Brief to Senator Bayh

Sodium Dichromate Exposure

at the

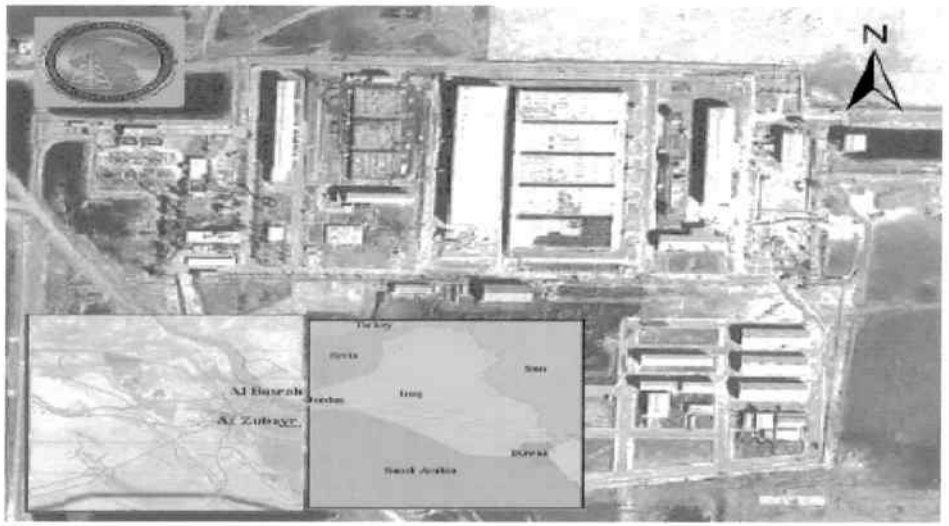
Qarmat Ali Water Injection Facility

22 December 2008

BACKGROUND

Qarmat Ali Water Injection Facility:

- The Qarmat Ali Water Injection Facility is a critical part of the oil production infrastructure in Iraq. The plant provides treated water for injection into wells to maintain oil reservoir pressure for oil fields in the south of Iraq
- The Qarmat Ali plant was built by the Iraqi South Oil Company. The facility was heavily damaged by looting after major combat operation ended in May 2003
- KBR was tasked by the US Army Corps of Engineers to restore the operation of the facility under the Restore Iraq Oil (RIO) contract in May 2003
- Subsequent contracts were undertaken to upgrade the facility. All work at the facility was completed in Dec 2006. The facility is currently operational
- One of 3,000 sites in Southern Iraq which qualifies as an industrial site



BACKGROUND

Sodium Dichromate Use at the Facility:

- **Prior to the war, the Iraqi South Oil Company used sodium dichromate at the facility to prevent corrosion in injection pipelines**
  - A component of Sodium Dichromate is Hexavalent chromium (chromium VI), which is classified as a lung carcinogen. This classification is based on scientific studies that showed that some industrial workers exposed to high levels for more than two years developed cancer
  - Hexavalent Chromium can also cause immediate irritation and health effects when a person has been exposed to the material at high levels
- **In June 2003, the South Oil Company staff informed KBR (according to KBR 's summary) that sodium dichromate was used in the chemical injection system and housed in an adjacent storage facility. Prior to that time, the USG and KBR were not aware of its use at the facility**

BACKGROUND

Security Roles:

The Rumallah oil fields were under the control of the British forces in Iraq after the invasion. During the project, British forces controlled the Qarmat Ali site, while U.S. Soldiers were assigned as personnel and area protection for project RIO

U.S. Soldiers supporting Project RIO provided 2 man protection details per KBR employee on a rotating basis. The U.S. soldiers traveled with the KBR employees to sites throughout the Rumallah oil fields

Congressional Inquiries:

1) Senator Dorgan (26 June 2008)

- Investigate KBR's conduct in exposing US troops and its own workers to this cancer causing chemical

2) Senator Lugar (27 June 2008)

- Concerned that IN ARNG may have been exposed to dangerous chemicals and that any Soldier who has been exposed has the important information he or she needs for health and well-being

3) Senator Bayh (12 Sept 2008)

- Improper testing performed, wrong standards used, too much time between exposure and test
- Establish registry for exposed Soldiers
- Notification of CONUS base after exposure of units (CENTCOM policy)

Findings:

- **Center for Health Promotion and Preventive Medicine Incident Response**
- **Actions on behalf of Potentially exposed units**
- **Defense Health Board review**
- **KBR Contract Review**

Center for Health Promotion and Preventive Medicine Incident Response (Survey)

- CHPPM performed site sampling, soldier surveys, and medical testing in October of 2003
- Performed air, soil, and swipe tests to determine levels of potential health hazards (including chromium VI)
- All post encapsulation testing determined that there were no chemical hazards which were above the acceptable Military Exposure Guidelines (MEGs) or OSHA permissible exposure limits (PELs)
- This concurred with prior testing results reported by British Forces in August 2003

Center for Health Promotion and Preventive Medicine Incident Response (Testing)

- Soldiers were surveyed about their time on site and were divided into two groups:
  - Group A: longer time on site (average 147.4 hrs/service member)
  - Group B: minimal time on site (average 8.25 hrs/service member)

- As a precaution, the Soldiers who fell into Group A were provided with extensive medical testing including:
  - Blood testing for chromium (serum and red blood cell)
  - Urine testing
  - Pulmonary function testing
  - Chest X-ray

- In addition all U.S. Soldiers who reported being on site were provided with information on the medical effects of sodium dichromate and were instructed to make note of potential exposure in their post deployment health assessment

Potentially Exposed Units:

C Company 1-152 IN (IN ARNG)

- C Company provided security to KBR employees throughout the Rumallah Oil Fields, including the Qarmat Ali Water Injection Facility (WIF) from June 2003 until January 2004 (with restricted access to the site starting in September)

- Reported an average of 20 days, 7.3 hours per day on site, for a total of 147.4 hours of exposure per Soldier (128 Soldiers in this group out of over 500 Soldiers in unit)

- While the CHPPM survey results demonstrated a low health risk potential (still well below industry standard), this group was provided medical testing due to their time spent at the site. All Soldiers in the unit were counseled and given information on the potential hazards of Sodium Dichromate exposure

- Based on recent developments, the National Guard Bureau went to the Indiana ARNG to insure INARNG Soldiers were fully informed about incident. The Indiana ARNG conducted an aggressive program of information dissemination (local media, town halls, hotline); Soldier identification (records reviews, interviews, Soldier reporting); and established a VA partnership effort (inclusion in Gulf War Registry, baseline medical tests, service connection) to care for potentially exposed Soldiers

Other Potentially Exposed Units:

1-162 IN (OR ARNG)

- Reported average of 2.8 days, 3.9 hours per day on site, for a total of 11.2 hours exposure per Soldier (48 Soldiers reported as being on the site)

133rd MP Company (SCARNG)

- Reported average of 2.4 days, 2.2 hours per day on site for a total of 5.3 hours exposure per Soldier (37 Soldiers reported as being on the site)

C Co 1092nd Engineer (WVARNG)

- Reported in one document in the reports on the incident. Activities at the site, and dates are unknown

Army Corps of Engineers Civilian Employees

- Part of Project RIO. Actions taken similar to those of ARNG

British Forces:

Security of the Rumallah Oil Fields, including Qarmat Ali Water Injection Facility (WIF) from April 2003 through at least January 2004. Included 24/7 site protection at the Qarmat Ali WIF.

No reported exposure for British Soldiers to USACHPPM.

U.S. Army has contacted the British Ministry of Defense and shared information about the Qarmat Ali WTF.

The Army Incident Review Process:

1) **Independent external review of the actions taken by the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM)**
    1) Comprehensive review of environmental surveys
    2) Proper test conducted on Soldiers (whole blood Chromium test)
    3) Proper standards used
    4) Tests done within appropriate timeframe
    5) Notification and information to Soldiers

2) **Review of the Project RIO contract between KBR and the Army Corps of Engineers.**
    1) Contract review
    2) KBR actions

3) **Care for Soldiers**
    1) Tracking of information in health records
    2) Notification and Information campaigns to Soldiers
    3) Roster of Soldiers with potential exposure
    4) What we are doing to take care of these Soldiers

Army Actions:

- **Tracking of information in health records**
  - Stored health risk assessment results will be transferred to the VA
  - Records of potential sodium dichromate exposure were successfully transferred from theater to the soldiers' individual medical records
- **Notification and information to soldiers**
  - Indiana National Guard has developed an exceptional program.
  - Army will provide IN ARNG program to other states as needed
- **Registry**
  - Indiana Guard ensuring that all potentially exposed IN ARNG Soldiers are included in VA Gulf War Registry
  - DoD Policies/programs in place (DODI 6490.03) to ensure that all significant exposures are documented in medical records, and exposure rosters are created and archived

Defense Health Board Review:

- **Found that the assessment and testing was appropriate**
  - Blood testing specifically for whole blood Chromium done
  - Done to the appropriate standard
  - Done within 30 days of last exposure
  - Decision making and interpretations sound
  - "No expectation of any future adverse health outcomes"
  - The results of this review are relevant to others who served at this or similar sites

- **Caveat #1:** Testing was done within 30 days of remediation, exposure rates prior to remediation were likely higher, but total is not known

- **Caveat #2:** Oregon National Guard Soldiers placed in lowest exposure category, based on the very short time they reported as being on site, even though contamination levels may have been higher at this time.

- **Recommendations:**
  - 7 specific recommendations
  - 7 general recommendations

Defense Health Board Specific Recommendations:

- Reassurance and information provided to exposed and possibly exposed Soldiers
- Assess receipt and understanding of information by potentially exposed individuals
- Redact and declassify the CHPPM final report for dissemination
- This is an excellent case study for future training
- A briefing should be arranged for all NG, contractor, and public health personnel to fully share information
- Service and medical record should include this information
- A simple registry should be established

Defense Health Board General Recommendations:

- Maintain current methods for anticipating hazards, recognition training, and capacity for investigations
- Assess adequacy of available experts in toxicology and epidemiology
- Ensure and facilitate timely access to civilian expertise
- Establish an external advisory committee to facilitate access to consultation on risk assessment if needed
- Review and evaluate exposure avoidance training for all ranks
- Make efforts to overcome impact of "silos" in exposure events
- Review system for classifying documents related to health matters

Contract Review:

Methodology: Review of contract files and interviews of USACE contracting personnel

- KBR's compliance with applicable contract terms:
  - Contract file contains no indications that KBR violated applicable contract terms
  - The Statement of Work (SOW) required KBR to perform an initial site assessment of the facility in order to establish an environmental baseline; KBR completed the assessment July 8, 2003
  - SOW required KBR to have a safety program; the presence of health and safety staff on site indicates KBR had an active program
  - No contractual requirement that KBR provide personal protective equipment to military or DoD civilian personnel
- There is ongoing litigation against KBR by KBR employees/subcontractors, and by INARNG personnel, in connection with the events of Qarmat Ali; the Army is not a party to this litigation

KBR's Actions:

- KBR identified the potential sodium dichromate contamination on July 25, 2003 and KBR informed the USACE Contracting Officer the same day
- KBR posted signs restricting the hazard area to personnel with personal protective equipment on August 7, 2003, after an environmental assessment conducted by KBR on the same day determined the extent of the contamination
- KBR notified the USACE Contracting Officer of the extent of the hazard on August 8, 2003, and requested remediation authorization on August 12th

The Indiana Guard Effort:

- Command emphasis from leadership from start
- Bring on full time staff dedicated to the problem
- Conduct town hall meetings, establish hotline and use local news and word of mouth to spread word
- Conduct interviews to identify current health problems and identify Soldiers who spent any time at all on site
- Partner with local (state) VA to use Gulf War Registry to ensure eligibility for treatment and conduct baseline medical testing of Guardsmen and former Guardsmen

Summary:

- U.S. Soldiers were exposed to a known carcinogen while on duty at the Qarmat Ali Water Injection Facility in Iraqi in 2003
- The level and amount of that exposure is well below the levels that would cause concern
- There is no expectation of any future adverse health outcomes for these Soldiers. While unlikely, there is a possibility of a higher exposure that was not detected in the evaluations
- The Army will continue an aggressive information campaign to ensure that we take care of Soldiers
- The Army is not a party to ongoing litigation against KBR

Back up Slides

Timeline:

-- **Apr 2003** 1-162 IN assumes protection mission

-- **May 2003** 19th KBR begins work at Qarmat Ali

-- **Jun 2003** 1st- KBR notified of Sodium Dichromate (SD) on site
18th 1-152 IN assumes protection mission

-- **Jul 2003** 25th KBR notifies ACOE that SD on site
26th KBR does site assessment

-- **Aug 2003** 133rd MP Co begins QRF mission
2nd KBR begins site testing
8th KBR informs ACOE of site testing
11th Site remediation starts
12th Environmental assessment sent to ACOE
31st Brit Forces do site assessment

Timeline (Cont):

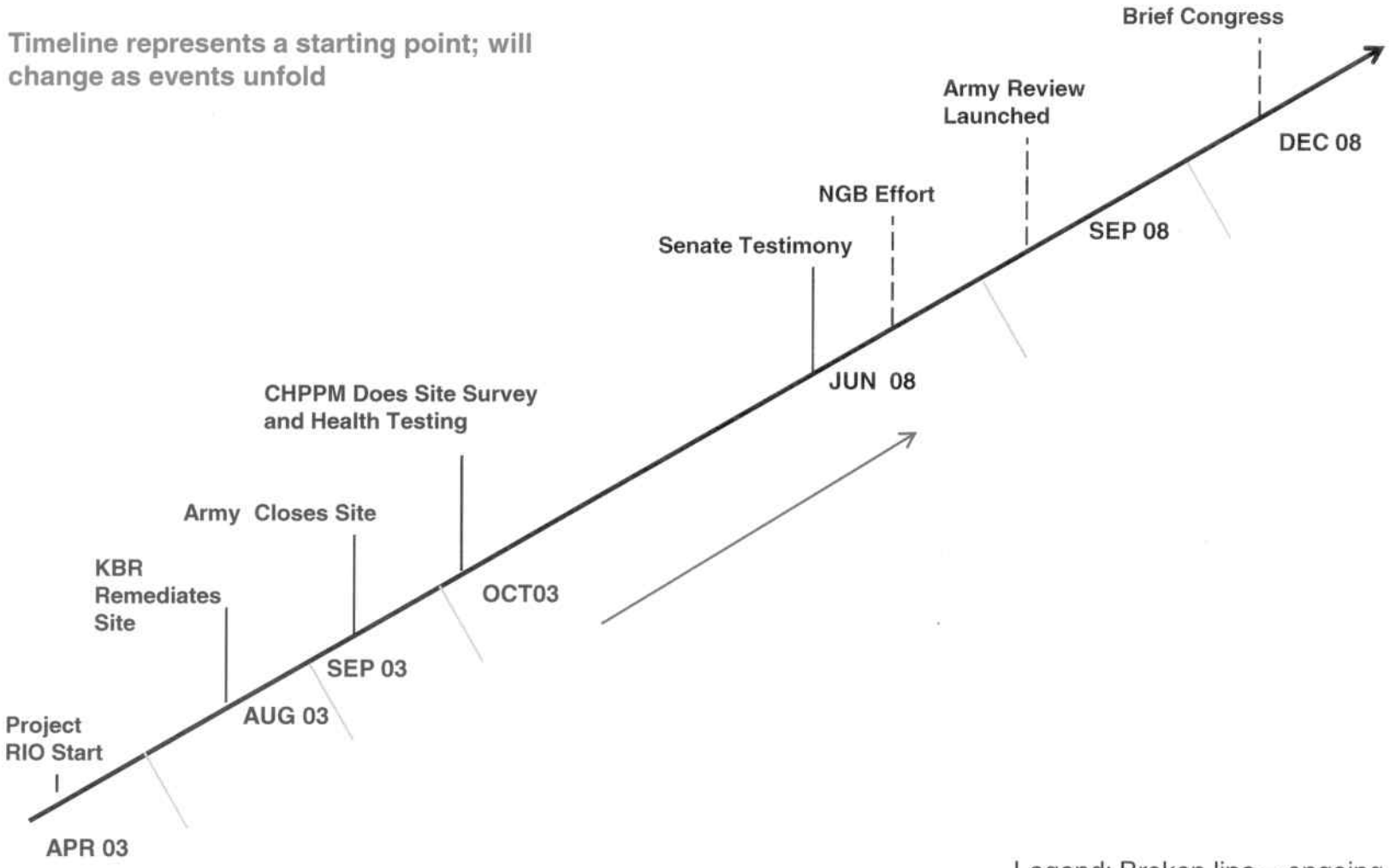
-- **Sept 2003**	2nd	Project RIO sends KBR report to Camp Victory
	3rd	Brit Forces do site testing
	8th	KBR sends preliminary test results to Army
	8th	KBR removes most workers, remaining workers use Personal Protective Equipment (PPE)
	15th	152 IN reports concerns to CFLCC
	17th	FRAGO 122 restricts site access
	30th	CHPPM arrives to start testing
-- **Oct 2003**	1st	CHPPM starts health testing on Soldiers
	5th	CHPPM starts testing at site
	13th	CHPPM completes site testing
-- **Jan 2004**	27th	TF RIO mission complete

Timeline (Cont):

-- **Jun 2008**		KBR Employees file suit against KBR
	20th	Senate Hearings
	26th	Senators Dorgan and Lugar send requests to Army
	30th	National Guard Bureau contacts to IN, OR, and SC
	30th	INARNG starts program
-- **Sep 2008**	12th	Senator Bayh sends request to Army
	21st	Under Sec Army directs Army review panel
-- **Nov 2008**	7th	Army review panel finishes
	13th	Defense Health Board meets
	20th	Defense Health Board finishes review
-- **Dec 2008**	3rd	Tell City Guardsmen file suit against KBR
	4th	Army receives draft copy of DHB results

Timeline (Cont):

Timeline represents a starting point; will change as events unfold



Legend: Broken line = ongoing

Defense Health Board Members:

- Dr Gary Carlson
  Professor of Toxicology, Purdue University
- Dr William Halperin,
  Chair, Department of Preventive Medicine, New Jersey Medical School
- Dr John Herbold
  Director, Center for Biosecurity and Public Health Preparedness, University of Texas School of Public Health
- Dr Wayne Lednar
  Global Chief Medical Officer and Director, Integrated Health Services, DuPont Human Resources

Defense Health Board Members:

- Dr Scott Lillibridge
  Assistant Dean for the Texas A&M Health Science Center School of Rural Public Health, Texas A&M University

- Dr James Lockey
  Department of Environmental Health, Occupational and Environmental Health Division, University of Cincinnati Medical Center

- Dr Thomas Mason
  Department of Epidemiology & Biostatistics, College of Public Health, University of South Florida

- Dr Alan Russell
  Professor of Surgery; Co-Director of the Armed Forces Institute for Regenerative Medicine, University of Pittsburgh

Technical Data:

- The OSHA Permissible Exposure Level (PEL) for Hexavalent Chromium in air in 2003 was 100 micrograms per cubic meter of air

- The concentration of Hexavalent Chromium on the site as measured by USACHPPM was between 1.03 and 1.27 micrograms per cubic meter of air. Only 7 of 43 samples showed any presence of Sodium Dichromate

- OSHA/ACGIH standards for occupational exposure are based on exposure for 8 hours per day x 5 days per week for a working lifetime

- Exposure of Soldiers is based on self reported days on the site. 5-6 hours per day, for an average of 20 days total exposure

BOTTOM LINE

Measured exposure for U.S. Soldiers at Qarmat was well below relevant governmental standards and this was supported by biological testing