



33-002-0908

Just the Facts...

Update on Sodium Dichromate Exposure at Qarmat Ali Water Treatment Plant in 2003 (for Soldiers)

Purpose: This fact sheet is an update to a series of fact sheets that were provided to Soldiers and health care providers (HCPs) in 2003, to support the evaluation and risk communication for soldiers assigned to the Qarmat Ali Water Treatment Plant (WTP) and potentially exposed to sodium dichromate, a hazardous chemical. The previous fact sheets provide very good information on the circumstances of the exposure in 2003, the evaluation and tests provided to the potentially exposed soldiers, and the meaning of the results, and information on potential health effects of sodium dichromate. These fact sheets are available through the INARNG toll-free Health Hotline (*see last section of this fact sheet*). The readers of these fact sheets should keep in mind that they were addressing issues in 2003, and therefore “future actions” have already been done, and “current exposure” is long past.

This fact sheet provides a quick summary of information provided in 2003, as well as additional details on the blood chromium tests performed at the time but not discussed in the previous fact sheets, and finally, what to expect from the previous exposure at this point in time.

Background: During the summer of 2003, Army personnel at Qarmat Ali WTP in Basrah, Iraq, were assigned to guard contract workers who were restoring the plant. During the time, sodium dichromate, a corrosion-preventing chemical that had been used by former Iraqi plant workers, was found on the ground, and low levels of the chemical were measured in the air. Chromium VI (six) in sodium dichromate is considered a lung carcinogen through inhalation (meaning, breathing in high levels could cause cancer). This is because scientific studies showed that some industrial workers exposed to high levels for greater than 2 years developed cancer.

Chromium VI is acidic and can also cause immediate (called “acute”) irritation and health effects with a high enough exposure. Therefore, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) provided a medical evaluation for the Soldiers there at the time. This took place in 2003, approximately one month after the chemical on the ground was covered by asphalt and gravel to prevent exposure. The evaluation and tests provided at that time were:

- A history which characterized the exposure and preexisting medical conditions of each Soldier
- A physical exam that identified any findings potentially related to a chromium VI exposure, and
- Medical tests including blood, urine, chest Xray, and a breathing test (called a pulmonary function test).

Of the 161 potentially exposed Soldiers and DOD civilians, 137 were evaluated (14 were not available for testing and 10 declined). The results at the time showed some abnormalities in individuals, such as complaints of eye, nose, throat and/or lung irritation, or on the pulmonary function tests, or kidney or liver tests. However, these could not be specifically traced to a chromium exposure, but possibly to numerous other causes such as the high dust (called particulate) levels in theater, dehydration, dietary supplements, previous medical conditions, or heavy workouts.

Blood Chromium Test results: After the previous fact sheets were written and provided to the unit stationed at the Plant in 2003, the blood chromium tests came back. This was a special test conducted for each individual evaluated, which measured the chromium inside the red blood cells (RBCs). This is a

specific measure of possible chromium VI exposure, because other forms of chromium, such as chromium III, do not cross cell membranes such as the RBC membrane. In addition, each RBC lives for 120 days, and the blood chromium test can measure excess exposure far longer than the few days it would remain in the serum (fluid part of the blood) or urine. All samples were analyzed by the Armed Forces Institute of Pathology (AFIP).

The results showed that nearly all test results were below the detection limit of the test method (very low), meaning that the levels were so low that the analytical method used did not detect chromium VI in the sample. Although it is not totally clear or agreed upon as to what "normal" or "acceptable" is, the AFIP used two sets of values found in the scientific literature:

- 0.2 to 10.0 ug/L: All the results were within this reference range; and
- 4.0 to 5.0 ug/L: 98% of the results were within the second reference range.

Note: There are some other literature references that use lower limits. In addition, the RBC chromium levels didn't correlate with how long each soldier said s/he was on site.

The chromium blood test results appear to show that there was not a significant inhalation exposure from chromium 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 experiencing at the time. Low levels of chromium could interact with the membranes of the eyes, nose and lungs, and the skin directly and cause irritation and inflammation, even with only small amounts being internally absorbed. Chromium VI in the body quickly changes to chromium III, which is rapidly removed from the body through the urine and feces in a matter of days. Extra chromium III coming from chromium VI would have been unlikely to be present when blood samples were taken, unless it was already in the RBCs.

Previous and Current Assessment: The medical team at the time felt that long-term health effects 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 (HCP). All soldiers with concerns were told to express them on their post-deployment health evaluation, which would provide any needed follow up.

At present, there is renewed interest in this previous exposure. However, the medical team at USACHPPM and the Army National Guard still considers it unlikely that any current symptoms or health problems could be related to this past exposure or that future problems from this exposure are expected. Having another blood chromium test would not be useful, because it is only good for 120 days after exposure (the life span of RBCs in general). Physical exam may reveal symptoms or health problems, but there are usually many other reasons for these in an individual. Your HCP can provide insight into any current medical conditions and answer questions as to potential causes and treatments or concerns you may have.

Points of Contact for Additional Information

For more specific information on site exposures and population medical evaluation outcomes, please contact:

- Chief of Preventive Medicine Army National Guard
COM 703-607-1056

For more information on environmental sampling and health risk assessment, please contact:

- USACHPPM Deployment Environmental Surveillance Program
COM 410-436-6096

For general medical information, please contact:

- USACHPPM Environmental Medicine Program
COM 410-436-2714

For more information about Chromium VI, please visit:

- Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles:
<http://www.atsdr.cdc.gov/toxprofiles/tp7.html>

Indiana National Guard Health Hotline:

- 1-800-237-2850 ext 3128