DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

DAIM-ZA

JUN 11 2004

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Department of Army Guidance for Assessing Potential Perchlorate Contamination

1. Reference. Memorandum from Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), *Interim policy on Perchlorate Sampling,* September 29, 2003 (Enclosure 1).

2. This memorandum applies to all Army facilities and Formerly Used Defense Sites (FUDS) located within the United States and provides Garrison Commanders, Field Office Directors for Base Realignment and Closure (BRAC) installations, the State Adjutants General for Army National Guard facilities and District Commanders for FUDS with guidance to implement the Department of Defense (DoD) *Interim policy on Perchlorate Sampling* (Reference). It also provides the Army with a consistent framework for programming and planning of potential perchlorate contamination resulting from ongoing activities, as well as past practices, and for reporting and tracking of perchlorate data.

3. No Federal regulatory standards (i.e., discharge standards or maximum contaminant level under the Clean Water Act, Safe Drinking Water Act, Comprehensive Environmental Response, Compensation, and Liability Act or Resource Conservation and Recovery Act) have been established for perchlorate, and only a few states have adopted perchlorate action levels. However, perchlorate is on track for future regulatory action at both the national and state levels. Federal and state regulators are asking Army facilities to sample and assess for the presence of perchlorate on, or emanating from, their facilities.

4. The Department of the Army guidance (Enclosure 2) provides the appropriate Commanders and Directors of Army programs and facilities, to include FUDS, with instructions for implementing the DoD policy. It also provides instructions for reporting of data to HQDA. This guidance applies to all active and reserve installations, BRAC Army installations and excess properties, Army National Guard and FUDS located within the United States and its territories.

5. OACSIM point of contact is Mr. Malcolm Garg, 703-601-0513, malcom.garg@hqda.army.mil.

2 Enclosures

LARRY J. LUST
Major General, GS
Assistant Chief of Staff
for Installation Management

DISTRIBUTION:
DIRECTOR, INSTALLATION MANAGEMENT AGENCY (SFIM-OP-E)(SFIM-AR-E), 2511 JEFFERSON DAVIS HIGHWAY, ARLINGTON, VA 22202
COMMANDER, US ARMY CORPS OF ENGINEERS (CECS/CELD-ZE), 441 G STREET, NW, WASHINGTON, DC 20314-1000
CHIEF, NATIONAL GUARD BUREAU (NGB-ARE), ARMY NATIONAL GUARD READINESS CENTER, 111 SOUTH GEORGE MASON DRIVE, ARLINGTON, VA 22204-1382
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT (DAIM-BO), 600 ARMY PENTAGON, WASHINGTON DC 20310-0600
HQ, U.S. ARMY MATERIAL COMMAND (AMCPE), 9301 CHAPEK ROAD, FORT BELVOIR, VA 22060-5527
US ARMY MEDICAL COMMAND (MCFA-E), 2050 WORTH ROAD, FORT SAM HOUSTON, TX 78234-6000
US ARMY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND (MTPAL-FE), HOFFMAN BUILDING II, 200 STOVALL STREET, ALEXANDRIA, VA 22332-5000
US ARMY SPACE AND MISSILE DEFENSE COMMAND (SMDC-EN), POST OFFICE BOX 1500, HUNTSVILLE, AL 35807-3801

CF:
DEPUTY ASSISTANT SECRETARY OF THE ARMY (ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH)
DAIM-ED
DAMO-TRS
DALO-SMA
ENVIRONMENTAL LAW DIVISION (JALS-EL), OFFICE OF THE JUDGE ADVOCATE GENERAL
ARMY ENVIRONMENTAL CENTER (SFIM-AEC-TSO/CDS), BUILDING 4480 ABERDEEN PROVING GROUND, EDGEWOOD, MD 21010
HQ, US ARMY JOINT MUNITIONS COMMAND (SFSJM-LGE), G4, ENVIRONMENTAL FACILITIES DIVISION, 1 ROCK ISLAND ARSENAL, ROCK ISLAND, IL 61299-6000
(CONT)

CF: (CONT)
DIRECTOR, US ARMY CHEMICAL MATERIALS AGENCY (AMSCM-RDE), 5183 BLACKHAWK ROAD, BUILDING E4517, ABERDEEN PROVING GROUND, MD 21010-5424
ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE (MCHB-CS/MCHB-DC-EHM), ABERDEEN PROVING GROUND, MD 21010-5422
US ARMY TEST AND EVALUTATION COMMAND (CSTE-ILE), 4501 FORD AVENUE, ALEXANDRIA, VA 22302-1458
US ARMY RESERVE COMMAND (AFRC-CS), 1401 DESHLER STREET, SW, FT MCPHERSON GA 30330-2000

IMA REGIONAL OFFICES:
INSTALLATION MANAGEMENT AGENCY (SFIM-NE), NORTHEAST REGION, 5A NORTH GATE ROAD, FORT MONROE, VA 23651-1048
INSTALLATION MANAGEMENT AGENCY (SFIM-SE), SOUTHEAST REGION, 1593 HARDEE AVENUE, SW, BUILDING 171, FORT MCPHERSON, GA 30330-1057
INSTALLATION MANAGEMENT AGENCY (SFIM-NW), NORTHWEST REGION, 1 ROCK ISLAND ARSENAL, ROCK ISLAND, IL 61299
INSTALLATION MANAGEMENT AGENCY (SFIM-SW), SOUTHWEST REGION, 1204 STANLEY ROAD, SUITE 9, FORT SAM HOUSTON, TX 78234-5009
INSTALLATION MANAGEMENT AGENCY (SFIM-PA), PACIFIC REGION, FT SHAFTER, HI 96858-5000

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

SEP 2 9 2003

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT, AND LOGISTICS)
DEFENSE LOGISTICS AGENCY (DSS-E)

SUBJECT: Interim Policy on Perchlorate Sampling

There are a number of actions that the Department of Defense (DoD) has undertaken to address perchlorate in drinking water, including monitoring for perchlorate through the Safe Drinking Water Act's (SDWA) Unregulated Contaminant Monitoring Rule (UCMR), monitoring surface water discharge under the Clean Water Act (CWA) at States' requests, and collection of data on occurrence of perchlorate at Defense Environmental Restoration Program (DERP) sites. Given recent public concerns over possible risks associated with perchlorate, the Department believes it is appropriate to take additional measures to assess the extent of perchlorate occurrence at active and closed installations, ranges, and Formerly Used Defense Sites (FUDS). Towards that end, DoD Components shall continue to consolidate existing perchlorate occurrence data, and shall sample any previously unexamined sites where a perchlorate release is suspected because of DoD activities and where a complete human exposure pathway is likely to exist. DoD Components shall establish and maintain databases containing the information listed in the enclosed spreadsheets described in each section below. This policy supercedes the DoD November 13, 2002, memorandum; *Perchlorate Assessment Policy*.

I. SDWA

The UCMR (40 CFR Parts 9, 141, 142) mandates that all community and non-transient non-community water systems serving more than 10,000 people, as well as smaller systems selected by the U.S. Environmental Protection Agency (EPA), monitor for specific contaminants, including perchlorate. Some military installations are subject to the UCMR and, therefore, should be testing for the presence of perchlorate and reporting the results to EPA and state regulators, as appropriate. UCMR sampling and reporting is a Class 1 compliance-funding requirement. This requirement is not applicable to FUDS.

ENCLOSURE 1

Each Component shall establish and maintain a database of UCMR sampling activities. The database shall include installation identification information, all data points collected, and, at a minimum, the information listed in enclosure 1. DoD Components shall work with the DoD SDWA Services Steering Committee in compiling a consolidated DoD report of UCMR sampling results by January 31, 2004.

II. CWA

Several states require some military installations to monitor for perchlorate under the CWA National Pollutant Discharge Elimination System (NPDES) permit program. Sampling and reporting in compliance with an NPDES permit is a Class 1 compliance-funding requirement. This requirement is not applicable to FUDS.

Each DoD Component shall establish and maintain a database of sampling data (by discharge point) for those permitted discharges that have a perchlorate reporting requirement in their NPDES permit, or other state requirement to monitor for perchlorate. The DoD Components shall list every NPDES discharge point required to monitor for perchlorate. The database will contain, at a minimum, the information listed in enclosure 2. DoD Components shall work with the DoD CWA Services Steering Committee in compiling a consolidated DoD report of NPDES sampling results by January 31, 2004.

III. Environmental Restoration

DoD Components shall continue to consolidate existing perchlorate occurrence data at DoD active or closed installations, non-operational ranges, and FUDS. For these categories, DoD Components shall also program resources and sample for the presence of perchlorate at any previously unexamined site where there is a reasonable basis to suspect that a release has occurred as a result of DoD activities and where a complete human exposure pathway is likely to exist. DoD Components shall consult with their office of counsel to determine an appropriate course of action with regard to sampling at sites involving potentially responsible parties other than DoD.

In determining the likelihood of perchlorate occurrence, DoD Components should consider the volume of perchlorate used, or disposed, and/or the intensity of perchlorate related activities at the site. Activities that could potentially contribute to perchlorate occurrence include, but are not limited to:

a. The manufacture/maintenance of missiles, rockets and/or munitions containing perchlorates;
b. The use of perchlorate-containing munitions for training or testing purposes;
c. The demilitarization of perchlorate-containing munitions using techniques, such as "hog-out" of rockets and missiles containing solid propellant; and,
d. Open burning/open detonation operations.

In assessing potential pathways of exposure, DoD Components should consider whether there are:

a. Drinking water sources likely to be impacted by ground water or surface water on or leaving the active or closed installation, non-operational range, or FUDS; and/or,
b. Drinking water systems on or near the active or closed installation, non-operational range, or FUDS that are listed on EPA's UCMR database.

Each DoD Component shall establish and maintain a database of existing data and the data collected pursuant to this policy at active and closed installations, non-operational ranges, and FUDS. The database will include, at a minimum, the information listed in enclosure 3. DoD Components shall work with the DoD Cleanup Committee in compiling a consolidated DoD report of sampling results by January 31, 2004.

IV. Funding

DoD Components may only use environmental restoration funding for sampling activities that meet DERP eligibility requirements described in the current version of the DERP Management Guidance. Under DoDI 4715.6, "Environmental Compliance," perchlorate sampling is an Environmental Quality Status Class I requirement.

V. Ranges

Assessing operational ranges for the potential for off-range migration of perchlorate is consistent with the Munitions Action Plan and the Defense Planning Guidance (DPG) requirements. The DPG requires the Secretaries of the Military Departments to assess potential hazards from off-range migration of munitions constituents. This policy memorandum requires the Military Departments to include perchlorate in future range assessments.

VI. Other Related Efforts

Currently EPA has only one approved method for testing for the presence of perchlorate. This method (Method 314.0) is only approved for testing drinking water. Alternative test methods have proven to be more accurate and reliable for other media (i.e., soil, sediment, groundwater, etc.). Therefore, DoD Components are required to develop guidance for appropriate testing methodologies for perchlorate in other media. If alternative sampling protocols are used, the method must be documented in the enclosed spreadsheets.

In addition, DoD Components shall continue to work together to develop and demonstrate new technologies for treatment and cleanup of perchlorate. I appreciate your support for these important efforts.

Philip W. Grone
Principal Assistant Deputy Under Secretary of Defense
(Installations and Environment)

Enclosures:
1. UCMR Spreadsheet
2. NPDES Spreadsheet
3. Site Sampling Spreadsheet

Department of Army Guidance for Assessing Potential Perchlorate Contamination

1. Authorities

a. This Guidance implements and supplements the Department of Defense (DoD) Interim Policy on Perchlorate Sampling issued on 29 Sep 03 by the Principal Assistant Deputy Under Secretary of Defense (Installations and Environment) (PADUSD(I&E)).

b. This guidance supersedes the Department of Army Guidance for Addressing Potential Perchlorate Contamination issued 27 Jun 03.

2. Purpose. To provide the Army with a consistent framework for programming and planning for assessment of potential perchlorate contamination resulting from ongoing activities, as well as past practices, and for reporting and tracking of perchlorate data.

3. Applicability. This guidance applies to all Army facilities and Formerly Used Defense Sites (FUDS) located within the United States. For the purpose of this guidance, these locations will be referred to as "defense sites".

4. This Guidance outlines:

a. Internal Army requirements for assessing potential perchlorate contamination resulting from DoD activities at Army defense sites.

b. Guidelines for determining the existence of a likely completed human drinking water exposure pathway.

c. Guidelines for conducting sampling, where warranted, prior to promulgation of a health-based standard by Federal or state regulators.

d. Funding authorities available for programming and planning to assess and sample potential perchlorate contamination.

e. Guidelines for reporting of data to Headquarters Department of the Army (HQDA).

5. The Army will adhere to, and comply with, any Federal legal requirements to sample, assess, or otherwise respond to suspected perchlorate contamination. The Army will also adhere to, and comply with, any state legal requirement to sample, assess, or otherwise respond to suspected perchlorate contamination to the extent that Congress has clearly and unambiguously authorized a waiver of sovereign immunity for this purpose. The appropriate Commanders and Directors for the defense sites will determine, in consultation with legal counsel, if any Federal, state or local statutes and/or regulations are applicable to their defense site. Any perchlorate sampling or response required by Federal, state, or local laws and regulations should be implemented, to the extent

ENCLOSURE 2

possible, consistent with the guidance below, to include the notification of perchlorate sampling and the reporting of data.

6. In the absence of an applicable legal driver, the Army shall plan and program resources to sample and assess for potential perchlorate contamination if all the following conditions are satisfied (Note: See section 14 of this guidance for special reference to operational ranges):

a. A reasonable basis exists to suspect a potential release of perchlorate has occurred as a result of DoD activities at the defense site;

b. A complete human exposure drinking water pathway is likely to exist;

c. Sampling plans and assessments are coordinated with the defense site's chain-of-command and approvals of sampling actions are received from a Flag Officer or equivalent in the defense sites chain-of-command. HQDA, DAIM-ED (Office of the Director, Environmental Programs (ODEP)) will be notified within 72 hours after sampling approval has been granted as described in section 9. d. of this guidance.

7. Basis for determining potential releases and likely complete pathways.

a. Determining the potential for perchlorate contamination: Defense sites may have the potential for perchlorate contamination if the defense site has a history of perchlorate use by a DoD component. This includes DoD manufacture of missiles, rockets and/or munitions containing perchlorates; DoD use of perchlorate-containing munitions for training or testing purposes; DoD demilitarization of perchlorate-containing munitions, such as the hogging-out of rockets and missiles containing solid propellant and the use of open burn/open detonation (OB/OD) operations; and other DoD activities resulting in a likelihood of a perchlorate release. To the extent feasible, information should be collected on the DoD perchlorate-related activity, on the intensity of the DoD activity and on the likelihood of a perchlorate release. The appropriate Commander or Director for the defense site is responsible for determining current and historical uses of perchlorate by DoD.

b. Determining the likelihood of a complete human drinking water exposure pathway: Perchlorate must be ingested to affect human health. Therefore, to determine if a complete pathway exists, an assessment must be made for the likelihood of perchlorate ingestion. The public may ingest perchlorate from drinking perchlorate-contaminated water and/or by ingesting certain foods that retain perchlorate when irrigated with perchlorate-containing water. To determine if a complete human exposure pathway is likely to exist, defense sites shall do the following:

(1) Review existing documentation of environmental and/or hydrogeological investigations performed at the defense site to determine the environmental factors that influence perchlorate transport (e.g., downgradient direction of groundwater from the installation).

(2) Determine if there is any drinking water source currently in use for human consumption that may be impacted by groundwater or surface water on or leaving the defense site.

(3) Determine if any drinking water systems on or near the defense site are listed in the EPA Unregulated Contaminants Monitoring Rule (UCMR) database at http://www.epa.gov/ogwdw000/data/ucmrgetdata.html and determine if the drinking water system has sampled for and/or detected perchlorate.

(4) Work with regulators and the public, as appropriate, to identify potential human drinking water exposure scenarios and pathways to any downgradient residence on a private water supply that may be impacted.

c. Conflict Resolution: Should the public or regulator disagree with the Army regarding potential perchlorate contamination and/or possible exposure routes, the issue will be elevated for resolution to HQDA/ODEP for all defense sites with the exception that Base Realignment and Closure (BRAC) controlled properties will report to HQDA/BRAC office (BRACO) and FUDS to Headquarters United States Army Corps of Engineers (HQUSACE). Decisions by HQDA/BRACO and HQUSACE shall be coordinated with HQDA/ODEP to ensure that a consistent Army position is maintained.

8. Risk Communication: Before the sampling stage of a perchlorate assessment begins, each installation will develop a risk communication strategy based on interviews with affected stakeholders to assess interests and concerns. The strategy will provide for on-going interaction and information sharing among stakeholders throughout the assessment process. Assistance in developing strategies can be obtained through the risk communication office of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). (Contact information can be found in Appendix B)

9. Approval of sampling plans, coordination, and notification:

a. If perchlorate sampling is required by an applicable legal driver (e.g. discharge permit, UCMR, Resource Conservation and Recovery Act, etc.) then special coordination and approval is not required; however, defense sites must still notify their chain-of-command of such activities and report the results to HQDA as provided in section 13.

b. Approval of perchlorate sampling activities not mandated by a legally promulgated driver must be obtained from a Flag Officer or equivalent in the defense sites chain-of-command. For defense sites supported by the Installation Management Agency (IMA), approval will be from the first Flag Officer or equivalent within the IMA chain of command; all other defense sites will secure approval through the MACOM chain of command, or through the Army National Guard (ARNG) or FUDS chain-of-command as appropriate.

c. Coordination of perchlorate sampling plans not mandated by a legally promulgated driver will be coordinated with the appropriate environmental command.

- All plans for perchlorate sampling occurring under the Defense Environmental Restoration Program (DERP) shall be coordinated with the appropriate US Army Environmental Center (USAEC) entity responsible for the DERP site.

- Defense sites that lack sufficient environmental resources to undertake such actions should contact and coordinate with USAEC.

- For perchlorate sampling occurring in areas with mission essential activities (i.e. manufacturing and assembly areas, Open Burn/Open Detonation areas) coordination of sampling plans will be with the authority designated by the installation's major command (MACOM) or major subordinate command (MSC) to oversee perchlorate activities.

d. Notification of perchlorate sampling activities not mandated by a legally promulgated driver: Within 72 hours of receiving approval of perchlorate sampling notification shall be made electronically through the defense sites chain-of-command to the HQDA/ODEP at acsimodepmc.hqda.army.mil. The notification will outline:

(1) Reasons for suspecting the perchlorate contamination

(2) Description of DoD activities resulting in the potential perchlorate contamination at issue

(3) Reasons for suspecting a likely completed human drinking water exposure pathway

(4) Brief outline of the scope of work and approximate cost of investigation

(5) Note the type of funding to be used for this effort. (i.e. compliance, DERP, or other; see section 12)

10. Sampling and Analysis for Perchlorate: All sampling and analysis for perchlorate must follow the procedures and guidelines outlined in the document, "Sampling and Testing for Perchlorate at DoD Installations, Interim Guidance" found in Appendix A. Included is a "Method Discussion" section that discusses information about the applicability, limitations, costs and Quality Control (QC) issues associated with the various perchlorate detection analytical methods.

11. If Regulators sample: If a regulating agency requests to sample, the defense site should first determine if the request meets the criteria outlined in this guidance. If the determination is made that the request is consistent with this guidance then the defense

site shall consider conducting the sampling themselves consistent with this guidance. If a determination is made that the request is not consistent with criteria established in this guidance and the regulatory agency still insists on collecting samples then defense site personnel shall coordinate the request with the appropriate chain-of-command and HQDA/ODEP will be notified through command channels of issues related to the request at the onset of negotiations and prior to sampling. In the event the regulatory agency does collect samples then defense sites are encouraged and authorized to collect and analyze split samples in accordance with the approvals noted in Section 9 and sampling protocols noted in Section 10.

12. Funding. Defense sites shall plan, program and budget for perchlorate sampling under the following authorities:

a. Environmental Restoration Program funding may be used for perchlorate sampling activities that meet Defense Environmental Restoration program (DERP) eligibility requirements as described in the current version of the DERP Management Guidance.

b. Non-DERP eligible activities:

(1) Compliance driven perchlorate-sampling activities (e.g., Safe Drinking Water Act (SDWA) UCMR mandated sampling, a permit condition in a National Pollutant Discharge Elimination System (NPDES) permit, mandated RCRA sampling) are Environmental Project Requirement (EPR) Class 0 requirements.

(2) Perchlorate sampling activities that are not mandated by a permit or regulatory requirement are an EPR Class 0 requirement. Perchlorate sampling should be included in the routine on-going Class 0 sampling activity to the extent that it is consistent with the conditions outlined in this guidance. The appropriate Law/Reg to use is Multimedia (MULT) and the appropriate Environmental Category (ECAT) is Sampling, Analysis and Monitoring (SMPL) as noted in the most current "Policy and Guidance for Identifying U.S. Army Environmental Program Requirements". Further, the narrative should specifically identify the reason and driver (i.e. Army guidance) for perchlorate to be included in the sampling activity.

c. Non-DERP eligible activities for Army Special installations: Requests for funding for perchlorate sampling activities will be made through the appropriate chain-of-command and will be funded through the appropriate account of the proponent's operating budget.

d. Non-DERP eligible activities for Tenants on Army Facilities: Requests for funding for perchlorate sampling activities will be made through the appropriate chain-of-command and will be funded through the appropriate account of the proponent's operating budget.

13. Reporting: Results of perchlorate sampling will be provided to the USAEC on a semi-annual basis, mid-year and end-year. Results will be collected and forwarded by the defense sites chain-of command in the format provided to the office listed below. The mid-year submission will be made no later than 30 July and the end-year submission will be made no later than 31 December. Additionally, plans are underway to include collection of perchlorate data and information through the Environmental Quality Report (EQR) web-based data system. Defense sites will be notified when this system is in place.

- Defense sites conducting perchlorate sampling related to drinking water and/or the SDWA UCMR shall provide the information requested in Appendix C, Sheet 1, UCMR and Drinking Water. This does not apply to FUDS.

- Defense sites conducting perchlorate sampling under the Clean Water Act (CWA) such as NPDES permits (or state equivalents) shall provide the information requested in Appendix C, Sheet 2, NPDES. This does not apply to FUDS.

- All other perchlorate sampling information shall be provided as requested in Appendix C, Sheet 3, Environmental Restoration/Investigation. This does not apply to FUDS.

- All FUDS perchlorate sampling information will be provided as requested in Appendix C, Sheet 4, FUDS Program Perchlorate Sampling Information.

Submissions shall by the defense site's chain-of-command to:

US Army Environmental Center, Cleanup Division, Oversight South Branch
ATTN: SFIM-AEC-CDS
Bldg. 4480
Aberdeen Proving Ground
Edgewood, MD 21010

Electronic submissions shall be made to the USAEC perchlorate data point-of-contact listed in Appendix B and copy furnished to ODEP at acsimodepmc@hqda.army.mil

14. Operational Ranges: The USAEC is currently conducting the Regional Range Study that is designed to gather credible data on the true environmental impact of munitions residues from live fire training and testing under a variety of climatic and geological conditions. Soil, surface water, sediments, ground water and vegetation are sampled and analyzed for munitions constituents, including perchlorate. Included in these assessments will be the potential for off-range migration of perchlorate. Any additional perchlorate sampling at ranges where a range assessment is scheduled shall be coordinated with USAEC.

15. Assessment and Prioritization Strategy: The Army is developing a perchlorate assessment strategy. This strategy will provide a methodology for ranking relatively high risk and relatively low risk defense sites. Installations will be prioritized based on their

relative risk. Additionally, the perchlorate assessment strategy will describe a phased approach for assessing for perchlorate contamination. This strategy will not apply to FUDS. The FUDS program will implement a FUDS specific strategy that will employ similar methodologies along with elements that are unique to FUDS.

16. Research and Development: Research and development (R&D) projects related to the development and demonstration of new technologies for the treatment and cleanup of perchlorate are strongly encouraged. R&D projects that involve sampling and/or cleanup on defense sites will be evaluated on a case-by-case basis. If sampling, treatment, or cleanup is to take place at a defense site a summary of the R&D work plan shall be provided, through command channels, to HQDA/ODEP, HQBRACO or HQUSACE as appropriate. All R&D sampling activities will be reported as noted in Section 13.

17. This guidance is effective until either promulgation of a federal regulatory standard, or HQDA receives further guidance from the Office of the Secretary of Defense, whichever occurs first.

Appendix A – Interim Sampling Guidance

Sampling and Testing for Perchlorate at DoD installations
Interim Guidance[1]

1. Introduction/Purpose

This document provides interim guidance developed by the DoD Environmental Data Quality Workgroup (EDQW) designed to help DoD Installations comply with the 29 September 2003 DoD *Interim Policy on Perchlorate Sampling*. The EQDW is in the process of developing detailed guidance for the characterization of perchlorate under Environmental Restoration and range Assessment programs, expected to be issued late in FY04.

2. Sampling and Testing

a. Safe Drinking Water Act and Clean Water Act

Method 314.0 is the only EPA-approved method for determining perchlorate in drinking water under the Unregulated Contaminant Monitoring rule (UCMR). The use of Method 314.0 may also be mandated in NPDES permits. Method 314.0, as currently written, is not reliable for determining perchlorate in environmental matrices other than drinking water, nor is it reliable for determining perchlorate concentrations below 4ppb in drinking water. If perchlorate is detected using this method at concentrations above the regulatory or permit-specified limits, then results must be verified by alternate, definitive, performance-based methods, such as those employing Mass Spectrometry (MS) technology. If a regulatory agency requests a method reporting limit (MRL) below 4ppb, then that agency should identify (or agree to the use of) an acceptable alternate method or modified Method 314.0 that meets the quality assurance and quality control criteria defined in paragraph 2.c below.

b. Environmental Restoration and Range Assessments

When a determination is made to conduct perchlorate sampling and testing for Environmental Restoration or Range Assessment activities, installations must prepare a site-specific Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP). The QAPP/SAP must address the regulatory basis and /or reasons for suspecting perchlorate contamination, potential human-health receptors and migration pathways, sampling locations and rationales, analytical methods, action levels, and data reporting requirements. The QAPP/SAP must also address all quality assurance and quality control considerations contained in this guidance.

[1] Relevant material was excerpted from the document *Interim Guidance on Sampling and Testing for Perchlorate*, developed by the DoD Environmental Data Quality Work Group (EDQW), that is enclosed in Memorandum, dated 5 Feb 04, from Deputy Assistant Secretary of the Navy (Environment) to the Deputy Assistant Secretary of the Army (ESOH)

When conducting sampling and testing for perchlorate in groundwater, soil, sediments, or other environmental matrices, installations shall: 1) document the applicable regulatory limit or action level (i.e. concentration of concern) for each matrix being sampled, and 2) identify analytical methods that can achieve and MRL, in the matrix of concern, *at or below the specified regulatory limit or action level.* If sampling and testing activities have been requested by a regulatory agency, or are subject to regulatory oversight, then installations should secure regulatory authority approval for use of the method. The collection of split samples is strongly recommended (i.e. where a portion of each sample is sent to a second laboratory).

In most cases, Method 314.0 will not be suitable for use in analyzing environmental samples under environmental restoration or range assessment activities, and either a modified Method 314.0 or alternate method should be used. If Method 314.0 or its modifications are used, then any results detected above the regulatory limit or action limit must be confirmed using definitive analytical methods, (e.g. those employing mass spectrometry (MS)).

c. Analytical Quality Assurance and Quality Control (QA/QC)

Regardless of the method used, method QA/QC requirements, including calibration procedures and procedures for documentation of the MRL, must be equivalent to or more stringent than those specified in Method 314.0. Each laboratory must document a MRL *in the specific matrix of concern* that is at or below the regulator-specified action level. The MRL cannot be lower than the lowest calibration standard. Ideally, the action level should be at least three times (3x) the MRL. Laboratories must provide data to demonstrate that laboratory glassware, regents, and solutions are free from contamination by perchlorate. [Note: a large commercial laboratory recently reported perchlorate contamination in some detergents used to clean laboratory glassware.]

3. Laboratory Qualifications

All laboratories selected to perform perchlorate analysis shall comply with the current *DoD Quality Systems Manual for Environmental Laboratories* (DoD QSM), which is available on the Navylabs website (www.navylabs.navy/manualsdocs.htm). In addition, the laboratories must demonstrate proficiency to perform the test method through one of the following; 1) accreditation under the National Environmental Laboratory Accreditation Program (NELAP), 2) applicable State certification(s), and/or 3) an approval process established by the Component. When perchlorate analysis is to be performed by methods other than 314.0, or if Method 314.0 is to be modified, the laboratory must provide, at a minimum, the Method Standard Operating Procedure (SOP), Demonstration of Capability at the Action Level, and Performance Testing (PT), Method Detection limit (MDL), and Precision Accuracy studies for approval by the Component or designee.

4. Reporting and Follow-on Actions

All reported data must meet requirements specified in the DoD QSM. Before reporting any perchlorate results, whether in drinking water or any other matrix, all perchlorate results must be validated by a party independent of the sampling and testing process. Reported data must meet quality assurance/quality control specification contained in the applicable method, SOP, QAPP/SAPP, and DoD QSM, to ensure that the results are suitable for use.

5. Method Discussion

This discussion purports to provide information about applicability, limitations, costs, and QC issues for methods described in the presentations. The following discussion divides methods into three categories: 1) Ion Chromatography (IC)/Conductivity (compliant with Method 314.0); 2) Enhanced Ion Chromatography/Conductivity (Modified Method 314.0), and 3) IC- Liquid Chromatography/Mass Spectrometry (IC-LC/MS) and IC- Liquid Chromatography/Dual Mass Spectrometry (IC-LC/MS/MS). [Note: While there is general agreement concerning the following technical issues, this summary is preliminary and does not represent formal consensus by the EDQW)

a. Ion Chromatography/Conductivity (Compliant with Method 314.0)

Applicability

- Use is mandatory for drinking water samples under the Unregulated Contaminant Monitoring Rule (UCMR)
- Suitable for use when:
  - Samples contain low dissolved solids (conductivity<1milliSiemens/cm [mS/cm] Total Dissolved Solids[TDS]) and chloride, sulfate, and carbonate concentrations < 100 parts-per-million (ppm) each
  - There is a confirmed source of perchlorate at concentrations exceeding the Method reporting Limit
  - Used as a screening method, subject to confirmation by definitive technology
- Reporting limit: 0.5 – 5 parts-per-billion (ppb)

Limitations

- Analysis is subject to false positives due to the unspecific nature of the conductivity detector
- Inappropriate for use in samples with high TDS
- The lower reporting limit of 0.5 ppb is achievable only in samples with very low TDS
- Confirmation of perchlorate by specific method is required
- Method has been validated in drinking water only; no guidance provided for use with soils, solids

Cost/Availability

- Widely available
- Instrument cost: $40 - 65K
- Per-sample analytical cost: $60 – 125 (extra for confirmatory analysis)
- Operator qualifications and experience: BS chemist
- Capacity: 500 samples/mo/instrument
- Run time: approximately 15 – 20 min/sample
- Maintenance: 6-8 hrs per 1000 samples

Recommended Quality Assurance and Quality Control

- Determine maximum conductivity threshold (MCT) at reporting limit
- Conduct MDL study at MCT
- Signal to Noise ratio: 5:1 at RL and 3:1 at MDL
- Lowest calibration standard at or below RL
- MS/MSD and LCS spike concentrations should be close to level of concern
- Continuing calibration verification sample (CCV) after every 10 field samples
- Surrogate or internal standard in each sample to check for retention time shifts

b. Enhanced Ion Chromatography/Conductivity (Modified Method 314.0; proposed method 314.1)

Applicability

- Can accommodate more difficult matrices
  - Samples with up to 10mS/cm TDS
- Reporting limit: 0.5 – 1 ppb
- Reduces false positives
- Second column aids in confirmation
  - 2nd channel method offers built-in confirmation

Limitations

- Lower reporting limit: 0.5 ppb
- False positives will be reduced but not eliminated
- No EPA-approved methods

Cost/Availability

- Initial set-up instrument cost: $75- 100K
- Modification to existing 314.0 set-up: $10K
- Per-sample analytical cost: $75- 150
- Pre-concentration columns not widely available
- Currently 6 -12 laboratories are able to use pre-concentration

- Start up time to implement this method: 6-8 months
- Operator qualifications and experience: Bachelor of Science chemist plus 1 year experience in LC or IC
- Run time: 30 min
- Maintenance: Somewhat higher than maintenance costs for standard IC, depending on the nature of the instrument modifications

Recommended Quality Assurance/Quality Control

- Same as method 314.0

c. IC-LC/MS (proposed Method 330.0), IC-LC/MS/MS (proposed method 331.0)

Applicability

- Much greater sensitivity (RL approx. 200part-per-trillion (ppt); MDL approx. 50 ppt)
- Eliminates matrix interferences (false positives)
- High confidence in compound identification with IC/MS
- Extremely high confidence with IC/MS/MS

Limitations

- Few available (2 – 4 laboratories have the instrumentation)
- Need to monitor accuracy in every sample due to ionization suppression which can result in low bias
- Need to monitor for cone fouling
- No EPA-approved methods

Cost/Availability

- Instrument cost: IC-LC/MS $150- 175K; IC-LC/MS/MS $250- 300K
- Per-sample analytical cost: $120-250
- Approximately 4-6 commercial laboratories currently have this instrumentation
- Limited availability of internal standards
- Analysis requires a highly knowledgeable analyst with experience in LC and MS
- Maintenance contract: 10% capital cost per year
- Operator qualifications and experience: Master of Science Chemist
- Anticipated availability in August 2004

Recommended Quality Assurance/Quality Control

- Signal-to-noise ratio should be 5:1 at reporting level
- Lowest calibration standard should be run at or below reporting level
- Isotope radio monitoring
- Daily MS tuning check standard must be run
- MS/MSD and LCS should be run at level of concern

- Continuing Calibration Verification sample should be run every 10 samples
- A QC sample must be run to monitor for cone fouling
- A QC sample must be run to check shifts in retention time
- A QC sample must be run to monitor for low-level standard suppressions
- Specify best run sequence

6. Summary/Conclusions

a. Positive results for perchlorate using Method 314.0 should be confirmed because the conductivity detector is non-selective. False positive results have been shown to occur due to interferences from numerous sources.

b. While modifications to Method 314.1 can be effective at reducing background interference, improving method ruggedness for use with higher dissolved solid matrices, the modifications do not improve method selectivity. The only way to improve selectivity is to use an alternative detection technology (e.g. mass spectrometry)

c. The lower reporting limits for ion chromatographic methods, including Method 314.0 and its modifications, ranges from 0.5 to 5 ppb. The lower reporting limit for methods employing MS ranges from 50 to 200 ppt.

Appendix B
Perchlorate Information Points of Contacts

Defense site staffs are encouraged to contact and coordinate with the following Army POCs for Perchlorate Issues.

- **Office of the Director of Environmental Programs (ODEP)** – Munition constituent issues and perchlorate sampling notification, acsimodepmc@hqda.army.mil; Malcolm Garg, Training and Support Division, 703-601-1513, malcom.garg@hqda.army.mil; Robert Ross, Cleanup, 703-601-1597, robert.ross@hqda.army.mil.
- **Installation Management Agency (IMA)** – Angela Atkins, 703-602-0741, angela.atkins@hqda.army.mil
- **Base Realignment and Closure Office (BRACO)** – Ricky Stauber, 703-697-0130, ricky.stauber@hqda.army.mil.
- **US Army Corps of Engineers (USACE) –** Jeffrey Waugh, 202-761-7263, jeffrey.h.waugh@hq02.usace.army.mil
- **Army National Guard (ARNG) –** Randall Nida, 703-607-7961, Randall.Nida@ngb.army.mil.
- **Army Materiel Command (AMC)** – Ranjit Sharma, 703-806-8728, ranjit.sharma@us.army.mil
- **Joint Munitions Command (JMC)** – Sally Gaines, 309-782-0032, sally.n.gaines@us.army.mil
- **US Army Environmental Center (USAEC)** – Steve Starbuck, 410-436-1612, steve.starbuck@us.army.mil; Michael Dette, 410-436-1626, michael.dette@aec.apgea.army.mil.
- **Perchlorate Data Submission, USAEC - Derek Romitti,** (410) 436-1506, DSN: 584-1506, derek.romitti@aec.apgea.army.mil,,
- **Risk Communication (USACHPPM)** - Roxanne Smith, 410-436-4851, roxanne.smith@apg.amedd.army.mil
- **Environmental Law Division (ELD)** – Captain Roburt Yale, 703-696-1569, roburt.yale@hqda.army.mil.
- **Defense Ammunition Center (DAC)** - Ed Ansell, 918-420-8081, eddie.ansell@dac.army.mil. Aaron Williams, 918-420-8605, aaron.williams@dac.army.mil.
- **Public Affairs Office (PAO)** – Robert DiMichele, 410-436-1651, robert.dimichele@aec.apgea.army.mil

Appendix C - Sheet 1

ARMY UCMR and Drinking Water Perchlorate Data

Program	Installation Name	State	EPA Region	Date(s) Sampling Conducted	DW Source (Surface or Groundwater)	Sample Collection Location**	Additional Sampling Planned	Expected Date of Next Sampling	Regulatory Driver Cited*	Perchlorate Sampling Results (ppb)*	Sampling/ Analytical Method	Comments or References	POC (name, phone, e-mail)
IMA/NERO	Aberdeen Proving Ground	MD	3	12/17/2002	GW	Finished water	Yes	12/26/2002	Maryland Department of the Environment Advisory level in finished water	ND	EPA 314-M	Finished Drinking water sampled for City of Aberdeen. Water source is GW emanating from aquifer under APG trailing field. APG and City alternate sample collection. MRL is 1 ppb. ND is < 1 ppb	
IMA/NERO	Aberdeen Proving Ground	MD	3	12/26/2002	GW	Finished water	Yes	12/31/2002	Maryland Department of the Environment Advisory level in finished water	ND	EPA 314-M	Finished Drinking water sampled for City of Aberdeen. Water source is GW emanating from aquifer under APG trailing field. APG and City alternate sample collection. MRL is 1 ppb. ND is < 1 ppb	
IMA/SERO	Fort Gordon	GA	4	09/09/2003	GW/SW	Surface Water Plant and Range Control Well	yes	12/09/2003	UCMR	ND	EPA 314.0	Sampling and analysis conducted by GA EPD-WPB	
IMA/SERO	Fort Gordon	GA	4	12/09/2003	GW/SW	Surface Water Plant and Range Control Well	no	n/a	UCMR	ND	EPA 314.0	Sampling and analysis conducted by GA EPD-WPB	
IMA/NERO	Aberdeen Proving Ground	MD	3	6/2002 - present	GW	Well head for City Production CAP 3	Yes	Weekly untill mid 2003, bi-weekly since then	For Maryland Department of the Environment Advisory level in finished water	ND to 1.8	EPA 314-M	Production wells that supply the City of Aberdeen. Wells 7, 8, 9, and 10 are located on installation. Detections have been found in wells 3, 6, 9, 10. MRL has ranged from 5 ppb to 1 ppb - 1ppb MRL was started in July 23, 2002. ND is < MRL	

EXAMPLE

Appendix C, Sheet 2

National Pollutant Discharge Elimination System (NPDES)

Program	Installation Name	State	EPA Region	NPDES Permit # and Type	Legal Basis for Including Prechlorate in the Permit	Sampling Frequency	Permit Limit or Requirement	Sample Collection Location	Sample Results (ppb) range last 12 months	Average Sampling Results (ppb) last 12 months	Analytical Method/ Method Reporting Limit (MRL)	Comments on Sampling Requirement	POC (name, phone, e-mail)
AMC-JMC	Lone Star Army Ammunition Plant	TX	6	TPDES permit - Storm Water; #02263 issued 12/16/02	TPDES	4 times during storm water events	4 ppb	Surface water discharge from High Explosive Demolition Ground and High Explosive Burning Ground	ND	ND	314.0/ 4 ppb	Perchlorate added to TPDES because perchlorate was discoved at neighboring installation, RRAD. If perchlorate is discovered at LSAAP state will require submition of a Pollution Prevention Plan for the Control of Perchlorate within 180 days after detectio	
ARNG	Camp Navajo	AZ	9	982347	Storm Water, NPDES	1/month	10ppb	effluent	0.9 to 39 ppb	3 ppb	314.0/ 4 ppb	Perchlorate was added to the NPDES stormwater discharge permit related to former OB/OD areas. The potential for perchlorate release comes from past uses of M7 propellant disposal at the former OB areas and de-militarization of M155 rockets at the former OD Area	
IMA/SWRO	Red River Army Depot	TX	6	TPDES Permit # 02206	TPDES, Storm Water P2 Plan	Qtrly	Notice of detection	storm water runnoff at 4 sites in the OB/OD area	ND-154 ppb	35.7 ppb	314.0/ 4 ppb	State requires submition of a Pollution Prevention Plan for the Control of Perchlorate within 180 days after detection. Note: US Army planning missile motor propellant grind-out facility at RRAD, which could largely replace the open burning demilitarization requirement for some missile systems.	

EXAMPLE

Appendix C, Sheet 3

Environmental Restoration/Investigation

Program/ Fundung Type	Facility	State	EPA Region	Site	Source of Perchlorate (Operations, Equipment, Activities)	Location sampled (gw, soil, etc.)	Number of detections	Number of Samples Collected	Range of Concentrations detected	Analytical method/ Method Reporting Limit	Potential Pathway(s) of Exposure	Regulatory Interest (Cleanup requested, permitting requirements, sampling requirements)	Installation POC (name, phone, e-mail)
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FX training field -(western study boundary area)	Training - pyrotechnics and smokes	GW (Monitoring well)	63	125	ND-23.4ppb	314.0/ 1ppb	Aquifer supplies water to the City of Aberdeen	EPA and MDE advisories/recommendations	John Sample, 333-245-6789, john.sample@base.army.mil
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FTX AREA	Training - pyrotechnics and smokes	GW (DPT)	249	268	ND - 3,500 ppb	314.0/ 1 ppb and STL-M-ClO4/ 500 ppb	Aquifer supplies water to the City of Aberdeen	Recommended by EPA	
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FTX AREA	Training - pyrotechnics and smokes	Soil (borings)	202	610	ND - 12,000 ppb	314.0/ 10ppb	Leach down to Aquifer that supplies water to the City of Aberdeen	Recommended by EPA	
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FTX AREA	Training - pyrotechnics and smokes	SW	0	4	ND	314.0/ 4ppb	Leach down to Aquifer that supplies water to the City of Aberdeen	Recommended by EPA	
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FTX AREA	Training - pyrotechnics and smokes	sediment	0	4	ND	314.0/ 10ppb	Leach down to Aquifer that supplies water to the City of Aberdeen	Recommended by EPA	
IMA-NERO/ DERP	Aberdeen Proving Ground	MD	3	FTX AREA	Training - pyrotechnics and smokes	surface soil	21	128	ND - 590 ppb	314.0/ 10ppb	Leach down to Aquifer that supplies water to the City of Aberdeen	Recommended by EPA	
BRAC/ DERP	Fort Wingate Depot Activity	NM	6	Former TNT Washout Facilities	Munition Demil	soil	1	11	ND - 100 ppb	EPA 314-M/ 12 ppb	Soil ingestion	Future permit requirements for sampling and cleanup	
BRAC/ DERP	Fort Wingate Depot Activity	NM	6	Former TNT Washout Facilities	Munition Demil	GW	12	47	ND -76.6ppb	EPA 314.0/ 4 ppb	Water ingestion	Future permit requirements for sampling and cleanup	
BRAC/ DERP	Fort Wingate Depot Activity	NM	6	Former TNT Washout Facilities and Building 528	Munition Demil	GW	2	2	2,440 - 2,890 ppb	EPA 314.0/ 4 ppb	Water ingestion	Future permit requirements for sampling and cleanup	
ARNG/	Camp Navajo	AZ	9	OD Pits 10, 11, 17	Munitons disposal	SW	3	11	4.2 - 37 ppb	314.0/ 2.0 ppb	drinking water	RCRA	
AMC-JMC/	Iowa Army Ammunition Plant	IA	7	East Burn Pads	Unknown - potential source - OB/OD	GW	1	12	0-8.8 ppb	314.0/ 4 ppb	none or limited	State regulator request	
AMC-JMC/	Iowa Army Ammunition Plant	IA	7	North Burn Pads LF	Unknown - potential source - OB/OD	GW	1	10	0-3.2 ppb	314.0/ 4 ppb	none or limited	State regulator request	
AMC-JMC/	Iowa Army Ammunition Plant	IA	7	Inert Disposal Area	Unknown	GW	1	20	0-<8.8ug/L (Analytical matrix interference)	314.0/ 4ug/L	none or limited	State regulator request	
AMC-JMC/	Iowa Army Ammunition Plant	IA	7	Line 800/Pink Water Lagoon	Unknown - potential source - LAP	GW	1	12	0-28ug/L	314.0/ 4ug/L	none or limited	State regulator request	

EXAMPLE

Appendix C, Sheet 4

FUDS Program Perchlorate Sampling Information

Facility	Site	Source of Perchlorate (Operations, Equipment, Activities)	Location detected (gw, soil, etc.)	Number of detections	Number of Samples Collected	Range of Concentrations detected (ppb)	Analytical method/ Method Reporting Limit	Potential Pathway(s) of Exposure	Regulatory Interest (Cleanup requested, permitting requirements, sampling requirements)	Sc E Sam (St Ann
Tyson Valley Powder Farm, Eureka, MO	AOCs 2, 24, 29, & 30	Potential from storage and testing areas	GW	4	4	4 ppb	EPA 314.0/ 4 ppb	GW & Surface Impoundments	EPA - EPA tested for perchlorate at the storage and testing areas	
Hingham Burn Site D01MA023207 Massachusetts	Hingham Burn Site D01MA023207 Massachusetts	Explosive Residue	GW	0	3	ND	314.0/ 4 ppb	None	In FY02, at the request of the State of Massachusetts, NAE sampled seral (3?) wells for various contaminants related to explosive residue, one of which was perchlorate. Nothing was found.	U
Rialto (formerly Rialto Ammunition Supply Point), Rialto	Rialto (formerly Rialto Ammunition Supply Point), Rialto, CA	Source - Fireworks Facility(?), BF Goodrich, Rocket Research and Manufaturing	DW	NA (If information is unavailable state why)	NA (If information is unavailable state why)	ND - 811 ppb	EPA 314.0/ 4 ppb	Drinking water supply wells	Reginal Water Board	City of
Tyson Valley Powder Farm, Eureka, MO	AOCs 2, 24, 29, & 30	Potential from storage and testing areas	SW	2	2	4 ppb	EPA 314.0/ 4 ppb	GW & Surface Impoundments	EPA	
Shumaker NAD, Camden, AR "Landfill"	Burn Pits	Atlantic Research washed ammonium perchlorate out of rocket motors and disposed of large pieces of AP in an open burning unit.	GW	3	16	413-850 ppb	EPA 314.0/ # ppb	Surficial Aquifer	EPA threatened 7003 Order	USA Septe
Shumaker NAD, Camden, AR "Landfill"	Burn Pits	Atlantic Research washed ammonium perchlorate out of rocket motors and disposed of large pieces of AP in an open burning unit.	Soil	0	##	ND	EPA 314.0/ ## ppb	migration to surficial aquifer	EPA threatened 7003 Order	USA Septe

EXAMPLE