Reference

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Mr. Kurt Kratz
Director of Environmental Cleanup
Office of the Deputy Under Secretary of Defense (Installations and Environment)
Department of Defense
3400 Defense Pentagon
Washington, DC 20301-3400

Re: Additional Information Regarding the Draft DOD *Interim Guidance on Sampling for Ammonium Perchlorate*

Dear Mr. Kratz:

This letter is a follow up to the meeting that took place on July 25th between EPA and DOD regarding the draft DOD Interim Guidance on Sampling for Ammonium Perchlorate Contamination. At that meeting, EPA agreed to provide input on several questions and issues that remained unresolved after the meeting was concluded:

1. What regulatory drivers exist regarding perchlorate? Is perchlorate classified as a hazardous substance?

Various statutes protect against harmful chemicals in water using similar terms with different definitions. For example:

- Section 1431 of the Safe Drinking Water Act provides EPA with regulatory authority for contaminants that might present an imminent and substantial endangerment to drinking water sources. A contaminant under the Safe Drinking Water Act includes any "physical, chemical, biological, or radiological substance or matter in water" which would include perchlorate

- CERCLA is a potential regulatory driver in two distinct ways. First,

CERCLA Section 104 allows the lead agency to respond to such actual or threatened releases of pollutants or contaminants that may present an imminent and substantial endangerment. Under CERCLA, "pollutant or contaminant" includes "any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring."

Alternatively, wherever there is a release or threatened release of a CERCLA hazardous substance, CERCLA authorizes the lead agency to respond. Although not specifically listed by name in 40 CFR Part 300, Appendix B (the reference list for specifically named hazardous substances), perchlorate is a hazardous substance wherever it is a characteristic hazardous waste under the regulatory definition of "hazardous waste" for RCRA Subtitle C purposes, i.e. wherever it has been abandoned or disposed of and meets any of the four RCRA characteristic tests at the time of its abandonment or disposal.

- RCRA Section 7003 allows EPA to take action when solid or hazardous wastes meeting the statutory definitions may present an imminent and substantial endangerment to health or the environment. The statutory definition of hazardous waste under RCRA includes "a solid waste or combination of solid wastes which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in serious irreversible, or incapacitating reversible illness or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of."

To summarize, there are numerous "regulatory drivers" for the remediation of perchlorate in the environment. Which and how many of those drivers apply requires a fact-dependent inquiry into how the chemical entered the environment, and what kind of receptors may be impacted.

2. How are sampling or cleanup levels determined?

The Interim Assessment Guidance for Perchlorate issued by EPA's Office or Research and Development (ORD) on June 18, 1999 states that its guidance to EPA risk assessors and risk managers is to utilize a Reference Dose (RfD) range of 0.0001 mg/kg-day to 0.0005 mg/kg-day for perchlorate-related assessment activities. The ORD guidance further states that "... by applying the standard default body weight (70 kg) and water consumption level (2 L/day), the resulting provisional clean-up levels or action levels would range from 4-18 parts per billion (ppb)..." for adults. Levels for "at-risk" populations (infants, children, pregnant women, elderly or sick individuals) should typically be lower. **http://www.epa.gov/region01/mmr/perchlorate1.pdf** Some states have issued their own advisory level which is to be followed by federal, state agencies or any private party involved in the evaluation and clean up of perchlorate. Some states have set their levels lower than the EPA provisional action level, e.g., New Mexico and Massachusetts have advisory levels set at 1 ppb.

3. Can Method 314.0 be improved?

EPA Method 314.0, as published in March 2000, was developed to achieve a Reporting Limit (RL) of 4.0 ug/L and a Method Detection Limit (MDL) of 0.53 ug/L, which supports the provisional RfD cited in the ORD Interim Guidance. Commercial laboratories, if requested, can modify Method 314.0 to obtain lower Reporting Limits without a loss of Quality Assurance/Quality Control (QA/QC). This was recently done at the Massachusetts Military Reservation site. At this site, the National Guard Bureau (NGB) requested two commercial laboratories to achieve Reporting Limits of 1.0 ug/L using Method 314.0. The laboratories quickly achieved the lower Reporting Limit (and lower Method Detection Limits of 0.35 and 0.43 ug/L), using steps which were overseen and approved by EPA and NGB contractor QA Chemists (see attached). In addition, Method 314.0 can identify lower levels of perchlorate without the presence of "false positives" if the calibration standard is lowered and the samples are purified prior to testing in order to remove other compounds that could affect the analytical results. There are other methods that have been developed by EPA and other agencies that can detect perchlorate at much lower levels, such as Mass Spectrometry and Liquid Chromatography, however, Method 314.0 is the only method approved by EPA.

4. Is Ammonium Perchlorate the only type of perchlorate that should be

of concern?

Perchlorate is an anion found in the environment as a result of the dissolution of a solid salt or perchloric acid. These salts include but are not limited to ammonium, potassium, magnesium, and sodium perchlorate. However, the original chemical form of the perchlorate is irrelevant to environmental concerns, since perchlorate contamination has resulted from various chemical forms other than ammonium perchlorate. Neither the toxicological assessment nor analytical method distinguish between the forms of perchlorate. We feel your guidance should be more generic to the family of perchlorate, as the previous and current Toxicological Review and Risk Characterization was entitled *Perchlorate Environmental Contamination* not Ammonium Perchlorate Environmental Contamination.

5. What is occurring around the country in regards to perchlorate?

Due to the relative recent attention that perchlorate has received, at nearly every site which is suspected to or does have perchlorate contamination, the circumstances of that site's perchlorate contamination will have unique variables not encountered at other sites. This variability is due to the methods in which the perchlorate was handled or disposed of, where it was disposed of, and the duration of these practices. As a result each individual site's sampling and cleanup levels and methods have varied. Another factor that must be considered when deciding on sampling and cleanup methods is whether the state has issued its own advisory level for perchlorate. As mentioned above, if it has, then the state will want any sampling and cleanup to meet the levels that it has set.

In regards to site specific examples, at the Massachusetts Military Reservation, (MMR) the state of Massachusetts has set it a safe drinking water level for the adjacent Town of Bourne at 1.0 ppb, that EPA has accepted. This level has been established by considering the consumption of contaminated water by children and pregnant women, who are most susceptible to the negative effects of perchlorate, rather than by utilizing the standard adult exposure calculation. Under EPA administrative orders, the use of high explosive and training artillery, smoke devices, pyrotechnics, and flares at MMR has been halted. Many different munitions in each of the above categories contain some form of perchlorate.

At Fort Wingate Army Depot in New Mexico, risk calculations involving perchlorate consumption were conducted and incorporated into the Site Assessment (SA). Current monitoring levels have found levels of perchlorate as high as 2,860 ppb in groundwater and 7,790 ppb in soil.

At Aberdeen Proving Grounds in Maryland, perchlorate has recently been found in many wells and sampling locations at levels ranging from 5-20 ppb. Contamination has also been confirmed in three production wells serving the town of Aberdeen at levels between 1 and 2 ppb. This perchlorate contamination is likely the result of historic and current training activities involving smoke grenades, flares and other pyrotechnics. The production wells function at a rate of hundreds of gallons per minute that suggests there must be a fairly large amount of perchlorate in the subsurface in order to maintain contamination levels of 1-2 ppb at a flow rate of several hundred gallons per minute. The Region is developing a clean-up level that will be based on current studies and sensitive receptors.

6. What revisions should be made to the guidance language regarding sampling?

EPA suggests that the language under guideline (d.):

" Any self-initiated Perchlorate sampling carried out by an installation should be performed in accordance with a site-specific sampling plan. If sampling is being conducted at request of a regulatory agency pursuant to a lawful access and inspection authority, the installation is to provide access to such agency at reasonable times to inspect and gather samples. Where applicable, installations should request split samples to be processed and analyzed with Component funds in accordance with EPA approved or requested methods."

7. What changes should be expected regarding perchlorate in the near future?

The revised Toxicity Assessment Report on perchlorate is expected by the end of FY 02. This report will likely set a new RfD

that when used in risk assessment calculations, will result in action levels substantially lower than the current provisional action level range of 4 - 18 ppb.

I hope this information will be of assistance when considering the language and content of the draft DOD interim guidance. If you have any questions, please feel free to contact Joshua Barber, FFRRO, at 703-603-0265 or Bernadette Rappold, FFEO, at 202-564-4387.

Sincerely,

James Woolford, Director
Federal Facilities Restoration and Reuse Office

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