

This book describes various aspects of nuclear nonproliferation, including post-Gulf War inspections in Iraq and implementation of the Comprehensive Test Ban Treaty.

**All Me Bloomin Life: Volume 2 - Life After the Navy,
Recollections of a Nuclear Nonproliferation Career**

By John J. Hyland III

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VOLUME 2 LIFE AFTER THE NAVY

All Me Bloomin Life

Recollections of a Nuclear Nonproliferation Career



John J. Hyland III,
Captain, USN (ret)

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Owner may also be found at jjhylandiii@gmail.com

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Preface

In the first of these two volumes I wrote about my career in the Navy. This much shorter volume deals with my fifteen-year career in nuclear nonproliferation after I had retired from the Navy. Unlike my career as naval officer, which could have been foreseen given my family background, I stumbled into this second act. Although my Navy retirement was generous, it was not enough to support my family, and I needed a job that provided a reliable salary. The market for retired naval officers is largest in Washington, DC, and that's where I found a position as a GS-15 at the Department of Energy [DOE]. That initial position in the Office of Energy Intelligence [OEI] led to fifteen years working on various aspects of nuclear nonproliferation.

This second volume, just as did the first, describes my growth from a neophyte in the field of nuclear nonproliferation to a widely experienced, competent expert. Though my background in nuclear submarines and nuclear weapons provided a good starting point in the field of nuclear nonproliferation, my Navy experience dealt with already fielded nuclear weapons and the procedures for authorized use of the weapons. I had no background in the processes that produce nuclear grade uranium and plutonium, convert a design into a deliverable weapon, and preclude unauthorized use of a weapon. Nor did I have leadership or management experience outside the narrow confines of the Navy. I had to learn how to deal with a new environment that included civil servants, laboratory scientists, foreign nationals, women in the work force, and new sets of institutional policies and politics. My experience as an Olmsted Scholar and a naval attaché proved invaluable in this second career. My work at DOE, the Central Intelligence Agency [CIA], and the International Atomic Energy Agency [IAEA] brought to the forefront the breadth of knowledge and understanding that these two tours had given me.

The highlight of my nuclear nonproliferation career was the tour on the Action Team doing inspections in Iraq after the Gulf War while living

in Vienna, Austria. The other jobs I held in those years were fulfilling, but they lacked the element that I most appreciated: the emotional satisfaction that comes from subordinating personal interests in the service of a goal greater than oneself. I freely admit that living in Vienna for six years was anything but a sacrifice. On the other hand, spending more than a third of the year inspections in Iraq to ensure that Saddam Hussein's nuclear weapons program didn't rise from the ashes like the Phoenix was not exactly a cake walk.

At the heart of this story is Ann, an essential part of my life and whatever success I enjoyed, the love of my life, and a beloved wife and cherished companion for fifty-seven years. In this second career we didn't move as often as we had when I was in the Navy. But, just as was the case with my submarine career, I was often away, especially in my work at the IAEA, which involved travel to Iraq after the First Gulf War. I could not have done it without her.

Nuclear nonproliferation has a technical language and jargon of its own. I have tried to simplify the discussions of the technical aspects of nuclear nonproliferation, most of which aren't common knowledge, so that they would be clear to any reader.

Chapter 2: Weapons Intelligence, Nonproliferation, & Arms Control Center 1994-1996

Fortunately when Jay Stewart began to look for pretexts to fire me, another DOE office, whose mission included building advanced radiation detection devices, was searching for someone to represent it at the newly formed Director of Central Intelligence [DCI] Center for Weapons Intelligence, Nonproliferation, and Arms Control [WINPAC]. At the urging of Bill Ten Eyck, a Pacific Northwest National Laboratory [PNNL] employee, I applied for the job at WINPAC.

Bill also recommended that I consider working for PNNL rather than remaining a civil service employee. He argued that as a PNNL employee I would be a stronger candidate for the WINPAC job. Bill, a retired Air Force officer also knew that as a federal employee I gave up half my Navy retired pay. Working for PNNL meant I would draw 100 percent of my retired pay. This was the first time Bill spotted an opportunity and pushed me to make a change. The upshot: I became a PNNL employee working as the DOE representative at WINPAC.

WINPAC was nominally a joint IC organization with representatives from all IC agencies, including DIA, DOD, NSA, State, and DOE, but CIA employees occupied all the senior positions in the organization. Beneath the veneer of jointness, WINPAC was a CIA organization at its core. The CIA may have weaknesses, but bureaucratic infighting is not among them.

Weapons Intelligence, Nonproliferation, and Arms Control [WINPAC]

At WINPAC I worked for Carter Morris, a Senior Intelligence Service [SIS] officer in the CIA's technical arm, the Directorate of Science and

Technology [DS&T]. The CIA had recruited Carter when he was a physics professor at Florida State University with a doctorate in solid state physics. Carter charged me with two tasks: finding innovative technology to monitor foreign nuclear weapons programs and promoting DOE laboratory expertise within the IC. Carter's tasking required me to translate Washington's requirements to the labs and translate the labs' proposals to Washington. I quickly learned what Carter already knew. Laboratory scientists, always eager for new funding, tend to promise to deliver a usable product in a shorter time frame than is reasonable.

Carter's background in DS&T gave him a broad appreciation for technical intelligence requirements, including those not of direct interest to WINPAC. Requirements for monitoring foreign nuclear weapons programs typically demand sensors that are as small as possible, use minimal power, and have increased radiation detection capability. This combination of requirements pushes existing technical limits and/or requires new, imaginative experimental approaches.

I began my assignment by escorting Carter on a trip to LANL, LLNL, PNNL, and SNL. Always attentive to business opportunities, each lab briefed him on its areas of expertise and suggested projects that might be of interest to WINPAC. Some of these proposals appeared promising and Carter put me in charge of monitoring progress in the ones he decided to support. Frequent sponsor visits to check on progress are the key to completing a project. I spent at least half of my time on the road prodding the scientists to make more progress faster.

Intriguing Device(s)

I also escorted Carter to several other DOE labs. On one occasion I found a particularly intriguing device at a laboratory known for pure science. When I took Carter to this laboratory, he paid close attention to the lab's demonstration of the device. I thought I had found an unknown gem, but on the way back to the airport, Carter revealed he had funded the development of the device when he worked in DS&T and had

deployed it in a program he chose not to disclose. Carter didn't elaborate on how the device was being used either. The lab scientists had no idea the funding for this device had come from the CIA.

On other occasions when I found technologies of interest and arranged for Carter to evaluate them, he always asked penetrating questions without making any commitments. Back at WINPAC if Carter knew of a use outside of WINPAC's interests for what I'd found, he'd say, "Good job, Jay. I'll take it from here." That was his way of saying DS&T had a program that could profit from the technology, but I was not cleared for it and had no need to know.

During this WINPAC assignment the DOE office that sponsored me at WINPAC called me back to headquarters to organize a classified briefing of its technology for the IC. This effort took about four months to organize and pull off, and it went a long way to publicizing DOE's technical capabilities within a wide range of IC agencies. The smaller laboratories, which often had the most imaginative ideas, were extremely reluctant to participate in the briefing. Initially I did not understand their reluctance, but organizing the briefing taught me that there is no honor among scientists. The scientists at smaller labs were wary of the larger labs' scientists poaching their ideas and then using the larger labs' superior financial resources to develop the smaller labs' ideas more rapidly than the smaller labs could. LANL, LLNL, and SNL, for example, had annual budgets on the order \$1 billion that allowed them to fund sensor developments at much higher rates than the smaller labs.

As my two-year tour at WINPAC was drawing to a close, Bill Ten Eyck, who had alerted me to the WINPAC job, told me about an opening for a Deputy Director position on the International Atomic Energy Agency's Action Team and urged me to apply for it. The Action Team was responsible for inspections of Iraq's Nuclear Weapons Program [NWP] in the wake of the 1991 Gulf War. You guessed it: I would be that American. Thank you again, Bill.

Chapter 3: International Atomic Energy Agency 1996-2001

The highlight of my career in the field of nuclear nonproliferation was six years stint as an Action Team employee of the International Atomic Energy Agency [IAEA] from 1996 to 2001. I was the Deputy Director for Analysis on the Action Team, a small group of IAEA employees whose exclusive mission was post-Gulf War nuclear inspections in Iraq. Working on the Action Team was the only time after I retired from the Navy when I had the luxury of waking up every day knowing that I was working for a goal greater than myself and that the people I worked alongside were as committed to the mission as I was.

From 1996 to 1998 I spent more than a third of the year in Baghdad doing inspections, about a third in Vienna planning future inspections, and the rest in the US recruiting inspectors for one-month tours in Iraq. These recruiting trips involved recruiting scientists with backgrounds useful to the Action Team. The other Deputy Directors, Garry Dillon and Jacques Baute, made similar recruiting trips to their nations, Britain and France.

I was the Chief Inspector in the last Nuclear Monitoring Group evacuated from Baghdad in advance of the US Operation Desert Fox in December 1998. After Operation Desert Fox, Iraq refused to allow the resumption of any UN inspections. Anticipating the resumption of inspections at any moment, I remained on the Action Team until I reached the IAEA's mandatory retirement age in August 2001. By then I saw no reasonable prospect of resuming inspections in Iraq and chose to retire from the IAEA and return to the US.

Establishing the Iraq Action Team

UN Security Council Resolution [UNSCR] 687 (1991) provided the legal basis for post-Gulf War inspections in Iraq and assigned the nuclear file to the Director General of the IAEA, Hans Blix. The timelines specified in UNSCR 687 implied that the mission would last only one hundred eighty days. No one anticipated the Iraq inspection effort would last as long as it did or to be called upon to do inspections before the 2003 US invasion of Iraq. Blix established the Action Team on April 15, 1991, to conduct these inspections. For the Iraqi inspection mission, Blix needed a technically competent leader whom he trusted to oversee a daunting technical mission in a complex political environment. Maurizio Zifferero met those requirements, especially the one involving Blix's trust.

Blix called Zifferero out of retirement to lead the inspection effort and assigned Dimitri Perricos as the Deputy for Operations and David Kay as the Deputy for Administration. All three were or had been IAEA employees. Zifferero had been a Deputy Director General and was a world class expert on reprocessing spent reactor fuel. Within the Agency (In Vienna the IAEA is often referred to as 'the Agency' just as in Washington the CIA is often referred to as 'the Agency.') Perricos, well known for his aggressive, acerbic personality, was regarded as one of the toughest inspectors in the Safeguards Department. Kay was viewed as a good administrator with little or no experience as an inspector. Career IAEA Safeguards inspectors and technical experts from IAEA member states supplemented this three-man core in the initial inspections.

Zifferero's close relationship with Blix allowed him to dictate the support he needed from other parts of the IAEA. For example, the Action Team did not follow the IAEA's standard personnel hiring practices. When Zifferero wanted to hire an inspector, he simply notified the IAEA's personnel division of his decision and left it to that office to bring his new hire on board as an IAEA employee. When I was hired, I became a full-fledged IAEA employee eligible for a UN pension

after five years of service, but my hiring didn't go through the normal IAEA bureaucracy. The same was true for the hiring of Jacques Baute, Frédéric Mariotte, George Healey, and the other members of the Action Team with whom I served.

Action Team Personnel

The US insisted that one of the Deputy Directors on the Action Team be an American. This demand was not unusual. All member states of UN organizations insist that the UN hire their citizens in proportion to their budget contributions to the organization. On average the US contributes 20-25 percent of the budget of every UN organization that it belongs to. In turn, this gives the US enormous clout in all aspects of UN operations, including hiring. My two predecessors were DOE laboratory scientists with hard science doctorates who went to Vienna on two-year assignments. The IAEA would have preferred another DOE laboratory scientist with a hard science doctorate, but the candidates with those credentials were unwilling to spend a third or more of the year in Iraq. I was the only candidate who did not balk at the prospect of a third or more of the year inspecting in Iraq.

Between 1995 and 2001, I served with three Action Team leaders: Maurizio Zifferero, Garry Dillon, and Jacques Baute; and two Directors General of the IAEA: Hans Blix and Mohamed El Baradei. The Action Team was multi-national organization with members from Britain, Canada, Egypt, Finland, France, Germany, Great Britain, Morocco, and Russia as well as other countries. The IAEA itself has an even broader representation from its member states. The Olmsted and attaché experiences provided me with an invaluable background for working in this environment that involved a wide variety of technical skills and cultural backgrounds.

The Action Team remained small, a core group of inspectors whose sole mission was inspections in Iraq under the UN mandate. At its maximum strength the Action Team numbered twenty-three, representing sixteen different nationalities. Member state experts in various nuclear

disciplines supplemented the permanent staff for one-month tours in Iraq.

The front office was staffed by an office manager and an assistant. Maurizio had a Roman's unerring eye for handsome women, and the front office staff reflected it. The office manager, Luz Marina Dueñas, was a stunning Columbian woman and an experienced and thoroughly competent administrator able to navigate the IAEA's bureaucracy and get things done quickly. Her assistant, Denise Zalazinski, was a gorgeous red-headed American. Denise was not as experienced in the ways of the IAEA as Luz Marina, but she was more adept than Luz Marina in computer technology, which made her essential in preparing the IAEA's reports to the UNSC. The two women attracted a constant stream of IAEA swains with no obvious business with the Action Team.

Garry Dillon was British and a senior, career Safeguards [SG] inspector before joining the Action Team as Director of Operations. Garry had led the IAEA's effort to verify South Africa's initial Safeguards (SG) declaration. When South Africa abandoned its NWP and signed the NPT, its initial SG declaration presented the IAEA with a difficult, politically charged, one-of-a-kind technical verification issue. Garry's experience in South Africa made him a logical choice for secondment from SG to the Action Team. He had a proven ability to accomplish a complicated technical task in a highly charged political atmosphere. When Maurizio died of cancer in 1997, Garry was the logical choice to move up and head the Action Team.

Jacques Baute had worked in France's NWP. Initially hired by Rolf Ekeus at UNSCOM, he subsequently moved to the Action Team as Director of Operations when Garry Dillon became the Maurizio's Deputy Director. Jacques's knowledge of nuclear weapon design and weaponization from his work in France's NWP made him a critical member of the team. When Garry Dillon retired in 1999, Jacques became the head of the Action Team.

Jacques, conscious of communications security, insisted that the Action Team have its own encrypted communications channel from Baghdad to Vienna that did not go through the Baghdad Monitoring and Verification Center [BMVC] communications center. This separate channel avoided the possibility of a communications compromise in which BMVC personnel might pass privileged Action Team information to Iraq or to UNSCOM. Jacques was also the prime mover in developing Action Team data bases that catalogued daily inspection reports, summaries of interviews with key Iraqi nuclear scientists and engineers, biographies and *curriculum vitae* of key players in Iraq's NWP, documentation supplied by Iraq, and the changing locations of teams of Iraqi scientists. Sandia National Laboratories provided vital assistance in the implementation of Jacques's pioneering data base ideas.

The Action Team's data bases had direct applicability for the IAEA's implementation of the Additional Protocol to Safeguards inspections. Senior Safeguards Department personnel, however, met Jacques's generous offers to share the Action Team's data base structures with a not-invented-here reaction. Even when Jacques later became a Division Director in the Safeguards Department, he met with resistance to his ideas from other SG Division Directors. Knowledge is power and the other Division Directors did not want to cede power by sharing information that only they had. Stove piping information is not a problem encountered only at the IAEA. It's ubiquitous in the US federal government as well.

In 1997 Garry Dillon brought on board another key member of the team, a Canadian uranium expert, George Healey. George spent an extraordinary amount of time in Iraq and was the prime mover in the Action Team's successful effort to put all of Iraq's uranium under IAEA seal in Location C at Tuwaitha. This achievement allowed the Action Team to ensure that Iraq had no uranium with which to rebuild its NWP. Another benefit of George's work was the Action Team's near perfect accountancy of Iraq's uranium inventory.

Dmitri Tolchenkov, a Russian physicist, was another key member of the team. Dmitri, who had grown up in Stalin's Soviet Union, brought a unique understanding of the pressures on Iraqi nuclear scientists facing inspections, meetings, and interviews with the Action Team. In 1998 Garry Dillon sent Dmitri and me on a special mission to get more detail on Iraq's nuclear weapon design. Restricting nuclear-weapon-specific information to Action Team members from nuclear weapon states was a constant concern. Action Team staff included Canadians, Finns, Germans, Indians, and Italians, none of whom were authorized access to nuclear weapons information. Dmitri and I were a team that could accomplish this goal without compromising the weapons-specific information to citizens of non-nuclear weapons states.

Lessons from Dmitri

In one of our first evening meetings Dr. Khalid Ibrahim Said, the chief scientist and director of Iraq's weaponization effort (G-4 in the PC-3 organization), told us that to reduce the weight of Iraq's weapon he had substituted depleted uranium for steel. Even I knew this was impossible. Uranium has a density of 19.1 gm/cc, while that of steel is roughly 7.5 gm/cc. I pointed this out to Dr. Said, but he stuck to his story despite my repeated expressions of disbelief. Finally, Dmitri kicked me under the table and whispered, "Jay, just say that we'll come back to this issue in a later session and move on." That's what I did. On the way back to the Action Team offices, Dmitri explained the realities faced by Iraqi scientists in meetings with IAEA inspectors. He reminded me that the scientists and their immediate and extended families would almost certainly be persecuted, if not killed, if the scientists deviated from their scripts, which had prior blessing from Saddam's government. He concluded, "When we reintroduce this topic later, Dr. Said will have a different, more plausible story, and it might even be closer to the truth."

This was only the first of several lessons in dealing with a tyranny that Dmitri taught me. On another inspection tour both he and I were suspicious of a set of Iraqi buildings that were not on the UNSCOM-approved list of inspection sites. Neither of us wanted to go through the

drill of getting UNSCOM to add this site to the list of sites approved for inspection. We knew our inspection tour would end before the UNSCOM okay came. One morning we set out to do a routine inspection at an industrial facility. Knowing our route took us past the suspicious buildings, Dmitri suggested we stop and buy watermelons and a block of ice to cool the watermelons as well as our supply of drinking water. Having made our purchases at a roadside stand, we continued toward the inspection site. As we passed the suspicious buildings, Dmitri suggested we pull over and have a mid-morning snack of watermelon and cold water. No sooner had we stopped than our minders ran up to tell us this site was not on the approved list. Dmitri acknowledged that fact, smiled, and invited the minders to enjoy the ice-cold watermelon and water.

While we and the minders were eating our snacks, a curious official emerged from the suspicious buildings and had a short discussion with the minders. Dmitri struck up a conversation with the official, I thought to put him at ease. I underestimated Dmitri's cleverness. After finishing our snack and getting back in the car to head for the day's inspection site, Dmitri gave me a complete run down on the mission and activities of the suspicious buildings. From the curious official, who turned out to be the director of the establishment, he had elicited all the information we needed to determine we didn't need to add the site to the list of approved inspection sites. Another lesson in how to get things done in a country ruled by a dictator.

Dmitri had a quirk about not stopping at red lights when we had worked late into the evening at the Canal Hotel. When I drove, I always stopped at red lights even when there was no traffic in the late evening. If Dmitri was driving, when he approached a red light, he would say, "Jay, that light looks slightly green," and drive through the intersection. He also left me with an indelible Arabic reminder of the need to be patient in Iraq: IBM or *Inshallah Bukra Malesh*. God willing, tomorrow, maybe.

Aerial Radiation Surveys

Jacques recruited a fellow French scientist, Frédéric Marriott, to join the Action Team. Frédéric became the Action Team's principal link to France's assistance to the IAEA effort in Iraq. Annually for a month the CEA, France's Atomic Energy Commission, sent a team of scientists to do aerial radiation mapping of the most important sites in the Iraqi NWP. If the radiation map of a site varied significantly from one year to the next, the Action Team went to the site and did a follow-up investigation on the ground to identify the reason for the variance.

The CEA's radiation detector was designed to fit between the skids of the Chilean Huey helicopters used to ferry inspectors to sites too distant to be reached by automobile. Before the first mapping flight the detector had to be calibrated. The Chilean pilots disliked the calibration flight which involved hovering at an altitude of fifty feet or less over Lake Tharthar while the French technicians calibrated their equipment. The pilots knew that hovering fifty feet off the water gave them no chance of avoiding a crash in the event of an emergency. I normally made several of the mapping flights in addition to the calibration flight. The pilots were comfortable flying only at fifty feet over an installation in contrast to their dislike of hovering over Lake Tharthar at the same altitude. I don't know why moving forward at fifty feet seemed okay and hovering at fifty feet was not, but for the pilots it made a difference.

A Bull-in-a-China-Shop

Frank Pabian, an American photo analyst from DOE's Lawrence Livermore National Laboratory [LLNL] Z Division, joined the Action Team as a Chief Inspector. LLNL Z Division is the largest intelligence unit among DOE laboratories, and Frank had extensive experience interpreting imagery of suspicious sites in Iraq. As the senior American on the Action Team, it fell to me to tone down, if not corral, Frank's bull-in-a-china-shop approach to inspections. He was insensitive to the fact the Chief Inspector was the face of the IAEA and his actions could adversely affect the Action Team's reputation for evenhandedness.

anticipated, the sample analyses and radiation surveys showed no evidence of nuclear activity at any of the palaces. The Action Team's approach stood in stark contrast to the UNSCOM approach. UNSCOM inspectors were not equipped to take environmental samples to detect traces of biological or chemical warfare programs, but they carefully mapped each site recording building positions with GPS equipment. The UNSCOM mapping process could reasonably have appeared to the Iraqis as a preliminary step to a later attack on the sites.

Nearly twenty diplomats, dressed in suits and ties, accompanied the Action Team and UNSCOM inspectors, none of whom wore coats and ties, on these inspections of Iraq's Presidential Palaces. After completing my tour as Chief Inspector, I flew out of Bahrain, dressed in standard inspection garb. One of the diplomats who had been on the palace inspections was seated next to me and struck up a conversation with me. Realizing that I had just come from inspecting in Iraq, he commented favorably on the Action Team behavior and inspection techniques. Being a diplomat, he made no mention of the contrast between those techniques and UNSCOM's, but his implication was clear.

Expulsion

In January 1998, Iraq blocked an UNSCOM team led by Scott Ritter from some weapons sites. Iraqi officials stated that information obtained from these sites would be used for planning future military attacks. Throughout 1998 the tension between UNSCOM and Iraq escalated as did US pressure on Iraq. The US strongly suggested that all UN Inspectors leave Iraq shortly before Operation Desert Fox began in December 1998. Seeing the increasing tension between Iraq and US, the Action Team executed its plan for an emergency evacuation in the face of imminent military action. As Chief Inspector I shut down the Action Team office in the BMVC, removing all sensitive materials and the hard discs from all the computers. After Operation Desert Fox Saddam Hussein denied UNSCOM access to Iraq. With UNSCOM's logistics

infrastructure inoperative, the Action Team had no choice but to follow UNSCOM's lead and suspend operations in Iraq.

Impact of Sanctions 1995-1998

In a word the sanctions worked. They kept Iraq from importing raw materials and equipment critical to its WMD programs. At the same time, they extracted an enormous price on the Iraqi population, which suffered from lack of food, medicine, and other essentials. The advent of the Oil-for-Food program in 1996 eased the suffering of the population somewhat, but control of food distribution gave Saddam Hussein's regime an effective means of controlling the population. Senior officials in Iraq, especially those essential to Saddam Hussein's survival in power, by and large, escaped the impact of the sanctions.

On a Friday in 1996, the NMG toured Babylon with a female guide, who spoke English well. Although the day was hot, she wore black mourning clothes. During the tour she said she was mourning the death of a son who had died from an entirely preventable illness due to an inability to get the necessary medicine. She noted that the UN sanctions had already hit ordinary Iraqis hard.

Later in 1997 and 1998, as I've noted elsewhere, the bite of the sanctions became unmistakable throughout the country. Over time the sanctions destroyed the economy of Iraq. They had an unmistakable impact on the sites the Action Team inspected. When inspecting a site that had once made electronic components that could have been used in the Fusing, Arming, and Firing [FAF] system of a nuclear weapon, the inspectors discovered that the site now made simple hand-held calculators and its quarterly production goal was a mere ten calculators. The site manager stated he could not get the raw materials needed to manufacture more than ten calculators per quarter because of the sanctions.

Between Baghdad and Tuwaitha the side of the road was littered with metallic debris. In early 1998 I came back for an inspection and the debris was gone. The minders told me the government cleared the junk

to recycle the metal. There were other signs of the sanctions as well. On the route to one of the large industrial plants we inspected we passed the major power plant for Baghdad. When I began inspecting three of its four smokestacks had heat plumes and smoke coming from them, implying the plant was running at 75% of capacity. By mid-1998 only one of the stacks had a heat plume and smoke. In 1998 if the electricity went out at the site the NMG was inspecting, the employees simply got up and left, knowing the electricity would not come back on until the next day, effectively ended the day's inspection.

Another obvious sign of the sanctions' impact was the growing unreliability of electricity. Action Team inspectors stayed at the al-Hyatt Hotel, one of the hotels where the regime guaranteed their safety. To maintain electricity the hotel had two diesel-electric generators and they came on more and more often as the regime resorted to rolling blackouts across the city. Like the hotel the BMVC had back up diesel generators to ensure we had electricity all the time and, like the hotel's generators, they ran more and more frequently in 1998.

By 1997 another of the many signs of the sanctions' impact in Baghdad were the fire engines sitting on blocks without tires. There were other indicators of the sanctions. Virtually all private automobiles ran on bald tires. Tires were so difficult to find that Iraq began to manufacture its own at Diwaniyah. If an inspector saw a single shipment of new tires in Baghdad during a month-long inspection tour, the sighting was worthy of comment. There is so much dust in the air in Baghdad that, when it rains, it rains mud. In 1997 automobiles had windshield wipers, of course, but they didn't work, another sign of the sanctions. During a rain, Iraqi drivers would jump out of their cars at every red light to try to clean their muddy windshields by hand.

Electromagnetic Isotope Separation [EMIS] uses immense amounts of electricity to enrich uranium. The Action Team inspected all plants in Iraq that used ten or more megawatts of electricity to check that the power was not being diverted to enrich uranium. In this category I inspected cement plants, an iron foundry, and an oil pumping station. At

every one of these sites there were almost no operational meters, which meant there was no way to observe the power coming in or how it was distributed. When asked about the condition of the meters, every manager shrugged his shoulders and said, “Sanctions.”

Another of these 10-MW inspections involved a flight to Basra to visit Iraq’s lone iron and steel foundry. This turned out to be one of the scarier inspections I made; it was as dicey as the HE inspections at Al Qa Qaa. The foundry had almost no safety precautions and the upper level had gaping holes in the floor. The employees were pouring liquid metal without face shields, appropriate gloves, or other safety measures. It was inconceivable that this plant could conceal an EMIS effort. After reading my report no inspector bothered to go back to this site.

For inspections we rode in new Toyota SUVs, while the minders followed in increasingly dilapidated pre-Gulf War vehicles. When we met them in front of the BMVC, they routinely asked us not to drive too fast because their vehicles could not keep up, a daily reminder of the sanctions’ impact.

In 1997 at Tarmiya, which had been the principal EMIS site, I checked compressed gas cylinders and noticed several marked Ether. The Tarmiya representative explained that Iraq no longer had any modern anesthesia for medical operations and had reverted to using ether.

The last, and most telling, impact of the sanctions was increased public displays of Islamic piety. In 1996 a significant number of shops in the souk ignored the Friday call to prayer. By 1998 none ignored it. In 1996 women in Baghdad dressed in conservative western dress and head scarfs were scarce. By 1998 virtually all women wore more traditional clothing and head scarves were ubiquitous. In 1996 billboards showed Saddam Hussein as a victorious leader in military garb. By 1998 the same billboards showed him as a devout Muslim at prayer.

Entertainment

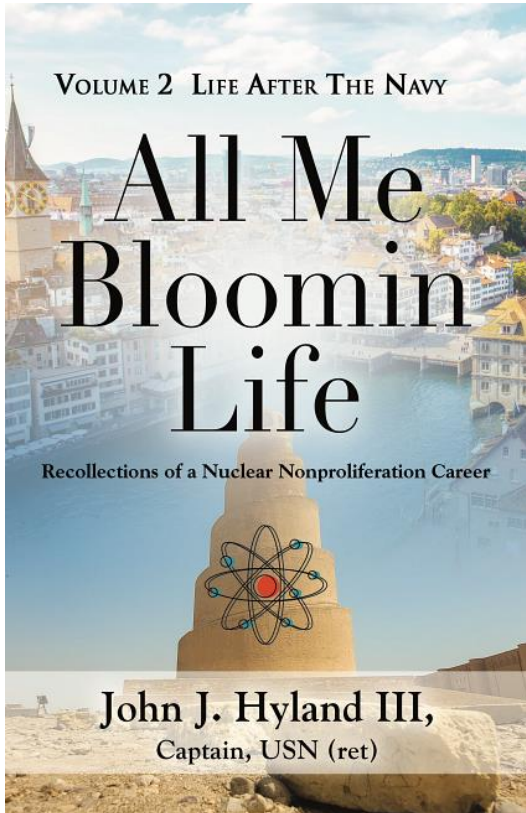
Fridays were normally days off for the NMG with the mornings spent in the BMVC catching up on inspection work. In 1996 in the afternoons we often went to the souk, significant sections of which stayed open after the call to Friday prayers. But as the impact of the sanctions grew, the response to the call to Friday prayers became nearly universal and very few of stalls in the souk remained open.

On one Friday in 1996 we traveled with our minders to Babylon. The minders drew overtime pay for working on Friday, and they often asked if we planned any Friday excursions subtly hinting that they would not object to accompanying us. Saddam Hussein had reconstructed Babylon on its old foundations. During the tour the guide pointed out the world's first bitumen (tarred) road and the lowest course of bricks in the foundations of the ruins where you could still make out the faint mark of Nebuchadnezzar. More prominent in the courses of bricks added to these foundations were the mark of Saddam Hussein, proclaiming himself Nebuchadnezzar's successor.

On another inspection tour I arranged for an excursion to Samarra to see the Golden Mosque, the Al Askari Shrine, a Shia holy site. The minders on this trip were particularly proud of this famous mosque and acted as our tour guides. After visiting the Golden Mosque, the minders insisted we drive outside Samarra to see the ruins of the Great Mosque of Samarra and to climb the mosque's fifty-two-meter spiral minaret. This day was an eye opener for me, the first time I had seen ordinary Iraqis' pride in their country and its history.

The Fat Man and The Princess

The NMG's principal entertainment in Baghdad was shopping for Persian carpets. The Action Team favored two merchants, the Fat Man, whose real name was Mohammed, and the Princess, whose real name I never knew. The continuing flow of carpets into these shops indicated the growing economic hardship among those who were once in the



This book describes various aspects of nuclear nonproliferation, including post-Gulf War inspections in Iraq and implementation of the Comprehensive Test Ban Treaty.

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