

# Steel, Mustard and CK:

## The Past, Present and Future of US Chemical Weapons in New Guinea

Written by Frederick J. Thomas, Photographs by Basil Tindeba Emimie

When my father was drafted in January 1943, the Army assigned him to the Chemical Warfare Service (CWS). Before then he was a plumber, experienced in working with pipes that carried water, waste and natural gas. The Army expanded his skills to include work with more dangerous liquids and gases: mustard agent, lewisite, phosgene, hydrogen cyanide, cyanogen chloride (CK) and more.

During WWII, the toxic chemical weapons handled by my father and other soldiers in the CWS were never used on the battlefield, but both Allied and Axis powers manufactured and deployed them in enormous quantities. A US training film, *You Are in the Chemical Warfare Service, Soldier Brown*, bragged that a single US factory, “can manufacture more mustard gas in one day than was manufactured by us in all of WWI.” The same film predicted the climax of WWII would come “when Hitler, with his back to the wall, frantically uses gas as a last resort.” At that point, soldiers of the CWS “will rush onto the field to take part in a main and deciding way.... [to] produce tremendous casualties on the enemy and at the same time prevent excessive casualties to our own troops.”

Many details about the US deployment of chemical weapons remained secret until 2009 when key documents were declassified under a broad executive order from President Obama. In response to my request, the Air Force Historical Research Agency at Maxwell Air Force Base, Alabama provided digital copies of 28 pages of microfilmed “Organizational History Reports” (OHRs) from my father’s 771st Chemical Depot Company (Aviation). These contained important—and sometimes frightening—insights into the unit’s work managing Ondal Advanced Chemical Park in India. Ondal was America’s central chemical weapons depot for the China-Burma-India Theater, with a stockpile of roughly 100,000 chemical bombs. Some of these bombs were distributed to operational airbases in India, ready to be loaded immediately onto B-29s or other bombers. The order to use America’s toxic chemical bombs never came, of course, and the final task given to the 771st was to dispose of its deteriorating and unwanted munitions.

Almost by chance, I also received 178 pages of OHRs from the 760th Chemical Depot Company (Aviation). The 760th operated a similar chemical stockpile for the South-West Pacific Theater, first near Charters Towers in Queensland, Australia and later near Oro Bay, New Guinea. Their stockpile was smaller than the one in India with roughly 30,000 chemical bombs, and few (if any) of their bombs were deployed further to operational bomber bases. The work of the 760th, however, was even more frightening than the work in India, particularly as WWII came to an end.

Early in the war, it was quite appropriate for the US and other Allied forces to manufacture and deploy large quantities of toxic chemical munitions. Toxic liquids and gases had been used extensively during the First World War, and Japan and Italy used chemical weapons in the 1930s. Germany also had very large chemical stockpiles and was expected to use them. President Roosevelt was adamant in his moral and political opposition to any “first use” of chemical weapons, while recognizing the need to have them available for a “response in kind” and as a deterrent that could (and did) help prevent chemical weapons from being used at all.

After Roosevelt’s death and Germany’s surrender, the strategic environment changed. German retaliation was no longer a consideration and Americans rightly feared the enormous casualties expected during a D-Day-style invasion of Japan. As described by historian Barton Bernstein, high-ranking military leaders in the US gave serious consideration to initiating the strategic use of toxic chemical weapons as a substitute for—or a supplement to—the use of atomic bombs. American public opinion was also shifting closer to a 50-50 split on the moral acceptability of using chemical weapons. Regardless of the high-level decisions on how to end the war, America’s aging chemical stockpiles in India and New Guinea had become militarily irrelevant. If the US had decided to load toxic chemical bombs onto the B-29s bound from the Mariana Islands to Japan, fresh and adequate munitions were readily available for delivery from

Hawaii and elsewhere. It is important to remember, however, that the still dangerous chemical munitions in India and New Guinea would not magically “go away.”

The Company Commander of the 760<sup>th</sup> was initially 1st Lt., Charles E. McCarty. McCarty left the Company in March 1944 to have eye surgery in the US and was replaced as commander by 1st Lt. Edward L. Kenny. Kenny had been part of the Company since December 1942, when they began six months of training in managing “Toxic Yards” at Edgewood Arsenal in Maryland. Kenny was the author of all his unit’s Organizational History Reports (OHRs), including those for the period before he assumed command. He showed careful attention to technical and logistical details, and concern for the 80 or so officers and enlisted men under his command. He also demonstrated consistent devotion to his mission of maintaining dangerous munitions in a state of military readiness.

The 760<sup>th</sup> arrived in Brisbane, Australia on June 13, 1943, having crossed the Pacific aboard the SS Matsonia. The Matsonia was a true luxury liner, built to carry wealthy passengers between the US West Coast and Hawaii. Although the Matsonia was operating in 1943 as a troop carrier, members of the 760<sup>th</sup> would recall the ship’s food and accommodations as far superior to their previous experience at Edgewood. They saw their trip from Brisbane to Charters Towers in a different light. Kenny described their arrival in Queensland with these words:

On the train to Charters Towers, the Company had its first glimpse of the Australian “Bush” and was not greatly impressed. The train was exceptionally slow, the meals served at the railroad stations were not very good and there were no sleeping accommodations. The train crawled into Charters Towers on the evening of the 26<sup>th</sup>. The unit was picked up at the station by QM [quartermaster] trucks and taken to the American Base operated by the 35<sup>th</sup> Service Group. On the Base there was a large Chemical Dump run by the 894<sup>th</sup> Chemical Company (AO) and the 760<sup>th</sup> was to take this Toxic Yard and warehouse over from the 894<sup>th</sup> and run them. Group personnel had set up tents for the 760<sup>th</sup> on the Base and the Company moved in immediately.

The Company’s disappointment with its new location sometimes extended to Charters Towers itself with its “innumerable goats that roam the street at will” and some restaurants that were placed off-limits by the Army Medical Corps. At the same time, Kenny praised his Company’s good relations with the nearby Australian military units.



Figure 1: Map of the Toxic Yard at Charters Towers

The daily work of the 760<sup>th</sup> in Queensland focused on testing, maintaining, and repairing the chemical munitions under their care. When they arrived, the toxic chemical stockpile at Charters Towers was already “large.” The stockpile quickly grew larger with frequent arrivals of new munitions. Both old and new bombs presented problems to the 760<sup>th</sup>, often centered on the 100-pound M47A2 mustard-filled bombs which were the mainstay of their arsenal. The warehouse under their care held gas masks, M10 spray tanks and other nontoxic but essential items. The Toxic Yard in Figure 1 held the explosive bursters and the toxic chemicals.

On Aug. 25, 1943, the Company sent the first of several reports about problems with the M47A2 bombs to the Chemical Officer, Fifth Air Force Service Command in Brisbane. Kenny noted later with pride that information from these reports was forwarded to Washington and came to the attention of General Aldon H. Waitt. Gen. Waitt was then the CWS Assistant Chief of Staff for Field Operations, a position he held until after Japan’s surrender. In November 1945—when other CWS Depot Companies

were still engaged in the disposal of their stockpiles—Gen. Waitt would replace retiring Maj. Gen. William N. Porter as Chief of the US Chemical Warfare Service.

The Company's third report to Air Service Command regarding incoming shipments of M47A2 bombs is dated Nov. 18, 1943. By then, the 760<sup>th</sup> had inspected all 9675 M47A2 bombs received at the depot during August and found 307 were already leaking when they arrived. Of the leakers, 289 were leaking around the burster walls, and could be repaired by unscrewing the bomb's burster, cleaning the threads with steel brushes, repainting the threads with red lead, and replacing the burster. The other 18 were leaking through the bomb's steel casing. These were emptied, the mustard was transferred to other casings and the leaking casings were discarded. Many non-leaking new arrivals had to be brushed clean of rust and completely repainted.

Removing rust and repainting bombs was far more than an exercise in aesthetics. The casings of M47A2 bombs shown in Figure 2 were made of relatively thin, 16-gauge rolled steel. Only about 1/16<sup>th</sup> inch (1.6 mm) of steel stood between the bomb's toxic contents and its handlers. Rust was a direct threat to the munitions and the soldiers. The 760<sup>th</sup> was also responsible for a smaller number of older M47 mustard-filled bombs. The M47A2 bombs were dangerous enough, but the casings of the M47 bombs were only 1/32<sup>nd</sup> inch (0.8 mm) thick, and these had long been recognized as highly prone to leaks. Throughout the unit's two years of operating their depot, much of the soldiers' time was devoted to brushing the rust from mustard bombs and repainting them.

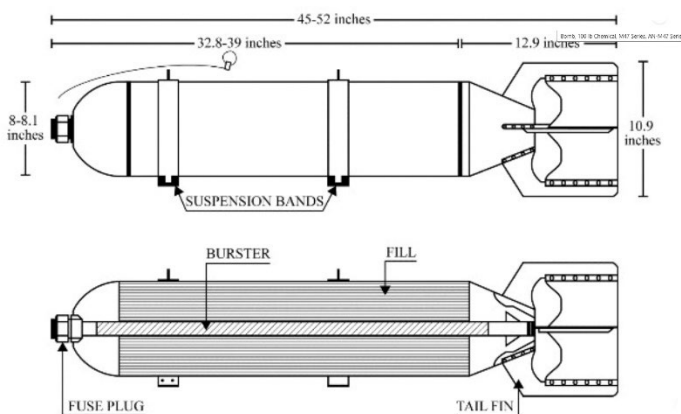


Figure 2: 100-pound M47A2 bomb

The toxic chemicals themselves, of course, were also an area of concern. In addition to the chemicals in bomb casings, the 760<sup>th</sup> maintained a number of one-ton containers filled with bulk mustard. While checking the pressure in those containers, they discovered what appeared to be "faulty mustard," which had changed its color and consistency. When they sent samples to the 42<sup>nd</sup> Laboratory Company in Brisbane for testing, the lab reported that the mustard remained "highly toxic and suitable for use." Writing sometime in late 1943, Lt. Kenny noted that this mustard, "had been stored in a tropical climate for almost two years and had lost none of its potency." This suggests that bulk US mustard agent had been stockpiled at Charters Towers or another "tropical" location since early 1942.

Chemical bombs generally arrived at the depot already filled, but with fuses separate. Although classed as "100-lb bombs," each M47A2 and M47 bomb actually weighed 93 pounds when ready for use. About 73 pounds of that weight was the liquid mustard agent or lewisite and the rest was the casing, fins, burster, and fuse. Bombs were not the only tool available to deliver mustard in battle. Other non-aviation units were prepared with motor and artillery shells containing mustard. As a unit devoted to supporting air operations, the primary alternative to bombs under the care of the 760<sup>th</sup> was M10 spray tanks. As described in the military's online "History of US Involvement in Chemical Warfare," each M10 spray tank could be filled with 320 pounds of mustard or 470 pounds of lewisite for crop-duster style release.

By February 1944, the mustard on hand at Charters Towers was sufficient to fill over 25,000 bombs. The US stock of toxic chemicals at Charters Towers (including both bombs and bulk chemicals) is shown in Table 1. The blister agent the 760<sup>th</sup> called "mustard" was also shown in their reports as "H," "HS" or "Levinstein mustard." All designations indicate the same "sulfur mustard" which had been used extensively during WWI.

Mustard (H)	1,875,447 lbs.
Lewisite (L)	193,686 lbs.
Phosgene (CG)	24,860 lbs.
Hydrocyanic Acid (AC)	14,100 lbs.

*Table 1: Toxic Chemicals at Charters Towers, Feb. 1944*

Sulfur mustard contains as much as 30% sulfur impurities, giving it an odor reminiscent of garlic or horseradish and reducing its effectiveness as a weapon. None of the other variants of mustard agent such as distilled mustard (HD), nitrogen mustard (HN) or mixtures such as mustard-lewisite (HL) appears in the OHRs of the 760<sup>th</sup>. Mustard is an oily liquid that can be dispersed by a small, explosive “burster” within the bomb to form a fog-like suspension of very small droplets. Pain and injury to the skin or eyes were common results of exposure. Inhaling the droplets could lead to serious lung damage. Exposure certainly can cause death or permanent blindness, although most soldiers exposed to mustard during WWI recovered within a few weeks. Mustard agent was “persistent” in that it could remain on clothing or surfaces for weeks, making it difficult or impossible for an enemy to use contaminated rifles, vehicles, artillery or other equipment until these had been decontaminated. Although military use of mustard exploited its short-term effects, mustard is now known to be both carcinogenic and mutagenic with long-term effects that are not entirely understood.

Lewisite is also a liquid blister agent, with short-term effects similar to those of mustard. It dates from later in WWI when it was developed and manufactured by the US, but not in time to be deployed on the battlefield. It might have been part of the US arsenal in the Pacific because it was thought to be more effective than mustard at penetrating Japanese gas masks.

In February 1944, the bombs containing phosgene (CG) and hydrocyanic acid (AC), were new arrivals at Charters Towers, and they generated substantial interest among the officers and enlisted men of the 760<sup>th</sup>. These highly toxic chemicals were quite different from the more familiar mustard and lewisite agents and the unit’s personnel believed they were the first to have them anywhere in the Pacific Theater.

Neither phosgene nor hydrocyanic acid (better known as hydrogen cyanide) was actually new, since both had been used as battlefield gases during WWI. They were also well-known to chemists and chemical engineers since they had—and still have—important civilian uses in manufacturing and other areas. Both have moderate boiling points, 8 °C for phosgene and 29 °C for hydrogen cyanide. This means they can be stored as liquids at manageable pressures within a bomb but change immediately into true gases when released, much as liquid propane in household tanks changes to gas when released. When used as a chemical warfare agent, hydrogen cyanide had the disadvantage of being less dense than air so it dispersed very quickly. Phosgene is more dense than air, and therefore had the advantage of remaining longer in low-lying places, such as the trenches of WWI. Phosgene acts as a “choking agent,” and normally enters the body through the lungs. It caused roughly 80% of all chemical deaths during WWI, but became much less effective once gas masks were widely available.

Cyanogen chloride (CK) was not part of the stock of chemical weapons maintained by the 670<sup>th</sup> in Australia, but it would play an important and uniquely dangerous role during their work later in New Guinea. Like phosgene and hydrogen cyanide, cyanogen chloride is highly volatile with a boiling point of 13 °C, so it can be stored under moderate pressure as a liquid, and changes quickly into a gas when released. All three were considered “non-persistent” by the soldiers who worked with them, since they do not remain on clothing or other surfaces.

The primary mission of the 760<sup>th</sup> was always to maintain its chemical munitions so they were ready for immediate military use. For the 760<sup>th</sup>, this readiness extended into areas of applied research. Likely encouraged by the reception their data on bomb shipment and storage had received, the unit’s officers responded enthusiastically to a request that they join with Australian forces in experiments. Kenny described one such experiment in January 1944.

The 760th was called upon during this month to assist on research work being conducted by the Australian Chemical Warfare Research Unit whose Laboratory and Camp area are located at Innisfail, Queensland. The experiment being conducted was to determine the toxicity of Mustard Gas stored in M47 bombs of which the 760th had three hundred on hand....

The planes taking part in the work left from the strip at Charters Towers, and the mustard bombs they carried were put in the bomb racks and loaded by personnel of the 760th at the request of the ground crews, and non-coms and officers from the Company were assigned to the various planes to assist in the case of leaks or any other mishap as far as the bombs were concerned.

The entire mission was a complete success and data on the experiment is still being collected as this narrative is being written.

The names of higher-ranking officers who participated in the January experiment are difficult to read in the available record. Kenny makes special note, however, that one of the visitors was a Captain from the CWS Medical Research Staff at Edgewood Arsenal in Maryland who had come from the US specifically for this activity.

The 760th was more deeply involved in another set of experiments in April, aimed at improving the effectiveness of M47A2 bombs in jungle conditions (where they tended to explode too soon in the forest canopy) and on beaches (where they tended to penetrate too deeply into the sand before exploding.) Under the direction of Colonel Lewis I. Acker, the 760th drained mustard from bombs and replaced it with paint. When 60 such bombs with the standard fuse and burster were dropped on Hinchinbrook Island off the coast of Queensland, only 15% adequately contaminated the ground below. Over a series of weeks, the 760th modified fuses and other bomb components on a daily basis and provided personnel to examine the results on site. The project collected data from two to four runs per day with 12 bombs per run dropped from various altitudes.

Based on the data with paint-filled bombs, the 760th recommended specific modifications to fuses and other bomb components for each type of target. Questions remained, however, as to the bombs' effectiveness with mustard itself. After Col. Acker was called back to Washington, the project progressed to experiments using actual mustard, under the direction of Captain Howard E. Skipper.

Before leaving, the Colonel had secured another area in the vicinity of Tully, Queensland for use as a Mustard target, and on which both M47 and M47A2 H bombs were to be dropped. The object in view was to use the modifications of fuse and burster arrived at during the previous weeks, but instead of paint filled bombs the actual agent was to be used in similar jungle terrain.

To aid in the technical work, Captain Skipper secured the services of the Chemical Warfare Research and Experimental Section of the Australian Army and much of their equipment.

The Detachment at Ingham, with the exception of eight men, moved to Tully during the first week of June and began the work of collecting data on the H bombings. The eight men left behind at Ingham continued to work with the Laboratory Section of the 94th on the Hinchinbrook Island target....

Forty-three (43) M47 and sixteen (16) M47A2 H filled bombs were dropped on the Mustard Target during this month.

When the 760th completed this project, they had time for recreation with Australian soldiers stationed nearby, playing volleyball, cricket and baseball. "The team lost at Cricket, but in a baseball game with the RAAF a week later restored the Company honor by trammeling the Aussies rather unmercifully."

By May 1944, a year had passed since the 760th departed California for Australia. Fighting continued in New Guinea (as it would until the final Japanese surrender), but victories by Australian and American forces at Madang and elsewhere made it clear any direct Japanese threat to Australia was over. As they watched other units depart Queensland on their way north, the soldiers of the 760th began to speculate on their next assignment. At a party to celebrate the end of their first year overseas, Lt. Kenny reported, "With the flow of beer came the flow of rumor and the ultimate destination of the Company before returning to the States was placed in India, Burma, China and sundry other places."

As Company Commander of a unique and somewhat independent CWS unit, Lt. Kenny may have been more involved with strategic decisions than a typical Lieutenant. He was aware, for example, that his Company's experimental work with chemical weapons had focused on their effectiveness under conditions similar to those in the Philippines. He may even have known before others that the IV Air Services Area Command (IV USAC) to which the 760th was attached was preparing to move all its units out of Australia and reposition them for the assault on the Philippines, as reported in Craven and Cates' history.

Specific reasons for moving the 760th and its munitions to New Guinea are unclear. The intention might indeed have been to make their bombs available for use in the Philippines where the first amphibious landing had occurred in October 1944. Oro Bay, however, was 2000 miles (3200 km) from the Philippines. Alternatively, the option to use chemical munitions might have been considered desirable in fighting the Japanese forces that remained nearer at Wewak and on Bougainville, each about 500 miles from Oro Bay. This second task, however, seems more appropriately left to the Australian chemical munitions which were also available. Support for the US B-29 bases being constructed in the Marianas might have been another goal, although these were 1600 miles (2600 km) away and could be supplied directly with fresh chemical munitions from Hawaii. The most likely reason for moving the munitions to Oro Bay is simply that the US IV Air Service Area Command was moving all its forces out of Australia, and Oro Bay was a convenient place to put dangerous and deteriorating chemical munitions that almost no one actually expected to need.

After 15 months in Australia on Sept. 11, 1944, the 760th received orders to move its chemical weapons stockpile. In addition to fuse components, bursters, and bulk chemicals, the order specified 23,047 bombs as shown in Table 2.

22,205	M47A2, H 100 lb.	Mustard
683	M47, H, 100 lb.	Mustard
104	M44, L, 100 lb. <sup>1</sup>	Lewisite
55	T2, CG, 1000 lb	Phosgene
80	T2, AC, 1000 lb	Hydrogen cyanide

*Table 2: Bombs Scheduled for Movement to New Guinea*

In preparation for the movement to New Guinea, the 760th sent fifty M47A2 bombs to the Australian Field Experimental Station at Bowen, Queensland, and eighty (80) M10 Spray Tanks to the RAAF Experimental Station at Laverton, Victoria. The rest of the munitions were sent by train to Townsville for shipment to New Guinea. Australian chemical munitions from Kangaroo Ordnance Depot were being shipped at the same time. Neither shipment ranked high among the logistical priorities of the time, and neither was treated as a desirable assignment.

When the Chemical Munitions arrived at Townsville the local wharfies became alarmed at handling such a cargo and went on strike. Lt. Cook and Capt. Oliver, after a conference with Australian Military authorities secured the services of the Australian Militia to continue the loading. The loading itself was slow due to higher priorities by other

---

<sup>1</sup> The M44 is actually a 1000-lb bomb. The total amount of lewisite listed earlier supports an interpretation that the 100-lb designation in the OHR is a typing error.

organizations, such as Depot Two, which meant the two ships loading Chemical Munitions had to pull out into the stream. Bombs of the same type from Kangaroo Ordnance Depot were also being loaded at the time. When stored in the hold of the vessel the bombs containing Mustard and Lewisite, built up a concentration of vapor, which though not lethal, was still dangerous, and the instructions as to opening of hatches and the procedure to be followed in unloading were left with the Chief Mate by Lt. Kenny. When these two ships were fully loaded they contained the entire theatre stock level of one hundred (100) lb. chemical bombs.

It took three months from receipt of the movement order for the men and munitions of the 760<sup>th</sup> to actually arrive at Oro Bay, and the transport problems were not yet behind them. Kenny described what would be the final large-scale movement of these chemical munitions, taking care to distinguish his responsibilities from those of other units.

The unloading began a week after the 760<sup>th</sup> arrived and the personnel unloading were members of the Port Battalion. During unloading proper precautions were not taken and many men received Mustard burns. The 760<sup>th</sup> was then called in to supervise the unloading and supplied a detail of twelve (12) men, four (4) on each eight (8) hour shift. These men worked in the holds of the vessel and enforced gas discipline, as a result burns to personnel, which had called for the treatment of fifty one (51) men previously, were cut to six (6) men burned for the duration of the work.

The unit settled into its new camp, erecting tents, listening to lectures on the prevention of malaria and scrub typhus, constructing showers and even starting a garden that yielded its first harvest of radishes a few weeks later. Working with the bombs was more difficult, "requiring work on a larger scale than was ever thought of in Australia."

In characteristic fashion, the 760<sup>th</sup> quickly established and carefully documented a new standard operating procedure (SOP) to deal with what continued to be their most pressing problem—leaking M47A2 mustard bombs. They mounted a slanted box near the stern of a steel barge into which a team of six enlisted men could place a leaking bomb. They punched holes at each end to drain the mustard while the barge moved forward, and then discarded the casing. The process took about one minute per bomb. Initially, this operation was conducted five miles (8 km) from shore. In May, two discarded casing washed ashore on a beach "in the WAC area," and an angry Colonel demanded the dumping location be moved at least ten miles (16 km) from shore.

During their first full month in New Guinea, the 760<sup>th</sup> checked 22,000 mustard-filled bombs and destroyed 141. Of those destroyed, 121 were dumped at sea and 20 were buried. They also disposed of "thirteen (13) truck loads of contaminated bombs, gas resistant sacks and howitzer shell casings."

The next few months in New Guinea provided boredom, hard work, and longings for Australian "pub call." Those months also brought continuing degradation of the mustard bombs and a frightening new problem with the unit's non-persistent, cyanogen-chloride bombs.

The month of May [1945] was unquestionably the toughest month of overseas service for the 760<sup>th</sup>. The novelty of life in the verdant, tropical paradise of New Guinea, so attractively portrayed in Stateside travel posters, had painfully given way to the reality of monotonous swamps, heat, dust, mosquitoes and the boring duty of handling the toxic agents with little or no change in daily routine.

The mustard bombs in the Toxic yard at Strip 12 were leaking more and more each day and a pungent, garlic like odor permeated the air for a mile in either direction. Working in this atmosphere, in impregnated clothing, on a hot day was far from pleasant. At Kabi the situation was even less attractive, since the defective 500 lb CK filled bombs were exploding without any apparent warning. Working in the vicinity of these bombs, and the defective bombs had to be cut out, was hazardous and unpleasant. These explosions,

extremely violent in nature, sent up a cloud of white gas and the detonations alone were capable of flooring a man fifty (50) yards away.

In destroying these bombs, a Standard Operating Procedure had to be established which would enable personnel to destroy the bombs rapidly and safely. Static detonation was out since this entailed removing bombs which might explode any moment to a detonation area three miles away. The remaining method was to destroy defective lots in the storage piles by marking the bombs and penetrating the casing with thirty (30) caliber armor piercing bullets. The background had to be clear in the event of ricochets. The jungle background against which the bombs were stacked was considered safe for the work. When the casing was penetrated from a distance of seventy-five (75) to one-hundred (100) yards, personnel, wearing their gas masks would move away, upwind, until the cloud had dissipated. Since polymerization had not yet occurred, the gas would escape without exploding.

The history of chemical warfare during WWII might have been very different if Japan had not recognized that Germany's surrender, American saturation bombing with explosive and incendiary bombs, Russian entry into the Asian-Pacific war and the atomic bombs made further resistance futile. The distant and deteriorating chemical bombs being maintained by the 760<sup>th</sup> Chemical Depot Company, however, were already irrelevant to the broad conduct of the war. Any toxic chemical bombs that might have been dropped on Japan could have been supplied from larger and newer stocks available in Hawaii and elsewhere.

Another old and distant chemical depot at Ondal Advanced Chemical Park in India was in a similar situation. The 771<sup>st</sup> Chemical Depot Company (Aviation) which maintained Ondal had already begun in April (five months before Japan's surrender) to dump its stockpile into the ocean. Small quantities of the munitions at Ondal might still have been used against Japanese forces fighting in the China-Burma-India Theatre, but their full stock of roughly 100,000 chemical bombs was clearly unnecessary. Like the 760<sup>th</sup>, the 771<sup>st</sup> was particularly concerned with its deteriorating M47A2 mustard bombs. Unlike the 760<sup>th</sup>, there was a nearby CWS company available to help the 771<sup>st</sup> with the complex task of safely disposing of these bombs. Major Joseph L. Gramling, Commanding Officer of the 771<sup>st</sup>, described their initial solution of draining mustard from leak-prone bombs, so the mustard could be shipped in bulk containers out into the Bay of Bengal. He realized the task was more than his Company alone could handle.

It was necessary to call for outside assistance because of the number of men burned from vapors. Three days later 30 colored EM [enlisted men] and one white officer reported for duty from the 769<sup>th</sup> Chemical Depot Company of the 20<sup>th</sup> Bomber Command to assist in the project of decanting bombs. Their first day of duty, 510 bombs were emptied. This was a record for decanting project to date, however, the following day 637 M47A2's were decanted. ...

[when] the job terminated on April 27, approximately 5000 bombs emptied filling nearly 1200 drums. The worse lot numbers were decanted and certain M47A2 bombs will be shipped to APO 671 [Calcutta Harbor] and thence by boat to the Bay of Bengal for disposal.

The initial ocean dump by the 771<sup>st</sup> eliminated about half of their enormous chemical stockpile. After the war's official end, they planned to dump the remainder of their stockpile well out to sea in the Bay of Bengal. Unfortunately, the soldiers of the 769<sup>th</sup> had left India, on their way to rejoin the B-29s of the 20<sup>th</sup> Bomber Command in the Marianas. Rather than removing the mustard from their remaining 15,000 M47A2 bombs or risking shipment of the mustard-filled and leak-prone bombs, the 771<sup>st</sup> received permission to bury the bombs on site. That burial process included an accident in which one of the bombs burst and exposed seven soldiers to mustard, none fatally.

In New Guinea, the 760<sup>th</sup> had little help and no time to dispose of their bombs. The Company's personnel were ordered to board a ship for the Philippines in June 1945, without their chemical munitions.



The organizational move to the Philippines, of which Capt. Kenny was informed at Headquarter in Hollandia on his last visit, took concrete form on the 12th when a Troop Movement Directive was received from FEASC, directing the unit to proceed to Manila, on the Australian ship, "Anhui", when called by Base "B" Troop Movement Office. Packing had been under way for several days, and activities at the Toxic yard had ceased when Lt. Petty, CWS and his crew of thirty (30) men, took over during the second week of June.

On the 15th, the dismantling of structures in the Company area such as the day room, motor pool sheds, grease racks, tool sheds, supply room and orderly room was begun. All salvageable material was tuned in the Engineers and the Company Area completely policed and all traces of Army installations removed. This work was completed on the 22nd. On that date, all personnel and organizational implements were moved to a new location on the beach at Oro Bay.

The next clear information about the status of the US chemical weapons in New Guinea comes in the form of two photographs donated by M. Keary to the Australian War Memorial. One of the photos is shown in Figure 3. Dated as having been taken in 1951, the photos are captioned by the Memorial as showing "American mustard gas bombs lying at the end of the airstrip at Embi. The bombs have been ignited, possibly to assist scavengers to salvage scrap metal."

A related report on Embi Airstrip at PacificWrecks.com quotes Frank Anderson as recalling from 1970:

They were Phosgene gas bombs rusted and some were weeping, I reported them to the Australian army who destroyed them by blowing holes in them with what I took to be shaped charges as the holes were nearly square. They were also large 1,000 lbs bombs. There were also plenty of H.E. bombs in the area.



Figure 3: American mustard gas bombs lying at the end of the airstrip at Embi, 1951

The report from then Capt. Kenny about his unit's departure from New Guinea raises another possibility as to how the mustard bombs in Figure 3 came to be burned. In earlier reports, Kenny was careful in specifying the other units with which he interacted and clearly felt a degree of personal accountability for the munitions that had been his responsibility for so long. The final transfer of authority for those still-dangerous munitions indicates only that Lt. Perry was with the Chemical Warfare Service and that he had a crew of thirty men—far fewer than the 80+ men and officers of the 760<sup>th</sup> who had been struggling to manage the depot. It seems possible that Lt. Perry's assignment was not to care for the remaining munitions, but simply to destroy them or render them unusable. It might have been Perry and his men, not scavengers, who used fire in an attempt to destroy the M47A2 mustard bombs.

With help from the *Papua New Guinea National Museum and Art Gallery* and local expert Basil Tindeba Emimie, up-to-date information about the current status of abandoned US chemical weapons in New Guinea, may finally have come to light. As shown in Figure 4, remnants of the runway at "Strip 12" remain clearly visible, but the bomb casings shown in Figure 3 are no longer apparent. It is possible the casings have been removed for the scrap metal; it is also possible the thin steel casings simply rusted



Figure 4: Basil Tindeba Emimie at the end of Embi Strip 12, Feb. 2023

away in the tropical climate. Soil samples would be appropriate to test for the continuing presence of rust and mustard residues.

The OHRs from the 760<sup>th</sup> Chemical Depot Company describe "Strip 12" as the site for the toxic yard which contained mustard bombs. They refer to "Kabi" as a separate (but nearby) location for the storage of their non-persistent bombs, including the 500-pound M78 bombs filled with cyanogen chloride (CK). There is little additional information in the OHRs or other WWII documents to aid in locating Kabi, except that it was at a boundary between flat, open land like that at Strip 12 and "jungle." Figures 5, 6 and 7 may show Kabi as it is today. The landowners warned that the area was too dangerous to approach closer, but at least two bombs are clearly visible and there are likely many more nearby. Whether or not Tindeba Emimie actually found "Kabi," he most certainly found a location that needs to be examined further by personnel trained in the disposal of unexploded chemical munitions.



*Figure 5: Perhaps at Kabi, taken in March 2023 by Basil Tindeba Emimie.*



*Figure 6: Perhaps at Kabi, taken in March 2023 by Basil Tindeba Emimie.*



*Figure 7: Perhaps at Kabi, taken in March 2023 by Basil Tindeba Emimie.*

The OHRs for the 760<sup>th</sup> mention a third location for bomb storage in New Guinea, but with virtually no details. As the Company was preparing to leave for the Philippines and ultimately Okinawa, Kenny's list of final achievements includes two brief references to 500-pound bombs filled with cyanogen chloride, as shown in Figure 8.

Miscellaneous Projects

300 CK M78 Bombs moved to a new location  
147 ten containers, Mustard and Leursite, pressure tested  
200 CK M78 bombs destroyed  
150 M47H2 bombs destroyed at sea  
229 M47H2 bombs leakers removed  
895 M47A2 bombs tested

Figure 8: From the OHRs of the 760<sup>th</sup>, June 1945



Figure 9: Basil Tindeba Emimie, near Oro Bay, Papua New Guinea, March 2023

The “new location” may correspond to another set of photographs taken by Tindeba Emimie and his assistant, included here as Figures 9, 10, 11 and 12. These bombs are located several miles south of “Strip 12” and “Kabi,” but quite close to the location where the personnel of the 760<sup>th</sup> were preparing to board the ship, Anhui. The CK bombs were the most dangerous bombs in their arsenal. They were also the newest and perhaps the most valuable in the eyes of then Capt. Kenny. Perhaps he believed there might still be an opportunity for a small, select group of these bombs to be shipped closer to the action and to be used in the final battles of the war.

The soldiers at Oro Bay and Ondal Advanced Chemical Park represent just two of the thousands of WWII units left to deal with unused munitions at the end of WWII. Air dispersal of “non-persistent” chemical munitions such as phosgene and cyanogen chloride was undoubtedly a common solution. Ocean dumps were generally the standard method for disposing of “persistent” chemicals such as mustard and lewisite. In late 1945, dispersal seemed to protect everyone, oceans seemed indestructible and most soldiers thought their work was finished. **None of those beliefs was correct.**



*Figure 10: Near Oro Bay, Papua New Guinea, March 2023  
Photographed by Basil Tindeba Emimie*



*Figure 11: Near Oro Bay, Papua New Guinea, March 2023.  
Note the bomb in the center foreground, which appears to have ruptured from internal pressure,  
perhaps as a result of CK polymerizing. Photographed by Basil Tindeba Emimie*



*Figure 12: Basil Tindeba Emimie near Oro Bay, Papua New Guinea*

That concludes the story as we know it of the past and present of US Chemical Weapons in New Guinea. Their future and the future of other unexploded US munitions from WWII in too-often ignored parts of the world is up to you. If you care, please spread the word.

We grant permission to duplicate and redistribute this document as you see fit. If you feel the writing and photographs have value, please pay it forward with a contribution to MAG International at <https://www.maginternational.org/>

March 14, 2023

## Sources:

- "760th Chemical Depot Company (Aviation) Organizational History Reports." 175. Maxwell Air Force Base, Alabama: Air Force Historical Research Agency, 1942-1946.  
<https://www.hoosierscientist.com/760th-history-reports>
- "771<sup>st</sup> Chemical Depot Company (Aviation) Organizational History Reports." 28. Maxwell Air Force Base, Alabama: Air Force Historical Research Agency, 1942-1946.  
<https://www.hoosierscientist.com/771st-history-reports>
- "American Mustard Gas Bombs Lying at the End of the Airstrip at Embi." Photograph P01362.005, 1951, Australian War Memorial, <https://www.awm.gov.au/collection/C243196>
- Bernstein, Barton J. "Why We Didn't Use Poison Gas in World War II." *American Heritage Magazine*, 36, no. 5 (1985). <https://www.americanheritage.com/why-we-didnt-use-poison-gas-world-war-ii>
- Craven, Wesley Frank, James Lea Cate, United States. Air Force. Office of Air Force History., United States. Air Force. Air Historical Group., and United States. USAF Historical Division. *The Army Air Forces in World War II*. 7 vols. Washington, D.C.: Office of Air Force History: For sale by the Supt. of Docs., U.S. G.P.O., 1983., p. 289 <https://www.ibiblio.org/hyperwar/AAF/V/AAF-V-10.html#fn39>
- "Embi Airfield Oro Province Papua New Guinea." PacificWrecks,  
<https://pacificwrecks.com/airfields/png/embi/index.html>.
- "History of United States' Involvement in Chemical Warfare." DoD Recovered Chemical Warfare Material (RCWM) Program, <https://www.denix.osd.mil/rcwmprogram/history/>.
- "You Are in the Chemical Warfare Service, Soldier Brown." In *WWII Chemical Warfare Service Training Video*, 10:12. USA, 1943. [WWII Chemical Warfare Service Training Video \(10 Min 12 Sec\) - YouTube](#)

*Dedicated to Sergeant Roger Thomas and all the other soldiers of the US Chemical Warfare Service who served during and after WWII. They did their best to complete their assigned missions as the world changed around them.*

