendix C.

HEALTH AND ENVIRONMENTAL RISKS OF ARSENIC CONTAMINATED SOIL

Arsenic is a chemical substance that is naturally occurring in rock and soils around the world and is present in residues from historic activities in both industrial and agricultural areas of the United States. It can exist in an inorganic or organic form. Arsenic can be absorbed into the body through inhalation, ingestion, and through absorption in the skin. It can also be passed through nursing, transplants or injections.

Arsenic in the soil is a risk to humans because by engaging in activities such as gardening, nail biting, smoking, and mouthing behavior in children, people do ingest soil and may be at risk if the soil is contaminated. Chronic exposure to arsenic is the principal concern. People exposed to environmental sources of arsenic over long periods of time are more likely to have increased risk of developing adverse health effects.

Environmental Affects: Concentrations of arsenic are highest in air close to industrial sources, in underground water in areas with natural geological contamination, and in soils or sediments near contamination sources. Organisms living in the environment react in a variety of ways to arsenic exposure. Arsenic poisoning can lead to poor growth, failure to reproduce, and even death. Where arsenic has contaminated a natural environment, the number of different species found is generally reduced.

Risks for People: In humans, if a large amount of arsenic is swallowed in a form that is readily absorbed, it can cause rapid poisoning and death. The gut, the heart and the nervous system are affected. Those who survive acute poisoning may develop pigment spots in the skin and damage to red blood cells, bone marrow (where blood cells are made), liver, nerves and brain. Long-term exposure to high levels of arsenic in drinking water can cause thickening and pigment spots in the skin, and cancer of the skin, lungs, bladder or kidney. Exposure in the workplace – mainly via the air breathed in – can cause lung cancer.

Long-term ingestion of arsenic has caused a disease called "blackfoot disease". Blood vessels of the leg and foot become damaged, resulting in coldness, loss of feeling and eventually gangrene in the foot.

HISTORY OF CURRENT STANDARDS AND BACKGROUND STUDIES

In 1993 Rhode Island promulgated the first set of “Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases” (Remediation Regulations). In 1996 after holding stakeholder meetings, public workshops, and a public hearing, the Rhode Island Department of Environmental Management (RIDEM) revised those regulations to include specific soil clean up values, and set the residential criteria for arsenic in the soil at 1.7 ppm. This standard was set based on a geometric average of 106 background samples evaluated across the state. The 1.7 ppm standard, however, had the unintended effect of imposing regulatory burdens on many sites with elevated background levels of naturally occurring arsenic, as opposed to just sites with documented or suspected releases.

From 2000-2003, RIDEM held additional meetings and workshops in regards to the arsenic standard, and revised the Remediation Regulation again in 2004. These revisions raised the standard to 7.0 ppm, and outlined in greater detail special requirements for addressing arsenic in the soil.

Rhode Island’s remediation standards for soil (both residential and industrial/commercial) for most metals are based on US EPA human health risk calculations (the Superfund Risk model). Using the ingestion and exposure assumptions typical for the model, the calculated standard for arsenic in soil is computed to be 0.4 parts per million (ppm). The Rhode Island arsenic standard, however, is not based on the EPA risk based standard, but instead takes into consideration that Rhode Island has an elevated level of naturally occurring arsenic in the soil.

To set the baseline level of naturally occurring arsenic in the soil, the state evaluated two independent “background” studies. The first study, completed in the 1990’s, utilized approximately 106 samples taken across the state. The second study, completed in 2001, utilized 374 data points from 1,039 site files reviewed from across the state, including some of the original 106. The final results from the 2001 study generally substantiated the findings in the earlier study, with the calculated state-wide average arsenic level being 1.87 ppm,

As part of the regulatory revisions completed in 2004, the entire background data set was re-evaluated using standard statistical procedures. Given the variations of naturally occurring levels throughout the state, the intent was to select a confidence level under which there was reasonable certainty that an actual arsenic release had occurred. Based on those deliberations, the state selected the 95% percentile of the data set versus the state-wide average, which created the new standard of 7.0 ppm. Under the new standard, therefore, there is a 95% percent certainty that naturally occurring arsenic results in the state will fall below his level.

These results are similar to the arsenic concentrations found in soil across the eastern United States, where studies have shown arsenic concentrations range from less than 0.1 ppm to 73 ppm, with an average concentration of about 7 ppm. According to the EPA risk based model, severe chronic exposure to arsenic at this level will result in a 1 in 50,000 increased chance of developing cancer.

Remediation (the clean up process) is triggered when greater than 10% of sample results exceed 7 ppm, an individual soil samples on a property is greater than 15 ppm, or the average of all the sample results are above 7 ppm.

If the levels are only slightly above 7 ppm a separate study of arsenic levels in the soil on the local level could be used to determine if the level is consistent with the natural level in the immediately surrounding area.

CONCERN WITH THE CURRENT STANDARDS

The commission heard from people concerned with varying aspects of the regulations. Environmental and consumer protection groups encouraged the state to keep the current standards as they were because the standard (based on background levels) was already higher than what the EPA risk based model calculation recommended. They also wanted to make sure that the standards would provide public health protection and were based on good science.

In areas of the state where naturally occurring arsenic in the soil is higher than the average, such as Aquidneck Island, concerns were raised that the standards posed an extraordinary burden on developers. Developers of both commercial and affordable housing stressed the high costs of remediation of the soil made some projects too expensive. In addition many believed that clarity was needed in the interpretation of the existing RIDEM regulations.

Concerns were also voiced that testing requirements for arsenic often differed between projects based on specific mandates of the financial institutions, so were not equally applied to all properties. Lenders for publicly financed affordable housing developments, and large bank financed developments generally require testing for arsenic, while privately financed projects may not. In addition the current standards treat small and large properties equally, causing a real burden for owners of small properties. In addition there was concern that to avoid the high cost of remediation developers have been trying to “game” or manipulate the sampling process. This often results in costly and time consuming negotiations between DEM and the developers.

Further complicating the issue is the fact that some lawn fertilizers and potting soils contain elevated levels of arsenic that would trigger DEM remediation requirements. In addition, the state has experienced staffing constraints that also impact on the ability to effectively regulate arsenic in the soil.

In addition, the Commission learned that the remediation process for arsenic is significantly more burdensome and costly than for other contaminants of concern such as lead. It was therefore suggested that the lead standards be looked at as a potential mode to develop a more balanced approach to arsenic remediation.

Although some argued that the standard for 7ppm was excessive when it was applied where there is limited evidence of release, both the Department of Health and Department of Environmental Management recommended that the current standards for 7ppm of arsenic in the soil should be maintained. However, they agreed that there could be more flexibility in how sites are remediated.

RECOMMENDATIONS

The Commissioners agreed that making recommendations to change the current standards was not their objective. Instead, the Commission created a sub-committee to look at ways that remediation (or cleanup) of the arsenic in soil could be done more efficiently while maintaining protection of public health.

The sub-committee was made up of the Department of Environmental Management, the Department of Health, Rhode Island Housing, and Newport Housing Authority. The objective was to maintain the standard for arsenic at no more than 7 ppm while evaluating alternative approaches to addressing arsenic in the soil that are protective of human and environmental health, more cost effective, address concerns with sampling criteria, and address equity and outreach concerns.

The sub-committee met several times from July 2007- December 2007 and developed a matrix of recommendations (see Appendix C). The major recommendation of the working group was to develop a three tiered system for remediation of arsenic in the soil modeled on the state's current lead remediation standards. As with lead remediation, in this tiered system, properties with 4 or fewer units would not be subject to the same filing requirements of remediation plans to the state.

Level I remediation would be required when the sample results show an average of 7-15 ppm. The contaminated soil must be adequately covered with clean soil or gravel at a depth of four inches.

Level II remediation would be required when the average arsenic level is above 15 ppm but below 43 ppm. This level requires excavation, removal, and replacement of soil, covering with landscape fabric and containment, or covering with concrete or any other permanent cover.

Level III remediation would be required for any arsenic levels above 43 ppm. The contaminated soil must be covered with concrete or any other permanent cover or a site specific plan must be developed that is approved by the Department of Environmental Management.

Site management plans will be required for all sites undergoing remediation, but only Level III remediation would continue to require Environmental Land Use Restrictions (ELUR) recorded on the property title.

The working group also recommended that all future homebuyers receive information on the health risks associated with arsenic and their right to test for arsenic, much like they do for other contaminants like lead and radon. The intent of the standard for

property owners with four units or less is to encourage the homeowner to test and remediate, but not require it.

The sub-committee believes that these recommendations reduce the burden for arsenic remediation for small property owners which should increase overall state-wide compliance. The recommendations also expand outreach and awareness of the health risks associated with arsenic, are cost effective, and have less burdensome reporting requirements while maintaining prudent public health protections.

CONCLUSION

The full Commission met again on January 16th and January 30th, 2008 to discuss the working group's recommendations. A representative of the Rhode Island Realtor's Association (RIAR) was invited to the meeting on January 30th. RIAR agreed in principle to the working group's recommendation to include information on the right to test for arsenic through the Real Estate Disclosure Statement. RIAR also indicated a willingness to work with the Department of Health to distribute appropriate informational materials on the health risks associated with arsenic through its members.

Concerns were expressed by Representative Amaral as to whether the threshold for Level II remediation was too high. The working group indicated that the specifics with regard to the revised regulations would have to go through a public comment process, and that the concerns could be addressed at that point.

In closing, the Commission voted to accept the recommendations of the working group. The Commission believed that the only legislative action that may need to be taken is a change to the Real Estate Disclosure Statement. All other changes can be done through the Department of Environmental Management by modifying the procedures in the Remediation Regulations.