

# Radiological Health Risk Assessment Tuwaitha Nuclear Research Facility Baghdad, Iraq



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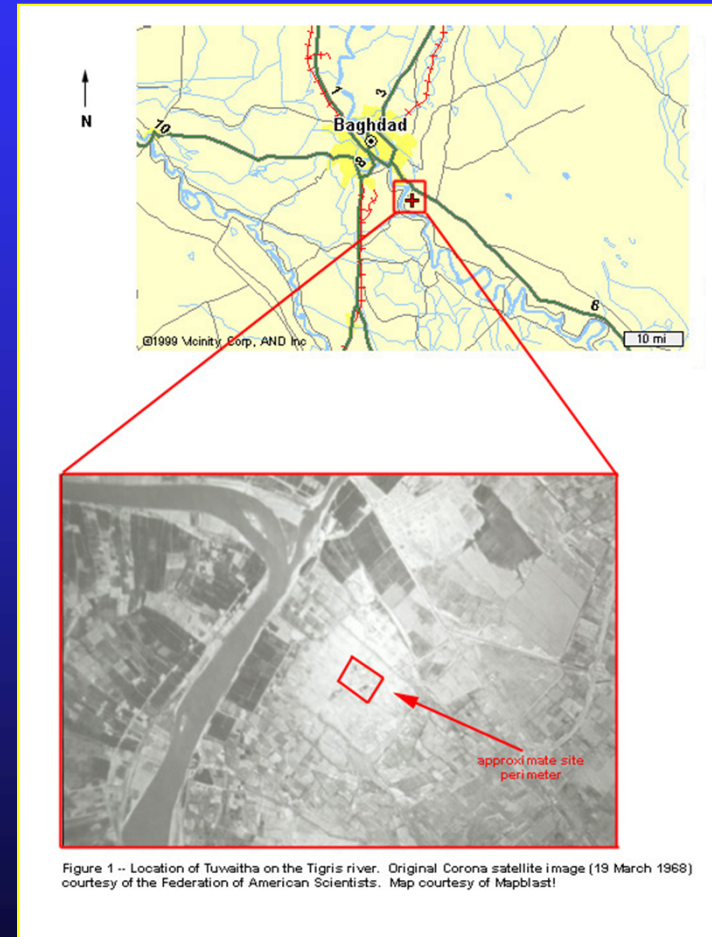


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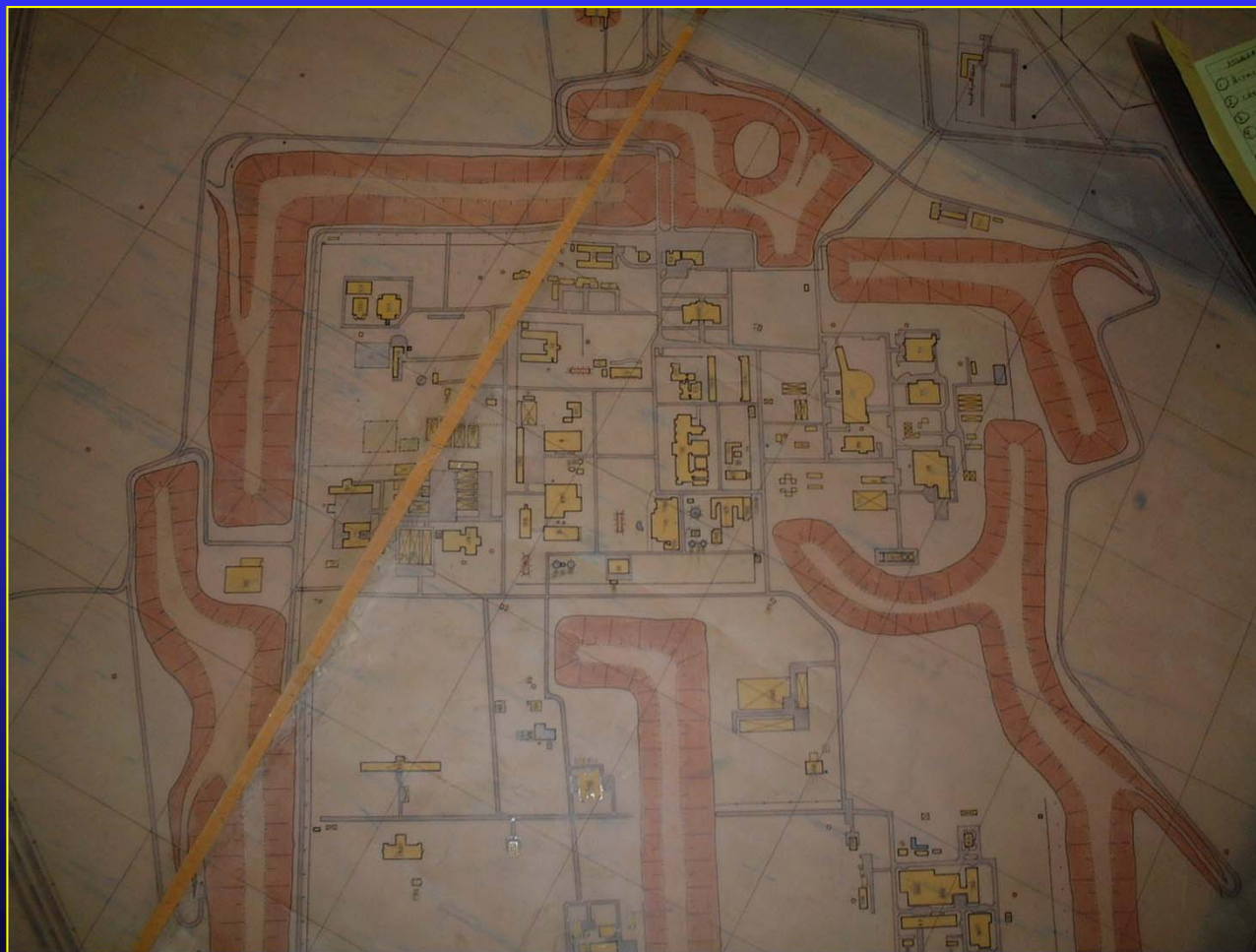
US Army Center for Health Promotion and Preventive Medicine

# Tuwaitha Nuclear Research Facility

- Center of Iraq's Nuclear Weapons Program
- Located 16 km south of Baghdad
- 23,000 acre facility at two locations
- Attacked by Israelis in 1983
- Attacked by the U.S. in 1991



# Tuwaitha Nuclear Research Facility



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# The Main Complex



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# Site C (Yellowcake Factory)



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# Massive Looting and Vandalism

- Site abandoned about 2 weeks before war started
- Massive looting and vandalism
- Barrels removed from Site C (yellowcake)
- Scrap metal and wiring stolen
- Site secured by roughly 4,000 Soldiers and Marines



# The Team



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# Operational Challenges

- Austere Environment
- Convoy requirements
- Communications
- Damaged/looted buildings
- Resupply
- Power
- Work/rest cycles
- Cross Contamination





# Health Physics Team Mission

- 2 Phase Health Risk Assessment (Acute Hazards and Chronic Hazards)
- Risk Communication
- Total deployment to Iraq lasted approximately two weeks (10 – 27 June 2003)



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# Risk Characterization Categories

- Category 1 – Personnel who entered the site and went in buildings/areas with radiation sources/radiological contamination
- Category 2 – Personnel who entered the site, but did not enter buildings/areas with radiation sources or radiological contamination
- Category 3 – Personnel who did not enter the site



# Sampling Strategy

- Comprehensive survey of billeting areas
- Walk thru surveys of structurally sound buildings
- Air and smear surveys of patrol vehicles (Bradley and Abrams)
- Exposure rate measurements, soil, water, and air sampling
- Smear samples



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# Comprehensive Survey of Billeting Area



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# Building Sweeps



# Significant Sources



# Marking and Posting Buildings



# Smears





# Vehicle Sampling



# Air Sampling



# Soil Sampling



# Water Sampling



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# Sampling Statistics

- Thousands of direct readings
- 40 high volume air samples
- 11 low volume air samples
- 142 soil samples
- 5 water samples
- 130 smears



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# Sample Management



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# Risk Communication



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Category	Assumptions
I	Individual exposed to highest dose rate for one hour and breathes resuspended particles from outside contaminated areas
II	Individual breathes in resuspended particles from outside contaminated areas
III	Individual doesn't enter either site





Category	Upper Bound Dose (Rem)	Percent of U.S. Peacetime Safety Standard
1	1.1	25 %
2	0.024	0.48 %
3	0	0



# Questions?



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