

# FACT SHEET



FACT SHEET No. 64-012-0520

## QARMAT ALI WATER TREATMENT PLANT SODIUM DICHROMATE INCIDENT STATUS UPDATE: MAY 2020

---

**PURPOSE:** This fact sheet provides an update to information provided to healthcare 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 fact sheet summarizes previously documented information, provides additional details on the blood chromium tests performed on the Army personnel at the time, and addresses current concerns regarding potential long-term health effects for the Army personnel potentially exposed.

**INCIDENT SUMMARY (March–October 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 and other Army personnel. 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 by onsite personnel. (*See details in paragraph, “What is Sodium Dichromate?”*). Sodium dichromate includes hexavalent chromium (which is also known as Chromium (Cr VI) or ‘chromium six’). This form of chromium (Cr VI) can have acute and long-term health effects (*See details in paragraph, “What are the Health Effects Associated with Chromium Exposures?”*). The exposure to dust contaminated with Cr VI at the QA WTP was a potential health risk that was initially unrecognized.

In September 2003, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) (now referred to as the U.S. Army Public Health Center (APHC)) was requested by the Coalition Forces Land Component Command (CFLCC) Commander to assess the site hazards and potential health risk to Army personnel. The USACHPPM Special Medical Augmentation Response Team, Preventive Medicine (SMART-PM) conducted an environmental exposure assessment and medical evaluations of the Army personnel present at the QA WTP at the time of the site assessment. The SMART-PM investigation took place in September and October 2003, approximately 1 month after KBR had covered the contaminated ground with asphalt and gravel to prevent further exposure. The assessment, which included a complete medical evaluation and bloodwork including whole blood chromium testing of the personnel present at the site, concluded that (1) the site hazards were being mitigated by the contractor (KBR), (2) the Army personnel that were serving at the site during the summer 2003 before the contaminated area was encapsulated did not report any specific medical symptoms associated with exposure to Cr VI, and (3) that the site hazards did not create an elevated risk of future adverse health effects for any Army personnel who were assessed onsite by the SMART-PM team in September and October 2003. Specifically, the team’s report noted that self-reported symptoms (e.g., irritation-type symptoms related to the eyes, nose, throat and lungs) and clinical findings were non-specific and could have been due to the desert environment and austere living conditions. Information collected through interviews with Army personnel indicated that average 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 exposures. (*See details in paragraph, “Were There any Chromium-Associated Health Effects Among the Army Personnel Evaluated?”*)

**CURRENT STATUS:** Since 2003, the potential exposures at QA WTP incident had continued to receive media and Congressional attention, which highlighted potential long-term health concerns. The Defense Health Board (DHB) reviewed and concurred with the SMART-PM conclusions in November 2008. Overall, the medical response to the QA WTP incident was exemplary, according to the DHB. Based on re-evaluations by APHC and the DHB review, APHC considers it unlikely that any current symptoms or long-term health problems are likely to be related to the short-term exposure to hexavalent chromium at the QA WTP. APHC acknowledges, however, that there is uncertainty relating to exposure levels prior to the October 2003 environmental and clinical assessments.

Due to concerns from NG units from Oregon, West Virginia, and South Carolina (who were present for some period at the Qarmat Ali facility prior to the SMART-PM assessment described), the Veteran's Administration contacted individuals who were identified as being at the site and offering screening examinations. The examinations offered a screening chest X-ray and pulmonary function tests.

**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 depend on: (1) the type of chromium (e.g., Chromium III (Cr III) versus Cr VI); (2) the route 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 than Cr VI.
- Cr VI can cause irritation to the nose, eyes, throat and lungs. At high enough levels of exposure, symptoms may include watery eyes or nose, nosebleeds, sore throat, or cough. These symptoms resolve after the person is removed from the exposure. Repeated long-term inhalation exposure (weeks to months) to significant levels of Cr VI can cause chronic symptoms of inflammation and a classic clinical 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 asthma or allergic dermatitis even at lower occupational exposure levels. Cr VI is known to cause cancer of the respiratory tract in occupational settings where long-term inhalation exposures occurred. (See ATSDR Toxicological Fact Sheet for additional information: <https://www.atsdr.cdc.gov/toxfags/tfacts7.pdf>.)

**Were there any Chromium-Associated Health Effects Among the Army Personnel Evaluated?**

- Personnel providing security at the time of the (October 2003) health assessment were medically evaluated with a history, physical examination, and other testing described below. The assessment was modeled after the medical surveillance examination used for workers routinely exposed to chromium in their occupation.
  - The self-reported average duration of exposure at QA WTP was 18.5 (8 hr) days. This is a relatively short exposure time 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 evaluated complained of irritation-type symptoms related to the eyes, nose, throat, and lungs. Physical findings were also consistent with mild irritation and/or inflammation 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 caused by other exposures common to the desert environment and austere living conditions.
  - Blood and urine tests only identified mild abnormalities most likely related to dehydration, protein and creatine supplement use, and pre-existing conditions. Abnormal blood and urine tests were just above the corresponding 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 consistent with inadequate patient effort, making the test indeterminate; mild airway obstruction related to smoking or pre-existing asthma; and changes possibly related to exposure to ambient air in and around the base camps. All individuals with mild lung function 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 RBCs for the 120 day life span of the RBC and, thus, gives some indication of an individual's Cr VI exposure during the previous 3 to 4 months. The results for nearly all whole blood samples indicated that there was no difference in Cr levels, compared to reference population levels of people with no occupational Cr exposure. The blood test results indicated 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 Army personnel reported at the time.
  - The medical team concluded that long-term health effects related to cancer or reproduction were very unlikely from the Cr VI exposure at the QA WTP. They conveyed this information to the Army personnel through fact sheets and town hall meetings. Those Army personnel with any exam findings or medical tests outside the normal range were advised to follow up with a healthcare provider. Army personnel with exposure concerns were told to express them on their post-deployment health evaluation, at which time appropriate referral and assessment would be conducted.
-