



Sandia National Laboratories Support of the Iraq Nuclear Facility Dismantlement and Disposal Project (NDs Project)

John R. Cochran
jrcochr@sandia.gov

6 January 2011

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000. SAND2010-xxxxP.



In a Sentence

Providing training, consultation & limited equipment to the Government of Iraq (GoI), so the GoI can cleanup its former nuclear complex and safely dispose of the radioactive wastes



Program Background

- **U.S. Dept. of State setup Iraq NDs Program in 2006 to help the GoI**
- **Sandia National Laboratories & Texas Tech University supported Program *since 2006***
- **Other participants include:**
 - International Atomic Energy Agency (IAEA)
 - U.S. NRC and U.S. EPA
 - Other countries include: France, Italy, Ukraine
- **Focused on Al Tuwaitha Nuclear Research Center & 9 remote sites**



Al Tuwaitha Nuclear Research Center

- **Near Baghdad**
- **1 km² nuclear complex w/ 18 major facilities including:**
 - **Two research reactors (Russian & French)**
 - **Fuel fabrication facility**
 - **Radiochemistry Building**
 - **Metallurgy Facility**
 - **Isotope Production Facility**
 - **Waste Management Facilities**

Al Tuwaitha Nuclear Research Center





Russian IRT-5000



Bombed during Operation Desert Storm in 1991





~ 30 Radioactive Waste Tanks

No inventory available for any tank

- 1- Fuel fabrication laboratories (3 tanks).
- 2 - Radioactive Waste Treatment Station (5 tanks).
- 3 - Radioisotopes production building :-
 - a-Russian building (4 tanks + outer 1 tank).
 - b-Italian building (4 tanks).
- 4-Research reactor Tammuz-2 (1 tank).
- 5 - Research reactor IRT-5000 (2 tanks).
- 6 - Russian silo station (2 tanks).
- 7 - LAMA building (1 tank).
- 8 - Radiochemistry building (unknown).

***Russian radioactive waste “cemetery”
– 1960’s – 1991 and records lost***





Building 39 – Storage Bunker



> 920 Disused Sealed Radioactive Sources)

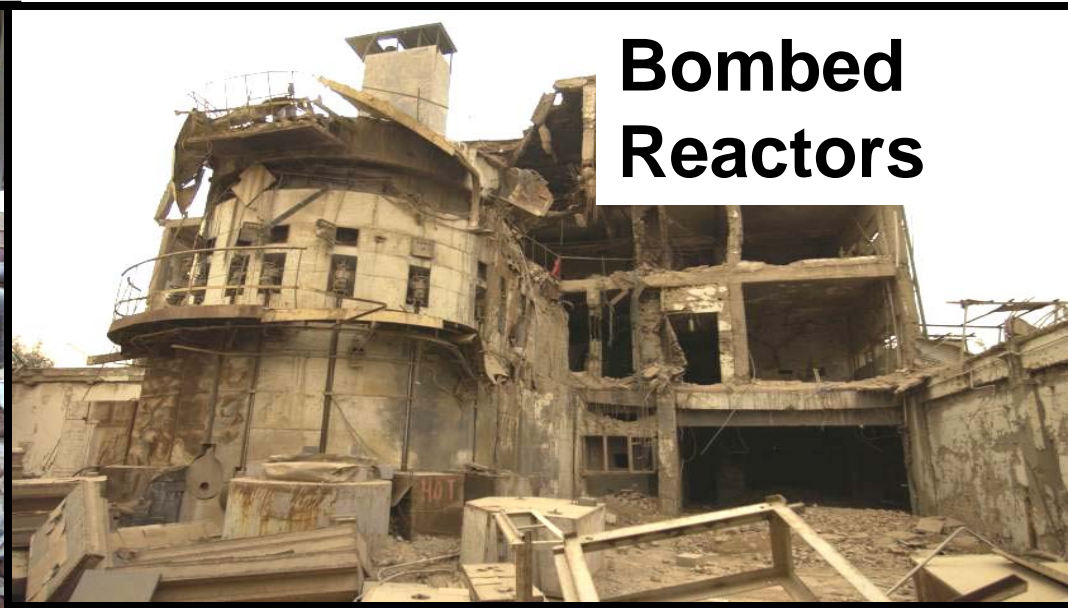


Decommissioning & Radioactive Waste Problems at Al Tuwaitha

Radioactive wastes



Bombed Reactors



Old disposal areas



Unwanted Sealed Sources





2010 Workscope

- **Radioactive Waste Management Training Program**
- **Radiological Worker II Training in Baghdad**
- **Help Setup Ground Water Monitoring Program**
- **Supply Groundwater Sampling Equipment & Training**
- **Draft Overarching Decommissioning Plan for Iraq**
- **Draft Project Plan for Monitoring Underground Tanks containing Liquid Radioactive Wastes**
- **Support IAEA Progress & Planning Meetings**



Radioactive Waste Management Training Program

Jim Thompson, Alicia Aragon
& others



Waste Management Training

- **Two weeks, 22 February - 5 March, 2010**
- **Iraqis work with Sandia specialists (many with decades experience)**
- **Last 2 days: MoST Deputy Minister Dr. Al-Musawi, Director General Dr. Ibrahim, Mr. Jarjies Adnan & Ms. Melanie Wong (IAEA)**



Sandia's Radioactive Waste Management Facilities



Training at Sandia's Mixed & Radioactive Waste Management Facility





Tour Old Sandia Steam Plant in Decommissioning







Radiological Worker II Training in Baghdad

Ross Miller



Radiological Worker II Training

- **Al Rasheed Hotel in IZ**
- **18-22 April, 2010 Rad worker II Class**
 - Course was presented in English
 - Ministry of Science & Technology
 - Ministry of Oil, and
 - Ministry of Environment
- **25-29 April Train the Trainer**
 - Course presented by Iraqi instructors
 - Discussion in Arabic
 - Slides in English





Help Setup Ground Water Monitoring Program

Mike Skelly



Setup Groundwater Monitoring Program

- 4 m to groundwater (GW) under nuclear facilities at Al Tuwaitha
- Assisting RPC in re-establishing GW monitoring program
- Goals:
 - Determine if groundwater contaminated by prior activities, dating to 1960's
 - Determine if waste management activities impacting groundwater
- Sandia drafting GW Monitoring Program Plan



Supply Groundwater Sampling Equipment & Training

Tim Jackson, Alicia
Aragon & many others



Supply GW Monitoring Equipment and Training

- **Purchased pump, tubing bundle, water quality meters (~ \$ 25 K USD)**
- **Cleared U.S. export controls and shipped to Iraq**
- **Trained Dave Kenagy & Dr. Abbas on how to use – 7-9 Sept 2010 (merged training at Sandia with IAEA-funded RPC trip to U.S.)**
- **Dave and Dr. Abbas transfer equipment to RPC and trained RPC staff – mid-September**



D. Kenagy and Dr. Abbas
being trained at Sandia



D. Kenagy and Dr. Abbas training
RPC on use of equipment



Draft Decommissioning Plan for all Decommissioning in Iraq


Alicia Aragon, Nick Durand &
others



Overarching Decommissioning Plan

- **Successful decommissioning requires planning**
- **Sandia drafted the Overarching Decommissioning Plan for IDP – overview of scope, goals, schedule, regulatory process, waste management ...**
- **Process**
 - Outline at IAEA meeting May 2010
 - Draft Plan to IDP – 9 July 2010
 - IDP updates & takes ownership – 15 September
 - Sandia improves the “presentation” – 13 October
 - Sandia supports IAEA Consultancy – 27 October
- **Iraqi Decommissioning Inventory and Waste Worksheet**



Facility Number:	Facility Name: Al-Tuwaitha Building 40 Russian Silos
Facility History: Used for both solid (98 wells/silos) and liquid waste: - liquid wastes evaporated to solid many years ago. Former liquid waste tank still shows high activity. Contents of the silos and liquid tank are unknown: some waste probably originated from the IRT upgrade but the origin of the higher activity waste is unknown. Known leakage to ground after nearby bomb explosion - further information on ground contamination would be desirable.	Facility Photo: 
Current Condition: Structure still present but in decayed state. Roof structure might be unsafe. Surrounding ground areas show spotty contamination. 98 wells/silos contained about 20-30 te solid waste from IRT (including upgrade); 1967-90. 70-80 te solid waste added around 1991 from unknown origin. There were unconfirmed rumors of buried contaminated items in the surroundings.	
Size:	
Contaminants of Concern: Co ⁶⁰ , Cs ¹³⁷ and others	



Draft Project Plan for Monitoring/Maintaining Underground Tanks containing Liquid Radioactive Waste

Matt Dennis



Liquid Radioactive Waste Tank Maintenance and Monitoring Program

- **Approximately 30 tanks in 9 locations**
- **No Inventory**
- **Drafted Plan to maintain and monitor tanks**
- **Eleven tanks pose the greatest risk because: no secondary containment (e.g., not inside basement) or they contain a substantial percentage of liquid waste**



2011 Workscope

- **Deploy U.S. team to 9 “remote” nuclear facilities to assess waste & decommissioning needs**
- **Support waste management activities (storage building & waste management)**
- **Overarching Decommissioning Plan**
- **Continue development GW monitoring program**
- **Support emergency response training**
- **Support database development for GW and rad waste**
- **Continue IAEA Progress & Planning Meetings**



**SNL contractors from TT
Al Tuwaitha, March 2010**





Success Story: First Field Work June 2009



LAMA Facility during cleanup



LAMA Facility after cleanup



Closing

Modest project that is having a significant effect in Iraq