

Just the Facts...

**Health Assessment of 2003 Qarmat Ali Water
Treatment Plant Sodium Dichromate Incident
Status Update: May 2010**

PURPOSE: This fact sheet provides an update to information provided to health care providers and Indiana National Guard (NG) Soldiers assigned to the Qarmat Ali Water Treatment Plant (QA WTP) in Basrah, Iraq, in 2003, who were potentially exposed to sodium dichromate. This factsheet summarizes previously documented information, provides additional details on the blood chromium tests performed on the Soldiers at the time, and addresses current concerns regarding potential long term health effects for the evaluated NG Soldiers as well as other potentially exposed personnel.

INCIDENT SUMMARY (March –Oct 2003): In March 2003, the Army contracted with Kellogg Brown and Root (KBR) to restore the oil infrastructure of the Rumallah Oil Fields (Project RIO-Restore Iraqi Oil), which included restoration of the QA WTP. During the summer of 2003, activated NG personnel were assigned to escort and guard the KBR contract workers. During that time, evidence of site contamination with sodium dichromate, a corrosion-preventing chemical that had been used by former Iraqi plant workers, was observed. (*See details on next page “What is Sodium Dichromate?”*). Sodium dichromate includes the chemical hexavalent chromium (which is also known as Chromium (Cr VI) or ‘chromium six’). This form of chromium (VI) may cause certain acute (immediate) and long term health effects, including lung cancer if inhaled at high enough levels (*See details on next page “What are the Health Effects Associated with Chromium Exposures?”*). The inhalation of dust containing Cr VI at the QA WTP was considered a potential health risk.

In September 2003, the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) (now referred to as the US Army Public Health Command (USAPHC)) was requested to assess the site risks and potential health risk to Soldiers and DA Civilians. The USACHPPM Special Medical Augmentation Response Team, Preventive Medicine (SMART-PM) team conducted an environmental exposure assessment and medical evaluations of the Soldiers there at the time. This took place in Sept/Oct 2003, approximately 1 month after the chemical on the ground was covered by asphalt and gravel to prevent exposure. The resulting assessment, which included a complete medical evaluation and whole blood chromium testing of the personnel present at the site, concluded that the site hazards were being mitigated by the contractor (KBR), the Soldiers and DA Civilians that were serving at the site during the summer 2003 did not show any specific findings associated with over exposure to Cr VI, and that the site hazards did not create an elevated risk of future adverse health effects for any Soldier who had served at the site. Specifically, the team’s report noted that self-reported symptoms (e.g., irritation-type symptoms related to the eyes, nose, throat and lungs) and physical findings were non-specific and could have also been from the desert environment and austere living conditions. Through Soldier interviews, it was determined that average Soldier exposure time to the site was 18.5 days, with a range from 2-720 hours. Long- term adverse health effects such as cancer were not expected from the relatively brief short-term exposure. (*See details on next page “Were There any Chromium Associated Health Effects on Soldiers Evaluated?”*)

CURRENT STATUS: Since 2003, this incident has continued to receive media and other attention, which has again raised health concerns. The conclusions of the SMART-PM team were validated by the Defense Health Board (DHB) in November 2008. Overall, the medical response to the QA WTP incident was exemplary according to the DHB. Based on re-evaluations and the DHB review, the USAPHC considers it unlikely that any current symptoms or long term health problems are likely to be related to this past short-term exposure. USAPHC acknowledges, however, that there is some uncertainty relating to the possible exposure levels prior to the Oct 03 environmental and clinical assessments

Due to concerns from NG units from Oregon, West Virginia and South Carolina who were present for some period at Qarmat Ali facility prior to the SMART-PM team assessment described, the Veteran’s Administration is currently contacting individuals who were identified as ever being at the site and offering screening examinations. The examinations include screening chest X-ray and pulmonary function test with periodic follow-up. Notification letters are or will be sent to these individuals. If you receive one of these letters, you may choose to undergo screening if you have concerns. We recommend that you contact your health care provider for any specific concerns you may have.

If you have questions, concerns, or any additional information regarding this incident please contact:

U.S. Army Public Health Command (Provisional), Environmental Medicine Program,
5158 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5403 <http://chppm-www.apqea.army.mil>
DSN 584-2714; COMM (410) 436-2714; FAX Extension-4117

What is Sodium Dichromate? Sodium dichromate is typically in the form of a reddish/yellowish flake or powder. Sodium dichromate contains chromium (Cr VI), otherwise known as hexavalent chromium. Although some forms of chromium are essential for health, Cr VI can cause adverse health effects in certain doses. Cr VI does not occur naturally in the environment and is produced by industrial processes for several different uses such as chrome plating, wood preserving, manufacture of dyes and pigments, and as in this case as an anti-corrosive for water pipes.

What are the Health Effects from Exposures to Chromium?

- Health effects depends on (1) the type of chromium (e.g., Chromium III (Cr III) versus CrVI) , (2) the type of exposure (e.g., ingesting versus breathing); and (3) the amount (levels) and duration of exposure
- While Cr III is an essential nutrient that helps the body use sugar, protein, and fat – adequate amounts are usually obtained through a normal diet. If ingested in large amounts, both chromium III and VI can cause stomach upset and ulcers, or kidney and liver damage, though CR III is less toxic.
- Cr VI is an acid-like compound can cause irritation to the nose, eyes, throat and lungs. At high enough levels, the symptoms may include watery eyes or nose, nosebleeds, sore throat or cough. These symptoms resolve after being removed from the exposure. Repeated long term inhalation exposure (weeks to months) to significant levels can cause chronic symptoms of inflammation and a classic finding of nasal perforation. Repeated skin contact may cause skin ulcers (known as “chrome holes”) and contact/irritant dermatitis. Some people may become sensitized to chromium and develop occupational asthma or allergic dermatitis even at normal occupational levels if they are sensitive. Cr VI is known to cause lung cancer in occupational settings where long term inhalation exposures occurred.
- See ATSDR Toxicological factsheet for additional information: <http://www.atsdr.cdc.gov/tfacts7.pdf>

Were There any Chromium Associated Health Effects on Soldiers Evaluated?

- Personnel providing security at the time of the (Oct 03) health assessment were medically evaluated with a history, physical examination, and other testing. The assessment was modeled after the medical surveillance examination used for workers routinely exposed to chromium in their occupation, with the addition of many other tests.
- The self-reported average exposure at QA WTP was 18.5 (8hr) days. This is a relatively short exposure compared to the months and years of occupational exposure where long term adverse health findings to Cr VI have been documented.
- Approximately one-fourth of the individuals complained of irritation-type symptoms related to the eyes, nose, throat and lungs. Physical findings were also consistent with mild irritation and/or inflammation, but only marginally in those who had complained of symptoms. There were no nasal perforations or skin findings consistent with “chrome holes.” All of the self-reported symptoms and physical findings were non-specific and could have also been from the desert environment and austere living conditions.
- Blood and urine tests only uncovered mild abnormalities most likely related to dehydration, protein and creatine supplement use, and pre-existing conditions. Abnormal findings were just above the normal range.
- All chest x-rays were normal.
- One-third of the pulmonary function tests had mild abnormalities. No baseline tests were available for comparison. The abnormalities were related to inadequate patient effort – making the test indeterminate; mild airway obstruction related to smoking or pre-existing asthma; and changes related to the general high particulate matter in and around the base camps. All individuals with the mild abnormalities had no symptoms, except those with a history of mild asthma, who generally only reported symptoms with exertion.
- Whole blood tests for chromium levels were performed as a marker of exposure. Whole blood testing identifies chromium in the blood as well as the chromium taken into red blood cells (RBCs). Sixty percent of Cr VI that does not enter RBCs is excreted within 8 hours. Cr VI stays in the RBCs for the 120 day life span of the RBC and thus gives some indication of Cr exposure during the past 3 to 4 months. The results, compared to reference population levels on people with no occupational Cr exposure, indicated that nearly all levels were so low that the analytical method used did not detect chromium in the sample. The blood test results indicate that there was not a significant systemic uptake of Cr VI. However, it is possible that low levels of exposure could have caused or contributed to the irritation symptoms and physical findings the soldiers reported at the time.
- The medical team concluded that long-term health effects related to cancer or reproduction were very unlikely from the exposure as understood. They conveyed this information to the Soldiers through fact sheets and town hall meetings. Those Soldiers with any exam findings or medical tests outside the normal range were advised to follow up with a health care provider. All soldiers with concerns were told to express them on their post-deployment health evaluation, at which time appropriate referral and assessment would be conducted.