

weighed anchor on 7 April and completed their 6,000-mile voyage at Apra Harbor, Guam, on 11 April. The two service groups disembarked the next day with the men in full back packs climbing down the side of the ship using nets. They were trucked 25 miles up the west coast of Guam to Northwest Field and caught glimpses of their new airfield being constructed in the jungle.

Meanwhile, the USS Exchange had steamed out of Eniwetok on 11 April with the remaining 315th personnel. It arrived at Apra Harbor on 14 April, and the men immediately began to disembark. It was well past sunset by the time they were trucked to Northwest Field. "It is easy to imagine the confusion that existed when that bunch of extremely tired, hungry, and grimy men reached the pitch black confines of the embryo airfield, loaded with one another's gear and equipment." Col. Kennedy assumed command of both group echelons and established the 315th Wing Headquarters at Northwest Field on 15 April.

Back in the States, ground echelons of the 331st and 502nd Bomb Groups and the entire 24th and 75th Air Service Groups had already begun their movement overseas. On 6 and 7 April, personnel from these units boarded troop trains at their home bases in Nebraska and Kansas and began to trace the same route to Guam used by the previous 315th units. The 331st and 502nd set sail from pier 39 in Seattle on 14 April aboard the USAT Cape Newenham. Two days later, on 16 April, the 24th and 75th boarded the USAF Kota Baroe and headed for Guam. Unfortunately, the Kota Baroe broke down shortly after leaving Hawaii. Her only escort ship continued on and left the Kota Baroe to fend for herself. While the ship's crew completed repairs, the 24th and 75th men felt alone and an easy target for the enemy. Chaplain Cooper and Colonel Joe L. Neyer, the 75th ASG Commander, seemed to have prepared for such an event. Before leaving the States, they had secretly written to the men's loved ones and asked them to write letters, but to address the letters to Chaplain Cooper.

The 75th Group, while sitting dejected and lonely in the middle of the Pacific blue, heard over the ship's speaker, "The 75th Air Service Group please report for mail call." The men couldn't believe their ears, but were a happy group as they received letters from home. Several thought Colonel Neyer had picked them up in Hawaii as he had gone off the ship there. Following mail call, they were each given a can of beer, also planned back in Kansas.

By 11 May, both ships had arrived at Guam to complete the transfer of all 315th ground echelons to the PTO. The men were glad to set foot on land again and were anxious to get into the war as soon as their flight and air echelons arrived.

The 315th's flight and air echelons were divided into two sections for the deployment overseas. One air echelon section traveled by troop train to Hamilton Field, California.

There they boarded Air Transport Command aircraft for the trip to Guam with intermediate stops at Hawaii and Kwajalein in the Marshall Islands. The other air echelon section flew overseas on 315th B-29Bs with the deploying flight crews. The 16th and 501st Bomb Groups used Kearney, Nebraska, as their staging base while the 331st and 502nd Bomb Groups used Herrington, Kansas. They headed for Mather Field, California, as the POE enroute to Hawaii, Kwajalein, and Guam. The 16th Group's aircraft "Ellie Barbara and Her Orphans," commanded by Captain Ralph Howard, and the 501st Group's "Roadapple," commanded by Major Allen Tintensor, were the first 315th B-29Bs to follow this routing and arrived at Guam on 26 April. The deployment of the remaining 315th flight and air echelons continued throughout May, June, and July as each bomb group completed its stateside flight training.

Captain James C. Mitchell's crew, 501st Bomb Group, had a unique experience during their deployment to Guam. His crew left Kearney, Nebraska, on 11 June 1945 in their aircraft "Late Date" and flew three uneventful legs to Mather Field, Hawaii, and Kwajalein. After landing at Kwajalein, they were surprised to see a small, formal group of people waiting for them at their parking spot.

There was no one around any of the other B-29s being parked. When we completed our check lists and disembarked from the aircraft the group came to attention, gave us a big salute, (and) then the leader stepped forward, introduced himself as the Base Commander, and gave us a reception speech. He welcomed us as being the 1,000th B-29 and crew to deploy through Kwajalein from the U.S. to the Marianas.

The crew autographed a softball and put the tail number of their B-29B on it. Capt. Mitchell's crew was escorted to the base club and served a steak dinner with cold beer. The autographed softball was placed on a shelf behind the club's bar beside various other trophies. Later, the crew received a number of sharp comments from other newly arrived B-29 crews who were treated less royally to C-rations in the mess hall. The next day, Capt. Mitchell's crew left Kwajalein for Guam to join their comrades at Northwest Field.

THE PACIFIC THEATER

War is hell, but it is double hell in the skies.
Gen. Frank Armstrong

The Early Months on Guam

By mid-April 1945, ten Army Engineer and Navy Seabee construction battalions were struggling to complete the airstrip at Northwest Field. Construction officials had underestimated the task in early March and assigned three

NORTHWEST FIELD



Name on tent left side LTC Geo. B. Mackey CO 331st Bomb Gp.
Tents on right 331st Bomb Gp. HQ. Guam 1945



315th Tent Area, Guam.



315th Area, Guam. Home Sweet Home.

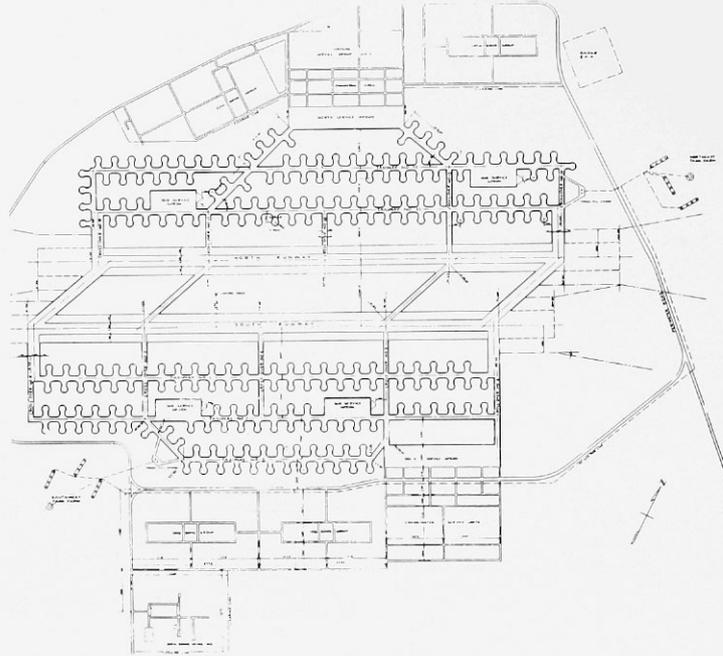


315th Area, Guam

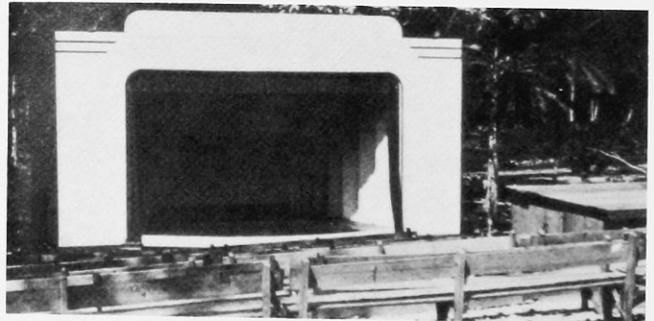


Tent Area 331st Bomb Gp. Men playing ball.

Northwest Field, Guam



315th Area Movie Screen.



more battalions to supplement the seven already on the job. The engineers worked around-the-clock to change near impenetrable jungle into an airfield that met the special operational requirements of the very heavy B-29 bomber.

Bases to hold B-29s, however, must be constructed with a firm rock base and a paved surface. When a 135,000-pound airplane lands on the airstrip, three feet of compacted rock base are needed to hold it. To operate successfully under combat conditions the Superfortress should have a runway approximately two miles long and 500 feet wide. There must be parking facilities, dozens of miles of taxi space, and hundreds of hardstands, all of which also must be paved. The approaches have to be free of mountains and other obstacles for 15 miles at each end of the runway. And, instead of moving 30,000 cubic yards of earth (for typical European airfields with medium bombers), it is often necessary to move a million cubic yards of ground.

The hard coral rock lying beneath the jungle growth dramatically slowed the construction pace. The engineers used dynamite, jack-hammers, and bulldozers to loosen, move, and replace the stubborn coral in a valiant effort to meet the scheduled 1 June operational date for the airfield.

When the wing's first ground echelons arrived at Northwest Field on 14 April 1945, they found very primitive living conditions. The wing had been assigned the last available piece of property on the northwest coast of Guam overlooking a sheer cliff that dropped to the sea. Bulldozer crews had cleared part of the airfield's living areas from the jungle just prior to their arrival. Consequently, there were no living quarters, mess halls, or bathing facilities. There were only a few latrines blasted out of solid coral and a limited supply of water for drinking or bathing in homemade washstands. Temporary living quarters consisted of two-man pup tents and bedrolls on the ground.

The officers of the [76th ASG] were not so fortunate, for their bedrolls were not unloaded from the ship, and they did not have their tents for the first night. The officers had to improvise their own shelter from raincoats and palm branches. Few of the officers will forget their experience during the first night trying to keep dry in their makeshift shelter during the incessant downpour.

The men ate C-rations during the first week. Later, field ranges were uncrated and used to heat the C-rations. The throng of insects, lizards, and huge rats which lived in the nearby trees added to their discomfort.

On their first night on Guam, Privates Harry H. Abernathy and Herbert E. Rowsey were assigned to guard duty and had an uninvited guest. Although Guam had been secured by American forces on 11 August 1944, an unknown number of Japanese soldiers were still hiding on the island

in 1945. Thus, Abernathy and Rowsey were picked to patrol the L-shaped area assigned to the 16th Bomb Squadron from midnight to 0200 hours. Although the men were armed with carbines, they had no ammunition. Suddenly "it sounded like Solomon's Army coming through the jungle." Both men quickly fell to the ground, held their flashlights up at arm's length, and shined the light into the jungle searching for the enemy. The beam of light caught two beady eyes nodding from side to side and coming closer and closer. Suddenly, the enemy came into full view, and the men were face to face with a 3-foot lizard. They guessed it was harmless and, with a sigh of relief, returned to their guard duties.

The water supply was the most critical problem at Northwest Field. Although a deep well with a capacity of 800 gallons per minute was located within 2 miles, the Navy held first priority and wouldn't release a pump to the 315th to use the well. Thus, water had to be hauled 47 miles, round trip, by truck from Agana and chlorinated again prior to use. The water was placed in lyster bags* throughout the area for drinking and in 5-gallon cans for bathing and washing. "The steel helmet became one of the most important pieces of equipment carried by the men and was used for washing, bathing, and washing clothes." Shower facilities were unavailable for seven days until the chemical warfare sections converted two large decontamination trucks into shower trucks. The massive water hauling operation created a logistical and maintenance nightmare for transportation personnel who struggled to keep the wing's water supply lines moving.

Local circumstances forced the 315th to construct its own living quarters and office buildings. When the wing's ground echelons arrived, the 1886th and 1887th Engineer Aviation Battalions were the only units available to work on the wing's building facilities. However, these construction units were immediately directed to work on the higher priority Northwest Field airstrip project. Thus, the 315th was tasked to erect its own buildings. Men from the wing headquarters squadron, bomb groups, and service groups were organized into construction crews for locating and erecting the prefabricated barracks and administrative buildings. Living quarters and mess halls had the highest priority while quonset huts and frame buildings for offices were put up based on future wing operational requirements. The men worked long days in a tropical climate drastically different than that at the training bases in the States. Within a few days, the men improved their skills and were soon completing three barracks a day.

The 315th's medical staffs did a remarkable job maintaining satisfactory health conditions. Mess, latrine, and other camp sanitary facilities were constantly inspected. The deep

*Lyster bags were portable waterproof bags used to supply disinfected drinking water.

latrine pits were oiled twice and burned out once weekly. Pits were constructed for the disposal of waste and laundry water. Preserving perishable food was a major problem in the tropical climate, thus only a 24-hour supply of perishable foods was kept in refrigerators at the mess halls. The mess halls were screened and fly-proofed by spraying with DDT. Pellets of Red Squill, a rat poison, were distributed throughout the area to control rats. Bathing facilities were constructed, and the water purification process was closely monitored. Finally, the medical staffs distributed informative literature on personal hygiene, preventative medicine, and general health safety procedures. Consequently, the only widespread epidemic was an initial outbreak of diarrhea attributed to an overindulgence in coconut milk and an intestinal influenza brought from the ships.

Every special services section strove to improve morale. The three main factors undermining morale were the primitive living conditions, the long work hours in a tropical climate, and the lack of recreational and post exchange facilities. Each special services section used every possible means to overcome these problems.

On the 15th [in the 501st Bomb Group] plans were underway for the construction of a theater and on the 17th of April the theater was in operation. Bomb Boxes were acquired from ordnance dumps for seats, a small shack was built for a projection house, and a sheet spread-eagled for a screen. On the 17th of April, a small quantity of PX supplies was purchased for resale to the troops. Several days later a temporary PX was set up and items were purchased on a cash-and-carry basis from the Main Island Exchange. Both the theater and the PX were the first to be established as such in the Wing.

Sports fields for softball, baseball, football, volleyball, basketball, and horse shoes were constructed, and competitive matches were organized. Sunday church services were initially held in the open air until tent chapels were put up. Each Sunday afternoon the men were allowed to swim at the nearby beaches or to attend boxing bouts at other island installations. The task of maintaining morale was difficult because the base construction activities seemed so far removed from supporting combat operations.

In April, Gen. LeMay decided the 315th would attack the Japanese oil industry. This industry had barely been scratched because it "was not specified as a top priority objective in the current assigned target list." However, Gen. LeMay believed Japan's oil industry was in a critical state and should be knocked out. Moreover, he thought the 315th should strike the refineries because they were located on or near the coastline where the 315th's Eagle radar could pick them up effectively.

Our strength was increasing enormously as new units flew in to join us. The 315th was the last to arrive, commanded by that old Eighth Air Force warhorse, Frank Armstrong. Oil targets became the speciality of the 315th. They were the

only B-29 wing equipped with the so-called Eagle radar....The Eagle had been designed especially for bombardment, and the 315th had trained especially for night missions. This added up to putting them on oil refineries, oil storage facilities, and even synthetic plants.

Lieutenant General Barney Giles, the new Deputy Commander of the Twentieth Air Force, immediately supported Gen. LeMay's decision. When queried by Washington, General Carl A. Spaatz, Commander of the U.S. Strategic Forces Europe, also strongly supported the decision because he had seen the German war machine grind to a halt following the strategic bombing campaign against Germany's oil industry. In addition, the Strategic Intelligence Section of the Air Staff in Washington concluded that the destruction of the Japanese oil targets would have an immediate effect upon the tactical situation. Thus, Gen. LeMay's decision was well supported, and the 315th's first objective in the strategic air war was the destruction of the Japanese oil industry.

As a result, the 315th was put under extreme pressure to perform. Gen. LeMay's previous attempts to test selective target bombing using the APQ-13 radar had proved inadequate. Now the 315th, with its highly touted Eagle radar, was given "the opportunity to test again the feasibility of all-weather attack against selected targets and at the same time to make a substantial contribution to the conduct of the war." Since Japan's oil industry was practically intact, it provided an excellent target to evaluate the 315th's performance. Thus, the 315th was under the gun to prove its radar bombing accuracy.

Meanwhile, the 509th Composite Group was reassigned from the 315th to the 313th Bomb Wing in April. Prior to the 509th's deployment overseas, Colonel Fitzpatrick, U.S. Army Corps of Engineers, was sent to the Pacific to find an air base suitable for the special needs of the 509th. His search revealed that Tinian provided the ideal combination of security, runway length, and a remote area to construct an ordnance facility to handle the atomic bomb. In addition, a Naval Seabee unit was available to provide construction support. Since these factors negated basing the 509th with the 315th at Guam, the 509th was assigned to the 313th Bomb Wing at Tinian.

Moreover, the Twentieth Air Force was also reorganized in April. The four bomb groups assigned to the XX Bomber Command and based on Tinian. However, the headquarters for Twentieth Air Force remained in Washington, D.C.

On 11 and 12 May, the 315th's remaining ground echelons arrived at Northwest Field and found the living conditions somewhat better than their predecessors had in April. The 24th and 75th Air Service Groups arrived on 11 May, and all personnel, except the 581st and 587th Engineering Squadrons, were assigned to quarters on the southern side of the airstrip. The 581st and 587th were assigned

to the less developed northern side of the airstrip along with the 331st and 502nd Bomb Groups' ground echelons which arrived the following day. Two-man wall tents and latrines were ready and waiting. Showers were available although water was still in short supply and strictly rationed. The men dined on C-rations because their mess halls were still a week from completion. Fortunately, mail was distributed in the evening, and it helped the men temporarily forget about the long sea voyage and conditions at Northwest Field.

The 315th's eight photographic units were consolidated into one organization after their arrival at Northwest Field. Prior to deployment, each bomb group and services group had its own photographic section operating independently of the wing and each other. The 315th's photographic officers believed this system would prove inadequate under operational conditions particularly if the separate units were widely scattered at Northwest Field. Thus, during the voyage to Guam, photographic officers from the wing headquarters and the 16th and 501st Bomb Groups proposed a plan to consolidate all photographic units into one organization to meet the operational needs of the wing. These plans were implemented immediately at Northwest Field with the construction of an H-shaped wing photo lab near the wing headquarters building. However, the photographic units weren't the only units to be consolidated.

The wing's four service groups were the victims of a B-29 base reorganization plan initiated by XXI Bomber Command. The plan originated to deal with the unique wing basing system and logistical shortages in the Pacific theater. Due to the limited land mass available in the Marianas, individual wing bases were established to house over 12,000 men and provide facilities for over 180 B-29s. The wing headquarters was established as the dominant operating entity responsible for the tactical, logistical, and maintenance activities of the four combat groups and four service groups at its base. Naturally, the massive buildup of B-29 forces in the Pacific led to critical shortages of manpower, equipment, and supplies, and it became necessary to economize operations. Thus, each wing was directed to combine the supply and maintenance functions of its separate service groups to form centralized wing functions. This meant the integrity of the service groups was sacrificed for economy and efficiency to meet wing requirements.

As a result, the 315th's four air service groups (ASG) began to consolidate their activities in April and May to form a single wing service center. The 315th Wing Headquarters directed the ASGs to consolidate their respective sections along functional lines to conserve manpower and improve efficiency in support of wing operations.

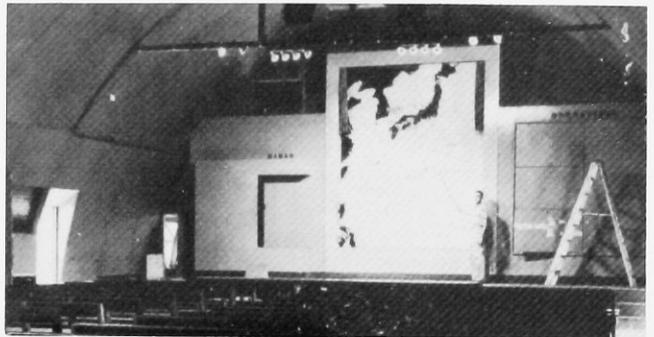
Suffice to say, it was very detrimental to the morale of the officers and men who had worked and trained hard with their friends and associates. Immediately, we had four of everything: commanders, adjutants, personnel staff, enlisted

sections chiefs, etc. In some cases, men were selected as assistants to someone junior to them. Also, some were assigned as assistants to assistants. This also resulted in a surplus of officers and men in some departments, so many of them were called upon to perform tasks far removed from their military specialty. Morale was at a low ebb.

Col. Neyer, the 75th ASG Commander, was the senior ASG officer and assumed command of the wing service center. He immediately initiated a series of administrative actions to implement the reorganization guidance.

The 315th planned to incorporate a unique visual display technique into the wing briefing room at Northwest Field. Prior to deployment overseas, the 315th Headquarter's air echelon at Peterson Field had initiated a project to find a better means of presenting briefing data to flight crews. Current briefing systems relied on poor quality visual projection machines such as the Baloptican and Epidiascope. Thus, the air echelon began an extensive series of tests with phosphorescent and luminescent paints and ultraviolet light.

Using these materials, it was found that the briefing personnel could project pictures, maps, radarscope photographs and charts so clearly that crews could gain a more rapid and lasting understanding. Specific points of interest could be emphasized in more prominent relief through the use of different colors. Another method involved the employment of paints which are invisible under ordinary electric light,



but which appear quite prominently under the ultraviolet illumination.

The results of these tests were submitted to Higher Headquarters, and the 315th was granted permission to use the new method overseas. Thus, the wing briefing room's interior was designed to display large data boards utilizing the new illuminated briefing technique.

Six radarscope photographic missions were flown in May. Radarscope photography was a new development using a special camera, the O-5, attached to the Eagle's radar machinery to record the images displayed on the radarscope. The radarscope film was used for crew briefings and to help operational planners. The missions in May were flown to obtain radarscope film for later use by the 315th in combat

mission planning and to provide training materials for the flight crews still in the States. The first mission was flown on 5-6 May by Capt. Howard's crew in the "Ellie Barbara and Her Orphans." The crew took off from North Field, Guam, where they had been temporarily attached to the 314th Bomb Wing pending completion of Northwest Field's runways. The mission was flown over the Kawasaki Aircraft Plant near Nagoya on the main island of Japan. The crew encountered no flak, but a Japanese fighter trailed the B-29B for 100 miles out to sea. Capt. Howard's crew flew five more missions during May to Kobe, Osaka, Tokyo, Yokohama, and Tamashima. Col. Gurney, the 16th Group Commander, flew with Capt. Howard's crew on the 31 May mission to Tamashima. Most missions were flown at 15,000 feet and the radarscope photographs obtained ranged in quality from good to excellent.

Maj. Tintensor's crew and aircraft, "Roadapple," were lost on the 8 May radarscope mission to Kobe. The crew were members of the 21st Bomb Group. They took off from North Field with Capt. Howard's crew on the daylight mission but failed to return. The reason for the loss of the five officers, five enlisted man crew was unknown. However, Capt. Howard's crew suspected aircraft icing as a possible cause since they had also experienced difficulty with icing on their aircraft.

On Sunday, 24 May 1945, the 502nd Bomb Group conducted a special flag-raising ceremony. The unofficial ceremony began at 0630 hours when the men were marched to the main square of the group's ground echelon area. Around them stood rows of two-man tents erected earlier in the week as their temporary homes on Guam. Four group officers presented an American flag to Colonel Joyce, commander of the ground echelon, who ordered the raising of the nation's colors. First Lieutenant Godsell, Group Special Services Officer, led the entire group in singing the National Anthem as the American flag fluttered in the morning breeze. This ceremony occurred six weeks after the 502nd's ground echelon left Grand Island, Nebraska, and marked the end of their period of initiation on Guam. The group was ready to begin constructing its permanent home and preparing for full-scale combat operations at Northwest Field.

Later that day, four enlisted men from the 485th Bomb Squadron, 501st Bomb Group, were involved in a tragic accident. The accident occurred around 1900 hours as the men were proceeding toward the Northwest Field housing area. Along their route of travel, a bulldozer had previously punctured an aviation gas pipeline on the side of the road causing gas to be sprayed onto the roadway. When the weapons carrier carrying the men entered the affected area, the gasoline fumes ignited and all four men were seriously burned.

As a result of [their] burns, Pfc. McCarty died at 2357 hours

on 24 May 1945; Pvt. Barna died at 0300 hours, 26 May 1945; Pfc. Lantosh died at 2300, 25 May 1945; and Pfc. Phillips died at 1500, 26 May 1945. Pfc. Phillips was buried at Military Cemetery number two, Guam. Pfc.'s McCarty and Lantosh and Pvt. Barna were buried in the same cemetery on 27 May 1945.

The loss of these men reminded their comrades of the dangers of fighting a war, regardless of one's location in the combat zone.

The 315th Wing Headquarter's air echelon arrived on Guam between 20 and 28 May. The air echelon came in small groups aboard a stream of 315th B-29Bs. Gen. Armstrong arrived on 28 May in his own B-29B, the "Fluffy Fuz III," built especially for him by the Bell-Marietta Company in Georgia. The "Fluffy Fuz III" had the normal B-29B modifications plus fuel-injection engines and reversible propellers which allowed the aircraft to use only half of the runway when it landed on Guam. The next day, 29 May 1945, Gen. Armstrong assumed command of the 315th Wing Headquarters at Northwest Field.

On 1 June, a formal dedication ceremony for Northwest Field was held on the south runway. Gen. Armstrong circled the field in his "Fluffy Fuz III" to begin the ceremony and landed on the newly completed south runway. He taxied the aircraft and parked facing the distinguished visitors' ceremonial platform while hundreds of men from various military services responded with thunderous applause and cheers.

On the speakers' platform with the Naval executive (Admiral of the Fleet Chester W. Nimitz) were: Lt. Gen. Barney M. Giles, commanding the Army Air Forces in the Pacific Ocean Areas; Maj. Gen. Curtis E. LeMay, Commanding General of the XXI Bomber Command; Maj. Gen. Henry L. Larson of the Marines, the Island Commander; Brig. Gen. Frank A. Armstrong Jr., Commanding General of the 315th Wing; and Col. Lee B. Washburn, Commanding Officer of the 933rd Engineer Aviation Regiment, the construction director.

The distinguished speakers highlighted the significance of the event in the brief but impressive ceremony. Admiral Nimitz, the honored guest for the occasion, made the opening ceremonial remarks. He commended the aviation engineer and naval construction battalions for their superhuman efforts to build Northwest Field. He also stressed the connection between the mission of the troops on Guam to the total war effort in the Pacific. Col. Washburn spoke next and declared Northwest Field operational. Gen. Armstrong promised a fine flying tradition and excellent results from the 315th's future combat operations out of Northwest Field. Gen. Larson spoke of the "unity of command and purpose" in this construction project and concluded by saying Northwest Field was a "milestone in the march to

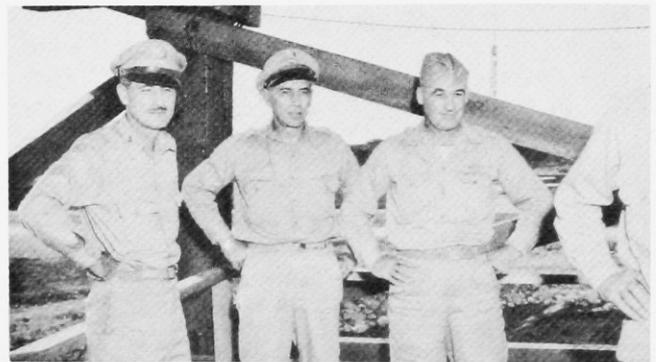
DEDICATION NORTHWEST FIELD



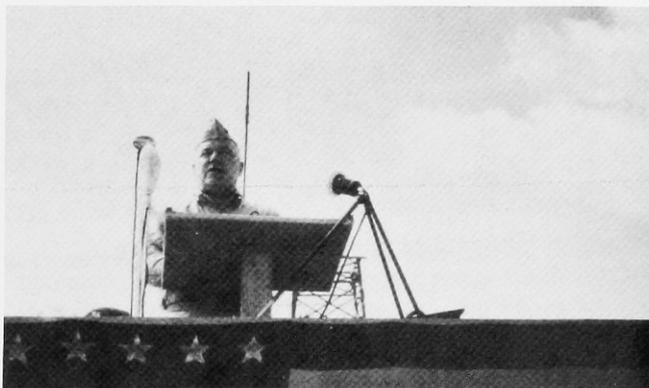
Sanborn , Nimitz, Giles.



Admiral Nimitz



Kissner, Armstrong, Twining



Maj. Gen. Larson, USMC Island Commander



Lt. Gen. Giles



Brig. Gen. Armstrong, CG 315th Bomb Wing (VH)



Giles, Armstrong, Larson (USMC)

PRESENTATION OF B-29 to FLEET ADMIRAL NIMITZ



Gen. Armstrong, Adm Nimitz, Gen. Armstrong, Col. Hubbard, and Crew.



Fleet Admiral Nimitz, CINCPAC-POA, shakes hands with some young Army airmen at Guam in early 1945.



Gen. Arnold, Col Hubbard, Adm Nimitz.



Gen. H.H. Arnold's last trip to Pacific landing Northwest Field.



Adm Nimitz congratulating crew followed by Col. Hubbard and General Arnold.

Tokyo.” Finally, Lt. Gen. Giles also commended the engineers and revealed that certain ranking Japanese engineers had told the Japanese Imperial Command that insurmountable terrain problems would never permit American B-29 forces to operate out of the Marianas. Gen. Giles then wondered what these Japanese engineers would say after the upcoming B-29 Superfort raids.

In early June, First Lieutenant Wesley Rhodenhamel, 15th Bomb Squadron radar navigator, made a special deal with some Navy Seabees to improve his standard of living. The Seabees came to Northwest Field trying to trade fake war souvenirs for booze. The men in Lt. Rhodenhamel’s quonset hut weren’t interested, but he offered 4 quarts of booze for a refrigerator—a luxury item found only at the mess halls. Although the two parties agreed on 6 quarts, Lt. Rhodenhamel didn’t expect the Seabees would deliver. Two days later around 0300 hours, four Seabees backed a truck up to the rear of his quonset, unloaded a refrigerator, and demanded 8 quarts of booze. They settled for 7. The refrigerator was promptly plugged in, stocked with warm beer, and temporarily hidden with a sheet. Before daylight the refrigerator was enclosed in two modified 500-pound bomb crates and resembled the other similarly constructed clothes closets in the quonset. Later in the day, Lt. Rhodenhamel and a quonsetmate drove to the Navy base at Agana and bought enough fresh lettuce, tomatoes, and cans of Navy hams to make sandwiches for awhile. They also bought a hot plate for only one bottle of booze and set out to procure bread from the mess halls even though this was strictly forbidden by posted official notices. Two days later, notices were posted all over Guam requesting information from anyone “knowing the whereabouts of admiral Nimitz’ refrigerator.” The men in Lt. Rhodenhamel’s quonset knew they were in trouble if their tough-minded Squadron Commander, Lieutenant Colonel Richard Kline, ever found out. Consequently, they were extremely cautious thereafter when they drank their cold beer and ate their sandwiches. While they secretly thanked Admiral Nimitz for the refrigerator, the wing was also preparing to formally thank him for his help in other areas.

On 14 June, the 315th held a special dedication ceremony at Northwest Field to honor Admiral Nimitz. Gen. Armstrong wanted the 315th to give special recognition and tribute to Admiral Nimitz and all the naval personnel who had given so much logistical support to build Northwest Field’s airstrip. Therefore, the 315th readied a B-29B, named it the “Fleet Admiral Nimitz,” and dedicated it to Admiral Nimitz at 1700 hours on Northwest Field’s south taxi strip. General H. H. Arnold, who was in the area on an inspection tour, was the keynote speaker for the ceremony. In his remarks, Gen. Arnold referred to the dedicated B-29B as a “distinct manifestation of the gratitude and admiration of the 315th Wing and the entire Air Force for Admiral Nimitz.” Gen. Arnold added that Japan would soon feel the weight of what the name Nimitz meant when the aircraft

began its combat missions against the Empire. In response, Admiral Nimitz expressed his honor and gratitude for the special christening.

After the official ceremony, Admiral Nimitz and Gen. Arnold inspected the “Fleet Admiral Nimitz.” They were introduced to Col. Hubbard, the aircraft commander and 501st Bomb Group Commander, and his crew. Next, Admiral Nimitz and Gen. Arnold toured the aircraft, and the crew described their respective duties and the aircraft’s outstanding features. Before departing, Admiral Nimitz presented Hubbard with a five-star insignia to put in the upholstery, a case of beer, and a bottle of Haig and Haig for the crew to celebrate with later.” In an expression of good luck, Admiral Nimitz later sent an autographed portrait to the crew members of the “Fleet Admiral Nimitz.” The good luck gesture was well timed because the crews were busy training for their first combat mission.

The 315th’s flight crews had to complete several weeks of theater indoctrination training before they could fly missions over the Japanese Empire. The training included two days of ground school, two orientation flights, and two shakedown missions required by a special XXI Bomber Command directive. Ground training included target study, air-sea rescue procedures, and tactical doctrine. The local orientation flights prepared crews for operations out of Guam. The two shakedown mission targets assigned to the 315th were Truk and Farajon de Pajaros. Truk, a major Japanese stronghold in the Eastern Carolines Islands by-passed by advancing American forces, still had Japanese forces on it and provided an excellent training target. Pajaros was a totally uninhabited and militarily unoccupied island in the Marianas used for bombing practice. The shakedown training included a trip to Iwo Jima, a small but vital B-29 emergency airfield secured at a high human cost by American Marines.

The first of seven shakedown missions for the 16th and 501st Groups in June was flown on the night of 16 June. Gen. Armstrong attended the pre-mission briefing. He welcomed the crews to the combat area and congratulated them on the start of their combat careers. He warned them that “war is hell, but it is double hell in the skies.” He also urged caution until they gained combat experience. Twenty-six crews flew the first practice bombing mission to Moen Island, Truk, and the mission was successful. The two groups flew six more shakedown missions on 21, 23, 25, 27, 28, and 30 June to Moen Island and Pajaros. Although there were no losses due to enemy action, one B-29B crashed during landing following the 28 June mission to Truk. Fortunately, the crew survived the accident.

The flight crews practiced their defensive measures on these relatively safe shakedown missions. They were authorized to go to full power and top speed in their B-29Bs to evade enemy fighters, searchlights, and flak. In addition, pieces of aluminum foil, or “rope,” were also ejected over

the target area to confuse enemy radar-controlled searchlights. If the rope was dropped too late, the aircraft could be lit up, or “coned,” by the searchlights, and the antiaircraft batteries could zero-in for the kill. Finally, the crews depended on the APG-15 tail turret guns as their only defensive firepower against fighter attacks. Despite these defensive measures, the 315th’s crews were excellent targets in their lightly armed Superforts flying in a single-ship stream over the target.

While some crews were flying shakedown missions in June, other crews were flying radarscope photography missions. Usually one or two aircraft were sent on these missions to obtain radar film of Japanese oil industry targets. During the month, “such priority strategic sites as the Utsube River Oil Refinery, the Kawasaki Petroleum plant near Yokohama, the Ube Coal Liquefaction works at Kudamatsu, the Maruzen refineries and others were photographed extensively.” The wing’s operational planners analyzed the radarscope film for the wing’s upcoming strikes against Japan’s oil refineries. These missions also helped the radar and photo technicians to eliminate any remaining discrepancies in the radar and camera equipment. However, these weren’t the only last minute preparations for the wing’s first combat strike.

A new air-sea rescue (ASR) system was implemented during June. Under this system, an LCI (landing craft, infantry) would patrol the shoreline of the island just off the runways when the Superforts started their Empire missions. In addition, a Dumbo (rescue aircraft) would cruise over the shoreline area to direct the LCI to any aircraft and crew in distress. Subsequently, the flight crews were required to practice ditching drills using this new ASR system. Each crew was taken a few miles out to sea in an LCI and tossed overboard with only a Mae West (life vest) for floatation. Shortly thereafter, a Dumbo dropped a rubber raft to the crew who inflated the raft and then used a signaling mirror to contact the Dumbo. The Dumbo contacted the LCI and directed it to pick up the crew. This local ASR system was part of an elaborate system set up in the Pacific using submarines, destroyers, and long-range patrol search planes to support downed aircrews. Although the flight crews hoped they would never have to use the ASR system, it was reassuring to know it was there as they crossed the vast Pacific.

On 18 June, a large service center theater was dedicated and named “El Gecko.” The theater’s name, El Gecko, was the Guamanian name for a common, harmless lizard on the island. The dedication ceremony capped many hours of voluntary off-duty labor performed mainly by service group personnel. Navy Seabees and Army Engineers supported the effort by bulldozing and terracing the building site. A large stage, 40 feet by 90 feet, was built to attract live entertainment to the 315th’s part of the island. Theater-like seats were constructed from discarded wooden bomb crates. The huge

outdoor amphitheater had a seating capacity of over 5,000 and provided an excellent facility for presenting live stage shows and movies. The El Gecko theater was one of the finest entertainment facilities on the island, but it wasn’t the only source of recreation.

In June, five enlisted men went searching for war souvenirs and found more than they wanted—some were still alive. Initially, Harry H. Abernathy, Harry J. Edwards, John C. Hockaday, Charles E. Ohse, and Cecil G. Westberg were lucky and found a Japanese skeleton and a broken trench shovel in the jungle. They continued their search through a coconut grove where the surrounding savannah grass was head high.

About that time three Japs jumped across the trail and we could see the rifles and the hand grenades they were carrying. I (Abernathy) do not know who was the more frightened—the Japs or us. Anyway, Hockaday and Westberg wanted to fight them barehanded, and Edwards and I said it was time to return for supper. This was about 3 p.m. and we both knew supper was not ready until several hours later. About that time, Edwards, Ohse, and I started to run, and a bang came from somewhere and Westberg and Hockaday ceased yelling to come out and fight barehanded and ran with us. I do not know if any other men of the 16th Sq., 16th Gp. ran from the enemy, but we five certainly did.

Encounters such as this were rare since the Japanese soldiers preferred to hide in the jungle, and many of the men in the 315th weren’t as adventurous. Fortunately, these men escaped with a lifelong war memory and didn’t become the enemy’s war souvenirs.

On Saturday, 23 June 1945, the 331st and 502nd Bomb Group Commanders arrived at Northwest Field. The aircraft bearing Col. James Peyton, the 331st Commander, was greeted by four jeep loads of men led by Lieutenant Colonel George B. Mackay, commanding officer of the group’s ground echelon.

An airman dropped through the plane’s nose wheel well,



Colonel Sanborn - Arrival Guam.



Colonel Peyton - Arrival Guam

flashed a grin at the welcoming committee, greeted Lt. Col. Mackay, 'George, that ocean's big!' Col. James N. 'Big Jim' Peyton, Commanding Officer of the 331st Bombardment Group, had arrived. With him—6,000 miles and 28 Superfortress hours from the U.S.—was the group's first combat crew to reach the unit's operational base, a 356th Squadron crew led by Captain Julius H. Baughn.

That same day, a plane piloted by Col. Kenneth O. Sanborn, the 502nd Commander, touched down on the south runway. A few minutes later, Col. Joyce welcomed Col. Sanborn, Major Ronald Johnson (502nd Group Technical Inspector), and Captain Dillingham's flight crew to Northwest Field. The ground and air echelons of both bomb groups were glad to finally be reunited.

The 315th wing staff gave construction priority to Service Center G during June. Service Center G was located on the southern side of the Northwest Field airstrip and was the designated operations area for the 16th and 501st Bomb Groups. The 331st and 502nd Bomb Groups were scheduled to use Service Center H following its construction on the northern side of the airstrip. Since the 16th and 501st were scheduled to become operational first, the large (75 structures) Service Center G complex received the highest construction priority. By the end of June, 68 of the 74 structures were finished with the remaining 6 nearly completed. In contrast, none of the 54 structures planned for Service Center H were begun in June.

Several of the 315th's key facilities were completed just in time for the wing's first combat mission. The wing briefing room was finished, and its walls were lined with large panels to provide aircrews with the latest information on target statistics, flak defenses, escape and evasion, and strike and reconnaissance photographs. The control room in the new communications building was the central operations communications point for the wing and had enlarged panel boards to show aircraft status, weather data, crew availability, and pertinent flight statistics. The photo lab personnel had radar photographs ready for the pre-strike briefings and were standing by to process post-mission radarscope film to analyze bombing damage. The permanent control tower replaced the temporary one built in May, and the tower personnel were anxious to launch the wing's aircraft on the first combat strike.

Operations

On 26 June, the 315th was charged with excitement as the wing prepared for its first mission against Japan's home islands. The field order specified a maximum wing effort against the Utsube River Oil Refinery at Yokkaichi. Every man was anxious to show what the 315th could do, and each flight crew member keenly felt the anxiety and tension of the occasion.

The Commanding General reflected this attitude at the

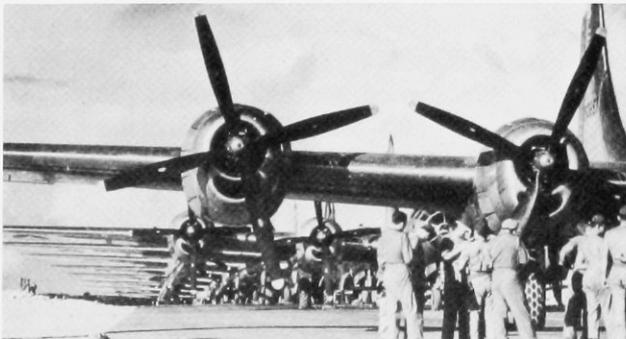


• IWO JIMA

NORTHWEST FIELD → GUAM



Navigator - Fluffy Fuz, William C. Leasure.



briefing for that first mission. In tones of understatement that underlined his emphasis, General Armstrong declared, "The 315th Bomb Wing is making history today. If this mission is successful, this raid will revolutionize aerial bombardment." And every last man voiced an inward thought that he would do his best and then some if necessary to make it a success.

The many months of training, organization, inconvenience, and planning were about to be tested in combat.

The pre-takeoff briefing was thorough. The operations officer briefed the mission using the 315th's special illuminated briefing technique. A night attack was planned to permit daylight takeoffs and landings as well as to compensate for the 315th's lightly armed B-29Bs. A 28-mile synchronous radar bombing run was planned at 15,000-16,000 feet in compliance with the tactics established by Gen. LeMay's XXI Bomber Command. The mission's routing passed Iwo Jima before and after the strike and provided an emergency landing field, if needed. The intelligence officer described the enemy's defenses, and the weather officer gave the mission forecast. The crews then conducted their specialized briefing and reviewed the mission profile, route check points, and radarscope photographs of the target. Everything was ready for Empire Mission 1.

Precisely at 1700 hours, Gen. Armstrong started his takeoff roll in the "Fluffy Fuz III" to lead the mission. Thirty-four B-29Bs from the 16th and 501st Bomb Groups followed him down the south runway at 1-minute takeoff intervals. Col. Gurney led the 16th's 15 B-29Bs while Col. Hubbard, in the "Fleet Admiral Nimitz," led 19 from the 501st. On takeoff the Superforts' engines became extremely hot as they strained to lift the bomb-laden planes into the tropical air. The crews found the steep cliff at the end of the south runway was well suited for B-29 operations, and they dropped down to just above the water to let the cooler air reduce the engine temperature before starting their climb. However, one 501st crew still had to turn back with engine trouble. Just prior to landfall at Japan, First Lieutenant Davis, 501st Bomb Group, also had an engine fail. Undeterred, he altered heading to complete a three-engine bombing attack against a target of opportunity at Kagata. The remaining 33 Superforts headed for the Utsube plant.

As the crews started their bomb run, the weather conditions were ideal for radar bombing. The sky below was totally overcast and blinded the enemy's ground defenses. The APQ-7 Eagle radar easily penetrated the cloud cover and located the target at the mouth of the Utsube River two miles south of Yokkaichi. One Japanese fighter with its running lights on made a pass at Col. Gurney's aircraft but didn't fire a shot. Approaching the target, the antiaircraft fire was meager and inaccurate. The 33 Superforts crossed the target in a steady, single-file stream and dropped 223 tons of bombs on Utsube. After crossing the target, each crew

turned sharply to change course, called a "breakaway," and headed homeward.

Two minutes after breakaway, the crew of the "Moldy Fig" nearly collided with another Superfort. First Lieutenant Ray J. Blaskey, the bombardier, spotted another B-29B about 100 feet away and yelled for the pilot, Lt. Leonard D. Jones, to dive to avoid a collision. The left scanner had been dispensing rope at the time and was thrown halfway through the camera hatch by the violent maneuver. Moments later the right scanner was knocked out briefly when he stepped into a hole and fell to the floor while trying to go rescue the left scanner. The right scanner quickly recovered and pulled the left scanner out of the hatch. The scanners administered first aid to each other and were all right. The crew of the "Moldy Fig" never discovered who they almost hit that night, or who was at fault in the near collision.

The 315th's first mission had mixed results. On the positive side, the wing completed its first mission and proved it was operational. There were no major injuries, and only one plane received minor damage to the right rear bomb-bay door. One 16th Bomb Group B-29B, commanded by First Lieutenant Whitted, ran low on fuel and landed at Iwo Jima. The remaining aircraft returned safely to Northwest Field, including Lt. Davis who flew all the way back to Guam with only three engines operating. On the negative side, the target was only partially destroyed. "Reconnaissance photos disclosed that 539,330 feet, or 30 percent, of the roof area was destroyed or damaged as a result of this mission. Many of the vital portions of the refinery were hit and seriously damaged." However, the refinery had not been knocked out, and another mission was needed to complete the job.

The 315th's first Empire mission highlighted the unique distance and weather problems complicating the strategic air campaign against Japan. First, the one-way distance from Guam to the Japanese mainland was more than 1,450 miles, or twice the distance for bombing missions in Europe. Secondly, Japan was situated between the continent of Asia and the broad Pacific Ocean and subject to unusual weather conditions. "Invariably, there were stacks of deep-bellied, stagnant clouds. Winds over Tokyo at high altitude probably were the strongest and most conflicting in the world." The high winds aloft over Japan were erratic in direction and generally from 100 to 175 miles per hour in velocity. These unusual winds drastically complicated the bombardier's task of lining up for the target and compensating for excessively high or slow ground speeds. Bombing accuracy also suffered because the winds adversely affected the flight path of the bombs falling to the target. Finally, the weather enroute to Japan over the vast stretch of water was frequently characterized by towering, powerful thunderstorms. However, "The Superfortress Supermen shrugged at the weather and drove their ships through the fronts to drop bombs either visually or by radar."

To deal with the unusual weather over the target, Gen. Armstrong decided to modify the bomb run procedure for Empire Mission 2. He planned to send an aircraft to the target a few minutes ahead of the wing's main force to broadcast wind drift information. The remaining crews could then apply sufficient corrections during the bomb run to compensate for the rapidly changing wind conditions, thereby improving bombing accuracy. Since the wind run aircraft would also drop bombs, Col. Hubbard took the assignment for this mission.

On 29-30 June, the 315th launched 36 B-29Bs to attack the Nippon Oil Company's plant at Kudamatsu. The Kudamatsu plant was one of the largest petroleum producers in Japan. Superforts from the 16th and 501st Groups launched in separate waves starting at 1811 hours using 45-second takeoff intervals. Shortly after takeoff, a 16th crew experienced engine trouble, jettisoned their bombs, and returned to Guam escorted by another B-29B. Meanwhile, the 501st, as the lead group, slowly climbed 8,000 feet while the 16th continued to 10,000 feet. One hundred miles prior to landfall at Japan, two more 501st crews had engine failures and terminated the mission. The remaining 32 Superforts climbed through a weather front to 15,000 feet and started their radar bombing run.

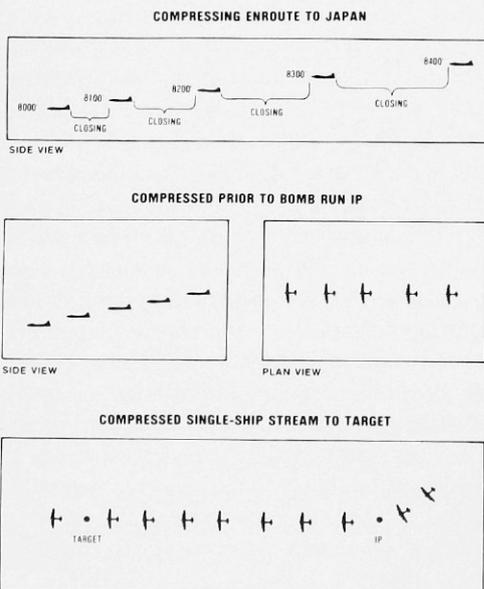
For the second time, the weather at the target was ideal to test radar bombing. A solid overcast hid the Kudamatsu refinery located west-southwest of Kure on the coast of Honshu Island. Col. Hubbard's crew flew ahead and reported a strong wind shift during their bomb run. Meanwhile, 17 enemy fighters approached the main wing force and began flying a parallel course as close as 500 feet. Since the fighters didn't attack, they may have been getting altitude checks for the anti-aircraft batteries below. However, enemy flak activity was light. The crews used 1-minute bombing intervals and dropped 209 tons of 500-pound General Purpose (GP) bombs on Kudamatsu. All aircraft returned safely to Northwest Field and completed the mission with an average flying time of 14 hours and 56 minutes.

The bombing results for Empire Mission 2 were similar to the first mission. Photo-reconnaissance showed the Kudamatsu plant sustained only 5 percent total damage with a 45,000 square foot refining unit and several small storage tanks and buildings totally destroyed. The bomb impact pattern was to the right and long with the Haitachi Manufacturing Company, a locomotive factory located adjacent to the Kadamatsu plant, approximately 40 percent destroyed by bombs falling beyond the briefed target. Although the bombing results for the first two missions were somewhat disappointing, the 315th crews had a taste of combat and were proud of the damage they had inflicted on the Japanese Empire. They were eager to improve their performance in the month of July — Gen. Armstrong was too!

Gen. Armstrong directed his staff to improve the wing's bombing accuracy. After careful analysis of wing bombing procedures, the 315th's operations staff realized the European theater bomb run procedures being used by the wing were inappropriate for Japan. The shorter bombing runs by units in Europe and by the 315th in the States didn't provide enough time for the crews to compensate for the unique wind conditions over Japan. Thus, they decided a much longer bombing run was needed to give crews adequate time to apply the wind information being supplied by wind run aircraft and to lock-in on the target. On the other hand, they were concerned that a longer bomb run would also increase crew exposure time over the target and give the enemy more time to zero-in on the Superforts. Furthermore, they knew this exposure time problem would heighten as the wing increased in strength and dispatched more aircraft. While other bomber units relied on formation bombing to reduce exposure time, the 315th had to fly in a single-ship stream to align the APQ-7 radar with the target. Each 315th crew was one-on-one with the target and the enemy's defenses. Something was needed to improve their chances for survival on a longer bomb run.

In response, Captain William C. Leasure, Gen. Armstrong's staff navigator and wing Tactical Plans Officer, developed a "compressibility" procedure to solve the problem. His procedure compensated for the lengthy B-29 takeoff period and allowed the flight crews to safely compress their aircraft interval during a longer bomb run. The key to his procedure was a method of aircraft cruise control the crews would use enroute to Japan.

We planned that each aircraft would fly at 100' elevation intervals—using the same indicated airspeed for all, i.e., the



first aircraft fly at 2,000' from Guam to the point where the climb was started to achieve bombing altitude prior to the IP; the second at 2,100'; the third at 2,200'; etc. The True Air Speed factor of 2 percent increase over indicated per 1,000 feet, gave me the closure over a great distance that was necessary to compress the aircraft bombing times to perhaps 20 percent of the elapsed takeoff time outlined to match the needs.

The compressed stream of aircraft crossed the initial point (IP) at the planned altitude and maintained their compressed spacing to the target. Capt. Leasure's procedure increased aircraft compressibility during the longer bombing run and minimized flight crew exposure to enemy fire. Unfortunately, the group commanders opposed the longer bombing run and compressibility plans because of factors unknown and concern for the safety of their men. Gen. Armstrong listened to all the objections, but supported the plan by stating, "That's the way it will be." Consequently, the groups prepared to use Capt. Leasure's procedure on the next Empire mission.

Meanwhile, Lt. Rhodenhamel had to reveal the existence of his secret refrigerator to the 16th Bomb Group commander. Following Empire Mission 2, Lt. Rhodenhamel had taken bread from the mess hall and had to pass by Col. Sam Gurney on the way to his quonset hut. Col. Gurney said nothing, but within an hour he paid a visit to Lt. Rhodenhamel's quonset and asked about the bread. Lt. Rhodenhamel confessed he had taken the bread and then promptly offered Col. Gurney a cold beer and a sandwich. Col. Gurney was surprised to see the refrigerator, but sat down and enjoyed the hearty snack. From then on, Lt. Col. Richard Kline, the 15th Squadron Commander, was always interested in why the 16th Group Commander was such a frequent visitor to Lt. Rhodenhamel's quonset.

Morale in the 315th improved dramatically in June. Living conditions were substantially better with prefabricated housing construction nearly completed and some of the permanent mess halls opened. The 16th and 331st Bomb Groups' newspapers, El Gecko and The Target, respectively, made their debut at Northwest Field in June. The 502nd's Special Services Section installed an ice cream machine and began making ice cream for the entire group on Sundays. The inauguration ceremony for the El Gecko theater was followed by several live shows and nightly movies. On 28 June, the wing announced the installation of a new mail facility to improve mail services. A long list of eagerly awaited promotions was released at the end of the month. However, the biggest boost to morale was the reuniting of the wing's ground and air echelons and the start of combat operations against Japan.

By the end of June, Northwest Field's airstrip was

nearly finished. The south runway and service aprons were operational. The north runway was two-thirds finished and forecasted to be operational in early July. Most of the grading work on the north runway's taxi strips was completed and readied for hard surfacing in July. The wing needed the north runway and service strips completed to expedite the launching of its rapidly growing B-29B force.

On 2-3 July, Col. Hubbard led Empire Mission 3 against the Maruzen Oil Refinery at Shimotsu. The plant was not only a major producer of aviation gasoline, lube oil, ordinary gasoline, and fuel oil, but it also had extensive oil storage facilities for the Japanese Navy. The wing launched 40 aircraft and 39 dropped their 500-pound GP bombs on the



Maruzen refinery. The returning aircrews reported columns of smoke rising to 10,000 feet and thought they had leveled the target. However, reconnaissance photos showed only 5 percent of the plant was destroyed. Consequently, a follow-up strike was scheduled for the night of 6-7 July.

On Empire Mission 4, Col. Hubbard led a force of 60 Superforts to restrike Maruzen. Col. Gurney led the 16th Bomb Group's element of 31 B-29Bs. As the B-29Bs approached Japan at 10,000-11,000 feet, 34 enemy fighters jumped them and made several attacks seeming to try to ram the Superforts. Col. Hubbard's crew flew ahead to bomb the target and to broadcast the wind data to the remaining wing force.

In the nose, the Norden bombsight indicators came together. Hubbard's red light flashed, indicating the bomb bay doors had snapped open. "Bombs away!" came the cry and the aircraft lifted as 10 tons of bombs headed for Maruzen. Hubbard swung right and down away from the target. His copilot, Major Gregory Hathaway, got the best view because he was on the inside of the turn as explosions erupted below and lit up the clouds. "We've hit pay dirt!" Greg shouted. "Of all the crap I've taken since I've been in the Army, it's paid off tonight."

Minutes later, 58 other Superfort crews located the target on radar, dropped their lethal bomb loads, and turned homeward leaving Maruzen engulfed in flames.

The reconnaissance photos for the Maruzen Mission proved its success. Photo analysis experts at XXI Bomber Command reported the Maruzen Oil Refinery was totally destroyed. Gen. LeMay's staff concluded that a force of 117 non-Eagle equipped B-29s would have been required to produce the same results as the 315th's smaller Eagle radar force. Gen. LeMay was so impressed he sent a congratulatory message to the 315th.

Successful strike is subject. I have just reviewed the poststrike photography of your strike on target 1764, the MARUZEN Oil Refinery at SHIMOTSU, the night of 6/7 July. With a half-wing effort you achieved ninety-five percent destruction, definitely establishing the ability of your crews with the APQ-7 to hit and destroy precision targets, operating at night. This performance is the most successful radar bombing of the Command to date. Congratulations to you and your men.

Gen. LeMay's praise reinforced the growing self-confidence and pride each man in the 315th had in his unit and its combat abilities. Thus, they were eager to repeat their accurate bombing performance on the next mission. Coincidentally, a new wing program was ready to ensure they would.

A radar operator training program was started to correct deficiencies noted in the first few Empire missions. Major problem areas identified included wind drift corrections for the bomb run, coordination between radar operators and bombardiers, and radar identification of landfall points. Training classes that included thorough radar film analysis were started to correct these problems and improve mission planning. In addition, a mockup of the APQ-7 was built so radar operators could practice inflight maintenance procedures.

While early radar operators were poorly trained, those in the 315th had the best training of all. Pre-mission briefings were so thorough that operators had to spend hours going over radar briefing material, including scope-reconnaissance photos of the target, and they had to prove they could draw the details of the target from memory.

The training program was used to increase the radar bombing accuracy of crews already in combat and as a means to share their experiences with the newly arrived crews.

The 315th also implemented a new altimeter setting procedure to improve aircraft compressibility over the target. Altitude separation was a crucial factor for safely compressing aircraft over the heavily defended targets. Different methods of coordinating altimeter settings at mission takeoff briefings had been tried but proved lacking. Finally, the 315th's crew tried an altimeter setting of 29.92 inches (barometric)* for the entire flight except for takeoff and landing. This method proved highly successful and became the standard operating procedure for the wing's aircrews.

For Empire Mission 5, the 315th revisited the Utsube River Oil Refinery on 9-10 July. The 331st provided 4 crews for its first mission against Japan and joined 60 crews from the 16th and 501st. Col. Peyton, the 331st Group Commander, led the crews of Captains Baughn and Goring and First Lieutenants Moore and Griffieon on the mission. Northwest Field's north runway was operational for the mission, and the wing's 64 Superforts launched at 30-second intervals. Approaching the coast of Japan, 50 enemy fighters were spotted, and two attacks were made. On one attack, First Lieutenant Maurer's crew exchanged fire with a fighter, but neither aircraft was hit. Flak over the target was moderate, and four aircraft suffered minor battle damage. Sixty-one Superforts reached the primary target and dropped 469 tons of GP bombs on Utsube with the 331st contributing 27 tons to the total. Aircraft compressibility was excellent with 50 aircraft crossing the target in 33 minutes. Except for two 16th Group B-29Bs which landed at Iwo Jima, all aircraft reached Northwest Field. However, one aircraft crashed and burned on the runway after its landing gear collapsed on landing. Fortunately, the crew survived. Photo-reconnaissance showed the raid successfully knocked the plant "out of commission for at least several months, if not completely beyond repair." While the 16th, 331st, and 501st were

successfully striking Utsube, tragedy had struck the 502nd back at Guam.

On the night of 9 July, one of the 502nd's flight crews crashed shortly after takeoff on a training strike to Truk. At 2300 hours, the first of ten 502nd crews launched from Northwest Field on the unit's first shakedown mission. The launch went smoothly until the last aircraft, commanded by First Lieutenant Wilkes, suddenly wavered in the air moments after takeoff and plunged into the sea 200 yards northeast of Guam. An LCI crew patrolling the coastline saw the aircraft explode. Immediately thereafter, personnel at Northwest Field heard a secondary explosion and saw a huge fireball light up the night sky. Air-sea rescue units searched the area thoroughly, but no survivors were found. "A piece of material containing the plane number was found which identified the crashed plane. A Mae West, 1 glove, and 4 green oxygen bottles were identified as accessories of the plane." Meanwhile, the 502nd's remaining airborne crews continued the Truk mission knowing their striking force had been reduced by one. The 502nd's first combat training strike against Truk proved successful but was marred by the loss of Lt. Wilkes' crew. The cause of the accident was unknown, but it may have been brought on by an engine malfunction.

The 315th's maintenance personnel faced a difficult challenge trying to keep the Superfort's engines operational. Although the Wright Cyclone 3350 engines on the 315th's flyaway B-29Bs were far better than those on the aircraft used in training, they still had a lot of valve problems.

The 3350 was known for swallowing valves. It was a strange engine to troubleshoot because the same problem would not always give you the same indication. One day as the aircraft were taxiing out for a mission, we pulled an A/C out of the line-up because we could hear the familiar loud tapping noise as it went by. The engineer had no indication of a problem, and the pilot was furious because he wanted to make the mission. We soon found the problem—(zero) compression on one cylinder, which meant a cylinder change.

When the maintenance crews first arrived on Guam, they were authorized to change a maximum of three cylinders on an engine. However, in the summer of 1945 they received a TWX authorizing them to change all 18 cylinders, if necessary, because a labor strike at the stateside engine plant had severely disrupted the flow of replacement engines to the Pacific theater. This TWX dramatically increased the workload of the 315th's already overworked maintenance crews. The grueling work schedule was hard on all ground support personnel, and the men sought various outlets to relieve their tensions.

In July, the men of the 24th Air Service Group used their talents to improve morale by supplementing their beer

*This altimeter setting procedure is used today in the United States' air traffic control system.

rations. Finding something alcoholic to drink was not too hard for the flight crews, but the ground personnel's beer was rationed to two cans a week. With the help of some Seabees and Navy personnel, several members of the 24th built a homemade still and started making "Raisin Jack" and running off "white lightning." The procedure was an art form for several members who hailed from Kentucky and West Virginia, and their product sold for \$20 a gallon. It was also 130 proof so the men used juice, water, or anything they could get to cut it. One night, someone spiked the water bag outside the 24th Headquarters Squadron barracks with Raisin Jack. As a result, many men were unable to report for duty the following day. First Sergeant Walter Bolding analyzed the problem and was the first to discover the cause of the epidemic. Thereafter, the morale of the 24th was usually higher than many of the other groups.

On 12-13 July, the 315th attacked the Kawasaki Petroleum Center. The same four 331st crews from the previous wing mission joined 58 crews from the 16th and 501st for Empire Mission 6. In the primary target area, there were four separate, but adjacent, companies: Standard Oil, Rising Sun Oil, Nippon Oil, and Mitsui Products. Although the target was protected by heavy anti-aircraft defenses, there was little flak due to heavy overcast skies. Thirty-eight enemy fighters were spotted, and two brief, but unsuccessful, assaults were made on the Superforts. Fifty-three B-29Bs dropped 452 tons of bombs on the target before turning homeward. In the raid, the target's tank storage capacity was moderately damaged while 27 percent of the total roof area was also damaged. The target was not totally destroyed and would have to be hit again.

Unfortunately, the 315th suffered two combat losses on the Kawasaki mission. Both B-29Bs and crews were from the 16th Bomb Group. Shortly after takeoff on the mission, First Lieutenant Milford Berry's crew developed three runaway propellers on their aircraft and were forced to ditch at sea approximately 125 miles north of Guam. At least five men of Crew 28 were known to have bailed out before the crash. Of these, three were picked up alive by surface rescue vessels, one was found dead, and the fifth man was never located. The other five crewmen apparently went down with their Superfort. In the second incident, First Lieutenant James C. Crim's crew completed their bombing run at Kawasaki but failed to return to Northwest Field. Lt. Crim and his crew were listed as missing; no word was ever received from the crew.

The three survivors of Lt. Berry's crew owed a special debt of gratitude to the 315th's Personal Equipment Sections. The wing's life support specialists not only maintained and stored flight crew lifesaving equipment, but they also provided emergency procedures training. Although the flight crews hoped they would never have to use their parachutes, life vests, or rubber rafts, they knew the dangers of the long overwater combat missions.

Any aircrew member who has returned safely from the unenviable experience of 'ditching' must have taken time out to thank the Lord for his good fortune. But a sense of appreciation must have told him that he should have reserved a mental note of tribute to those men responsible for the condition of the lifesaving equipment which made this 'ditching' a success.

Each member of the wing's personal equipment sections had a tedious job of maintaining thousands of pieces of life support equipment in top working condition. They measured the success of their support efforts in the number of crew lives saved by the operable condition of the life support equipment they provided.

By early July, the 315th Wing staff was concerned about repeated reports of serious malfunctions with the APG-15 radar-directed tail turret system. Crew gunners had increasingly reported they were forced to recalibrate the APG-15 inflight even though maintenance personnel had calibrated the system perfectly prior to takeoff. In addition, the APG-15 frequently locked-on to a target without searching or would search but refuse to lock-on to a target. Fortunately, enemy fighter attacks had been light. However, intelligence reports indicated the Japanese were conserving their fighter forces and building strength to defend the home islands against an American invasion. Since the 315th's crews were sitting ducks for enemy fighter attacks without the APG-15 system, the wing staff wanted the problem corrected as soon as possible.

On Friday, 13 July 1945, the wing initiated Special Project EPR No. 1 to solve the APG-15 problem. Major William G. Pierce was assigned as director to accomplish the project's threefold purpose: (1) To place in combat readiness at once the APG-15 and related equipment in operational B-29 aircraft under this command; (2) To teach group personnel how to use this armament; and (3) To teach all B-29 gunners of these groups how to operate the equipment advantageously. A special group of people was selected to help Major Pierce, Dr. Vance Holdam from MIT, the designing engineer on the APG-15, was flown to Guam to help solve the maintenance difficulties encountered by every group in the 315th. Test flights were conducted using P-38 aircraft to make simulated attacks on B-29Bs to evaluate the APG-15 system and its operators. Training courses were developed and given to maintenance and flight crew personnel. The 315th's goal was to ensure that all personnel and equipment were fully prepared if, and when, the Japanese decided to use their remaining air power to counter the 315th's operations

On 15-16 July, the 502nd Bomb Group got its baptism of fire on Empire Mission 7. The target for the mission was

the Nippon Oil Refinery at Kudamatsu. Captains Hall, Worda, and Swartz and First Lieutenant Boulware led their 502nd crews on that unit's first combat mission. Col. Sanborn, the 502nd Group Commander, flew as an observer on Capt. Hall's aircraft. The 315th launched 71 Superforts for a return visit to the weakly defended Kudamatsu plant. An 85-mile bomb run was planned using a 1-minute bombing interval between aircraft. Two crews were sent ahead to act as weather scouts for the primary target and then completed a diversionary bombing attack on the Ube Coal Liquefaction Company. Enemy opposition was negligible, and 61 Superforts pounded Kudamatsu with 494 tons of bombs. All four 502nd aircraft bombed Kudamatsu, and Capt. Hall's crew split the target in half with 27 bombs. After bomb release, the crews broke left and headed to a turning point on northern Kyushu. They then cut across the eastern tip of Kyushu and headed for Guam via Iwo Jima. There were no casualties or aircraft losses for the mission.

Damage reports from the Kawasaki raid showed the target was virtually destroyed. All the refinery units were damaged or destroyed, and there was also extensive damage done to the adjacent warehouse buildings and a crude oil tank farm.

341,000 barrels, or 85 percent of the original crude oil tank capacity (400,000 barrels) destroyed or damaged; 49,300 barrels or approximately 70 percent of the original intermediate oil tank capacity (71,300 barrels) destroyed or damaged; 17,200 barrels or approximately 15 percent of the original refined oil tank capacity (115,700 barrels) destroyed or damaged; 2 oil bunkering piers on the south side of the refinery destroyed.

The wing's first raid with all four bomb groups participating was tremendously effective and set the stage for larger bombing strikes.

The 315th's Superforts were readily identified in combat by their distinctive external features and unit markings. The 18-foot APQ-7 Eagle radar antenna mounted beneath the fuselage and the single tail gun turret were unique to the 315th's B-29Bs. Each Superfort also had a large diamond symbol painted on the tail with one of four letters (B,L,Y,H) inscribed to identify the 16th, 331st, 501st, and 502nd Bomb Groups, respectively. Unfortunately, the wing's Superforts were also easily identified by the enemy on the ground.

The 315th's military police sent out a patrol to search for Japanese soldiers on 16 July. Six days earlier, security guards patrolling the jungle area east of Northwest Field had found evidence of recent Japanese habitation. Thus, a patrol was organized and sent into the designated sector. On the first day of the patrol, they killed four Japanese soldiers and wounded another who died later. "Two days later, another pair of enemy survivors were sent to accompany their ancestors." Although this patrol was successful, more Japa-

nese soldiers were probably still at large on the island. As a result, two weapons carriers were equipped with 50-caliber machine guns and were used to guard against future reprisals by any remaining Japanese soldiers.

On 16 July, the 16th Bomb Group staff was reorganized. Lieutenant Colonel Castellotti, acting commander of the 16th, called a meeting of all officers at 1600 hours and made the following announcement:

As of 1330 this afternoon, I assumed command of this organization permanently...Col. Gurney will not be back. Where he is going, I cannot tell you. But I can tell you that we have lost a hell of a fine officer. As far as his policies in training, organization, and discipline are concerned, they shall remain the same.

Lieutenant Colonel Collier H. Davidson assumed the 16th's Deputy Commander duties. Major Zed S. Smith III was assigned to replace Lt. Col. Davidson as operations officer. Lt. Col. Castellotti concluded by praising the group staff for their past performance and stressed the importance of full cooperation between the group and wing staff personnel.

In July, there were also major changes to the organizational and command structure for strategic forces operating in the Pacific. With the end of the war in Europe, the Eighth Air Force was being converted to very heavy bombardment operations and scheduled to deploy to Okinawa. As a result, the United States Army Strategic Air Force (USASTAF) of the Pacific was established at Guam on 5 July to control and coordinate the pre-invasion combat operations of the Twentieth Air Force and the redeploying Eighth Air Force. On 16 July, the XXI Bomber Command officially became known as the Twentieth Air Force and headquartered at Guam with five B-29 wings, the 509th Composite Group, the Seventh Fighter Command, and the Guam Air Depot under its command. Thus, the USASTAF became the guiding force for the final assault on Japan with Twentieth Air Force carrying the load until the Eighth Air Force became operational.

Prior to takeoff on Empire Mission 10 on 26 July, Capt. Henry Dillingham's crew entertained two special guests. Mr. Walter Dillingham was on a special diplomatic mission to the Philippines and stopped at Northwest Field to see his son's crew takeoff on their combat mission. Mr. Dillingham was escorted by Gen. Giles, Commanding General of the Strategic Air Force, who also shook the hands with each of the crew members and wished them all luck on their upcoming mission. Capt. Dillingham's crew was one of eleven 402nd Bomb Squadron crews representing the 502nd Bomb Group's total B-29B striking force for this mission.

The 502nd's crews were assigned to strike a special target on Empire Mission 8. The wing's primary target was

the Nippon Oil Refinery at Amagasaki. However, to test the 502nd's individual bombing accuracy, its special target was a small oil tank farm consisting of 10 oil tanks in an area measuring 850 feet by 1,000 feet and located just west of the main refinery. The "greenhorn" 502nd crews were determined to prove their bombing skills at Amagasaki. At the beginning of the bomb run, Captain Dipple's crew had an engine fail, but they continued the attack. Searchlights coned Captain Ramey's aircraft, and flak bursts ringed his Superfort. The crew promptly dropped rope to confuse the searchlights, and Capt. Ramey went to full power to escape the deadly fire. All eleven 502nd crews released their bombs on their special target, and the wing's total force of 83 B-29Bs crossed the target area in 34 minutes. The crews executed their breakaway maneuver and headed for Guam.

Post-mission photo-reconnaissance showed the wing attack on Amagasaki had mixed results. On the one hand, the 502nd wiped out the small oil tank farm with only two of the ten large oil tanks left undamaged—and those two tanks were empty. After the mission, Gen. Armstrong complimented the 502nd for its bombing results and stated, "I am proud to command a wing that has the 502nd Group in it." Unfortunately, the wing's 72 other aircraft had inflicted only minor damage to the main refinery area, and Amagasaki would have to be hit again.

On 22-23 July, the 315th launched 82 aircraft on Empire Mission 9 to raid the Ube Coal Liquefaction Company. This important Japanese refinery was a leading producer of synthetic oil and a high priority target in a Japanese petroleum industry crippled by the U.S. naval blockade. Searchlight and flak activity over the target area was light and inaccurate. From an altitude of 12,000-13,000 feet, 74 Superforts dropped 637 tons of bombs on the primary target. Four other aircraft struck targets of opportunity due to radar malfunctions. All aircraft returned safely with only four receiving minor flak damage. Iwo Jima also proved its value on this mission with 19 of the wing's crews landing there. On this raid, 31 structures were damaged at the plant, but most of the refinery was still in operation.

Empire Mission 10 was flown on the night of 25-26 July against the Hayama and Mitsubishi Oil Refineries. These targets were located in the heavily defended Yokohama-Kawasaki district just south of Tokyo, and the wing planned to use maximum compressibility for the attack. Of the 85 aircraft launched on the mission, 7 aborted prior to the target. The Japanese defenders took advantage of the clear night sky and used their searchlights to scour the sky for the Superforts. The flight crews dropped rope to confuse the enemy searchlights, but the defensive fire was relentless. Capt. Dillingham's aircraft was hit by flak and exploded in midair. It was a tough night in the target area with 13 aircraft damaged and Capt. Dillingham's crew lost in action. In the raid, 34 percent of the total storage tank capacity and 17 structures at the Hayama-Mitsubishi oil

installations were destroyed or damaged. However, the joint target was still operative.

The dedicated efforts of the 315th's ground support personnel enabled the wing to fly its rapid succession of Empire missions. The sheet metal shops promptly repaired the battle damaged Superforts. The electronics sections achieved a 90 percent effectiveness rate for the APQ-7 radar equipment while the aerial photo section personnel kept the O-5 radarscope camera operational. Maintenance work stands and towing tugs were in short supply so the engineering sections built their own stands and used jeeps to tow equipment. The armament and ordnance sections completed all bomb loading requirements on schedule despite shortages in B-7 bomb shackles and C-6 bomb hoists. The flight-line maintenance crews kept the aircraft fueled and completed the 50-, 100-, and 200-hour inspections. All 315th ground support personnel deserved a share of the credit for the wing's outstanding record during the first 10 Empire missions with 618 aircraft launched out of 636 scheduled.

The last Empire mission for the month of July was flown on 28-29 July against the Nippon Oil Refinery at Shimotsu. This plant was an important refiner of crude oil with large and modern facilities and good shipping and rail connections. The weather in the target area was ideal with overcast skies hampering the enemy's heavy searchlight and flak defenses. Of the 84 Superforts airborne, 78 saturated Shimotsu with 658 tons of bombs. The plant exploded, and the ensuing fires were the brightest the crews had ever seen.

[Reconnaissance] photos showed it was unnecessary to return to the refinery for in this one mission the target was almost completely destroyed. 927,000 barrels of the 1,246,000 barrel capacity were damaged while the 1,274,100 cubic foot gasometer capacity was almost completely destroyed. 69 percent of the 210,254 square foot area was destroyed. The target was thoroughly saturated with bombs and obliterated beyond repair.

Target photo-reconnaissance also showed 60 percent of the wing's crews "placed their bomb salvo centers within 1,000 feet of the aiming point." As a result, the Shimotsu Oil refinery was erased from the priority target list by the 315th's pinpoint APQ-7 bombing accuracy.

The wing's photo lab personnel were extremely busy in July. During the month, they processed 1 1/2 million frames of radarscope photography film from the wing's nine Empire missions and numerous training sorties. Before each of these missions, the photo lab personnel carefully calculated the operating distances for the O-5 radarscope cameras to conserve the limited supply of valuable film. After the missions, they carefully analyzed the radar photographs to assess and validate the wing's target damage until post-strike photographs were obtained. In addition, the damage

assessment photographs for the wing's Empire strikes in July also validated a photo lab developed technique for plotting aircraft bomb run tracks to determine bombing accuracy. The photo lab also ran a series of experiments and produced a suitable formula to prevent the fogging of photographic paper caused by the tropical climate. Finally, the photo lab completed the ordinary photo work in the public relations, identification, historical, and other related fields of ground activity.

Likewise, the 315th's Weather Section worked at a hectic pace in July. The month's stepped up radar photography, training, and Empire missions taxed the weather section to provide timely and accurate forecasts. In response, the weather section developed a special weather display to brief flight crews. The display used miniature cutouts of weather symbols treated with luminescent paints to depict forecasted weather conditions for the missions. Flight crews reported the new technique vividly portrayed the weather information and made it easier to remember the data on the long Empire missions.

For its first mission in August, the 315th planned Empire Mission 12 as a large scale raid against three previously bombed targets. The mission plan split the wing's B-29Bs into two forces to strike three adjacent targets in the heavily defended Kawasaki area south of Tokyo. One force would attack the Kawasaki Petroleum Center previously raided during Empire Mission 6 on 12 July. Meanwhile, the other force would concentrate on the Hayama and Mitsubishi Oil Refineries partially destroyed on 25 July during Empire Mission 10. Bombing altitude for the mission would be 15,000-16,000 feet. Since these facilities had already claimed 315th aircraft and lives, the flight crews were apprehensive but eager to knock them out.

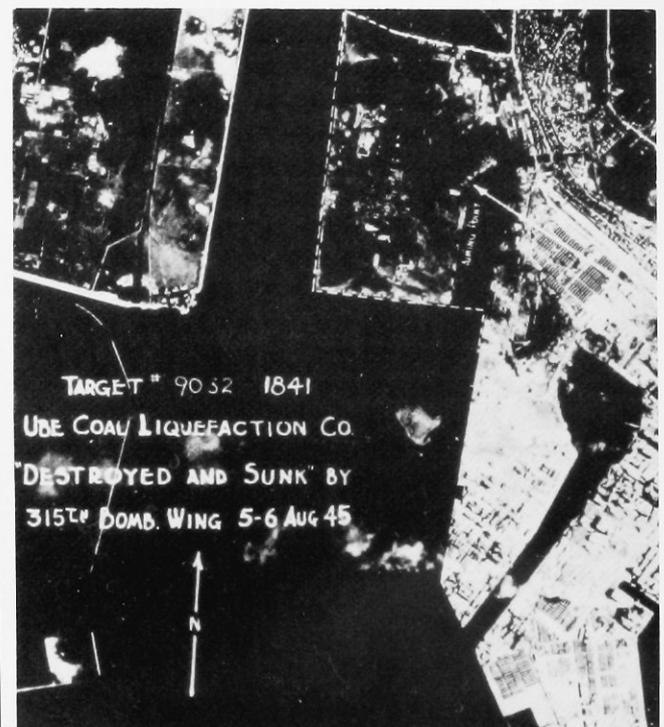
On 1-2 August, the 315th launched 130 Superforts for Empire Mission 12. Colonel William A. Miller, wing Deputy Chief of Staff, flew with First Lieutenant Larson's crew, 502nd Bomb Group, and led the entire wing off on the mission. The weather in the target area ranged from clear to 9/10 thin overcast skies. Two enemy fighters attacked First Lieutenant Ethier's aircraft but missed. An estimated 130 blue and green searchlights blanketed the skies, and anti-aircraft fire was medium to heavy. Two aircraft sustained heavy flak damage while 13 other received minor damage.

One plane, H-5, commanded by Captain Woida, received major damage. The number one engine was shot out, fuel cells and gas lines were damaged, and other damage was done to the bomb-bay doors, wing, and other surfaces of the plane. It landed at Iwo, and the crew returned in a plane of the 16th Bomb Group which had previously been left at Iwo for repairs.

Captain Woida's aircraft was one of five forced to land at Iwo with heavy battle damage or engine trouble. The crews

reported they had left the Kawasaki Petroleum Center and Hayama-Mitsubishi refineries engulfed in flames and were confident the targets had been destroyed.

The 315th's raid on the Kawasaki area was part of the largest single-day bombing effort by Twentieth Air Force during World War II. On 1 August, Twentieth Air Force dispatched 836 B-29s to bomb a variety of Japanese targets. Of these, 784 reached and bombed their assigned targets,



including 120 Superforts from the 315th which dropped 1,025 tons of bombs on the Kawasaki targets. The damage report for the Kawasaki attack listed the Kawasaki Petroleum Center as "practically inoperative" while the Hayama-Mitsubishi refineries received "crippling damage" with 40 percent of the primary structures destroyed. Five other industrial installations were also struck and severely damaged. Consequently, the three Kawasaki plants were useless to the enemy.

On 5-6 August, the 315th flew its most spectacular mission, an attack on the Ube Coal Liquefaction Company. This target had been partially destroyed during a previous wing attack on 22-23 July. On this return visit, the wing launched 113 aircraft and 108 attacked the primary target with 938 tons of bombs.

The damage assessment was not available until 22 August, but it revealed a spectacular bombardment job. The refining units of the plant were 100 percent destroyed or damaged, and 80 percent of the stores and workshops were destroyed or damaged. In addition, 50 percent of the (adjacent) Iron Works Co. had been damaged.

Furthermore, the nearby dikes protecting the Ube plant from the sea were hit by bombs. The target photo-interpreter who analyzed the damage sent a special post-strike photograph to Admiral Nimitz with a note attached reporting, "Target destroyed and sunk." In a letter of commendation to the Army Air Force commanders, Admiral Nimitz remarked that it was the first time bombers had ever sunk a factory.

On the Ube raid, Crew 1102, 502nd bomb Group, aborted their takeoff but still completed the mission. Their takeoff was normal through 65 miles per hour, and Second Lieutenant John T. Newburg, the copilot, continued to call the increasing takeoff speeds. Suddenly, he shouted that engine number three had lost power, and Captain Horatio W. Turner III, the aircraft commander, promptly aborted the takeoff. As their aircraft rapidly approached the end of the runway, Capt. Turner told his copilot to get on the brakes with him while he pulled the emergency brake handles with his right hand. In succession, the left and right scanners reported the wheels were on fire as smoke poured from the overheated brakes. The aircraft ran off the end of the runway and onto the coral overrun, heading straight for a 50-foot-high bank. Capt. Turner described his instinctive reaction to avoid a collision.

Luck was with us. I felt some brake just as we were getting really close to the embankment. I stood on the left brake and let the airplane ground loop around the locked wheel. We cleared the embankment and were able to taxi out of the coral overrun and back along the runway and taxiway to the ramp. When I climbed out of the plane, my flying suit was wringing wet.

Maintenance promptly repaired the engine, found the cooled-down brakes were operable, and topped the aircraft off with fuel. Capt. Turner and his crew launched again less than an hour after their aborted takeoff and flew the mission as "Tail End Charlie." They reached Ube and dropped their bomb load on the target. They were the last crew to return to Guam at 1140 hours on 6 August with a flight time of 15 hours and 25 minutes.

Meanwhile, Colonel Paul Tibbets and his 509th Composite Group crew had dropped the world's first atomic bomb on Hiroshima. After his bombardier released the atomic bomb at 0815 hours (Hiroshima time) on 6 August, Col. Tibbets immediately raked his aircraft, the "Enola Gay," into a sharp 150-degree turn to escape the impending blast. The bomb exploded less than a minute later, and a blinding light filled the sky. A huge, dark mushroom cloud erupted over Hiroshima, and 4 1/2 miles of the city were leveled. More than 71,000 of Hiroshima's 245,000 population died instantly. However, the Japanese government did not surrender following the attack. Three days later Major Sweeney, flying in "Bock's Car," led another 509th crew to drop a second atomic bomb on Nagasaki. News of the devastating new weapon spread rapidly through the Pacific, and the 315th finally learned the well-kept secret mission of its former subordinate unit. Everyone waited to see if the Japanese would finally call it quits. They didn't, and the 315th prepared for another mission.

Empire Mission 14 was a return strike to the Nippon Oil Refinery at Amagasaki on 9-10 August. In the target area, there were a large number of Japanese fighter aircraft. However, only one made what might have been an attempt to ram First Lieutenant Pananes' aircraft and came within 15 feet. Flak activity was moderate to heavy with 11 Superforts receiving minor damage. Of the 109 B-29Bs launched, 97 dropped 918 tons of bombs on Amagasaki.

Late photo reports said the target was almost completely destroyed. Damage was well distributed. In the tank area, only two tanks remained undamaged. Synthetic oil plants showed damage to a gasometer, four buildings, and a sulphur removal unit. In the refinery area, four refining units and 30 tanks were destroyed. In addition, nine other tanks and 25 buildings were damaged.

The 315th finished the job it had started at Amagasaki on Empire Mission 8 and left one more Japanese oil refinery in ruins.

The 315th's armament personnel performed their most remarkable feat for Empire Mission 15. The wing scheduled 145 Superforts to carry a payload of smaller 100- and 250-pound bombs for the mission. Unfortunately, the armorers had to load the 100-pound bombs by hand because the mechanical bomb hoists were designed for larger bombs. The armorers worked tirelessly on the sweltering flight line and in the over-hot bomb bays to complete the

monumental task. To load the 16th Bomb Group's 38 Superforts, "Approximately 80 men worked for 17 hours lifting the bombs into place and after the task had been accomplished many were so tired they were unable to raise their arms above their shoulders." Thanks to the armorers' remarkable efforts, the 315th's B-29Bs were ready to deliver over 12,000 bombs to Japan.

On the night of 14-15 August, the 315th conducted its longest and largest raid of the war. The target for Empire Mission 15 was the Nippon Oil Refinery at Tsuchizaki on the northern coast of Honshu Island—a round trip distance of 3740 statute miles. Gen. Armstrong led the mission and launched at 1637 hours. However, some of the other crews, including Col. Hubbard's, were temporarily delayed on the ground.

When his (Hubbard's) airplane was out on the runway, a jeep drove up and an officer signaled to cut engines. Once this was done the officer climbed into the cockpit and said 'Admiral Nimitz says the war is over.' Shortly afterward, another jeep rushed up and the driver yelled, 'Get going! LeMay hasn't received word that the war is over.'

Postponed for several days by Japanese-American peace negotiations, the wing's maximum effort mission was finally underway.

Enroute to the target, the skies were full of B-29s. Approaching the coast of Japan, the 315th's crews saw hundreds of homeward bound B-29s. Col. Hubbard and other aircraft commanders turned their landing lights on to avoid a collision in the traffic jam above Honshu Island. Although 9 wing aircraft aborted the mission, 134 B-29Bs approached the lightly defended target at 10,000-12,000 feet and began their radar bombing run. The Superforts crossed the Tsuchizaki plant and dropped 954 tons of bombs on the target. Huge fires and dense smoke covered the refinery as the 315th's crews turned to start the long journey to Northwest Field.

Before the last 315th B-29B landed at Guam on the morning of 15 August, the war was over. President Truman had announced the unconditional surrender of Japan, and the returning crews heard the news over their radios. Thus, the 315th had inflicted the final bombing damage to the Japanese Empire with the last bombs away at 0339 hours, 15 August 1945. Captain Dan Trask's crew, 502nd Bomb Group, was the last to takeoff on Empire Mission 15 and was the last to land 16 hours and 45 minutes later. His crew and aircraft, "The Uninvited," immediately "received a publicity spread as the last plane over the Empire during the War."

Results of photo-interpretation of damage brought now familiar words: 'Almost completely destroyed or damaged.' Photographs disclosed that no portion of the target was untouched. The three refining units were a tangled mess of

wreckage, the main power plant still standing, but seriously hit. More than 66 percent of the tank capacity was destroyed. Lesser installations, including the workers' barracks, were destroyed.

The bombing results were particularly impressive for the longest nonstop combat mission ever flown.

The War Is Over

Shortly after the end of hostilities, Twentieth Air Force was tasked to fly mercy supply missions to 70,000 Allied prisoners of war (POWs) held in Japanese camps. The POWs desperately needed food, medicine, and clothing to survive until friendly forces could reach them. Unfortunately, friendly ground forces were still far away from the POW camps located in China, Manchuria, Formosa, Korea, and the four main Japanese home islands. Consequently, Twentieth Air Force was directed to use its B-29 force to airlift the needed supplies to the POW camps. Naturally, the 315th contributed to this great humanitarian effort.

The 315th was directed to complete two support taskings during the preparation stage of the mercy mission operation. On 23 August, crews began flying to the Philippines to pick up 24,000 cargo parachutes shored there for the planned American invasion of Japan. Meanwhile, other crews flew to Tinian and picked up 205,000 pounds of food and delivered it to Saipan to make POW supply bundles.

Many of the supplies were packed in used fuel drums. Service crews, who called themselves the 'Saipan Samaritans,' welded two barrels together into what looked like 'blockbusters.' The oil drums filled with supplies were anchored to the bomb racks by the same shackles that had once been used to secure bombs.

The 315th completed its two support taskings within 10 days and prepared to deliver the supply bundles.

Captain Lewis H. Ribble and his 331st Bomb Group crew flew one of the parachute missions to the Philippines. They departed Guam at dusk and landed early the next morning at the Florida Blanca airstrip just north of Manila. They loaded the parachutes and planned to leave early the next morning to deliver their cargo to Tinian. Staff Sergeant Laurence O. McCarthy, the crew chief, spent the rest of the day souvenir hunting and found a bomb damaged Japanese "Betty" bomber in a nearby revetment. He salvaged "a torn section of fabric from the tail feathers (elevator) having a decal with data in Japanese printed on a black background." The next morning, the crew took off in a driving rain.

We were in heavy rain for about 4 or 5 hours, then broke out of it to see a big double rainbow on the white fluffy clouds

below. I (SSgt. McCarthy) was then sitting at the forward end of the tunnel at the astro dome from where it appeared that the rainbow was all around us. We were then near the approximate position where the cruiser Indianapolis went down.

The USS Indianapolis had delivered the atomic bomb to the 502nd at Tinian and was heading for the Philippines when a Japanese torpedo delivered a lethal blow to its forward powder magazine. The USS Indianapolis sank so fast that no SOS message was sent, and only 300 of the 1,050-man crew escaped into the water. Unfortunately, less than 100 survivors were found by air-sea rescue units three days later. Many had drowned, and many others were attacked by sharks. At Tinian, Capt. Ribble parked his aircraft, "Slicker 6," next to the "Enola Gay" with "Bock's Car" parked next to the "Enola Gay." Capt. Ribble and his crew stopped to reflect on the coincidences of the mission and the unique double rainbow they saw below their aircraft as they passed over the gravesite of the ill-fated USS Indianapolis.

Unfortunately, the 502nd Bomb Group had two fatal aircraft accidents during the 315th's support missions. On the night of 27 August, Captain Claude S. Larson's aircraft crashed into Mt. Tapotchau, near Isley Field, Saipan. The crash occurred when Capt. Larson attempted a second approach following a missed landing attempt in low visibility. There were no survivors.

Four days later, on another flight to Manila, airplanes of the 411th Squadron took off from the Philippines to return to Guam. Crews landing at base reported very bad weather enroute, possibly a typhoon. Consequently, anxiety spread throughout the Group when it became apparent late the night of 31 August that Captain William J. Pananes and his crew were overdue. As time passed with no word, search parties were sent out to scour the sea on his flight path. No traces were found except on empty life raft.

The 315th paid a heavy price to support the mercy missions, however, the wing successfully completed its assigned tasking for a worthy cause.

The 315th flew its first major POW mercy mission on 29 August. Thirty Superforts carried supply packages to POW camps near Mukden, Manchuria, a round trip of 4,000 miles, as well as the Tokyo-Yokohama, Shikoku, and Honshu sectors in the Japanese home islands.

A B-29 carried sufficient food for 200 prisoners. Eighteen bundles were loaded in each bomb bay and the drops were made from less than 1,000 feet. Targets were designated by furrows, paint, or cloth panels on the ground....The bombardier, navigator, and radar operator combined their efforts to determine the exact moment for 'supplies away.'

Although the camps were difficult to locate, two 315th

crews succeeded in making radio contact with overjoyed POWs at one camp in Mukden. The POWs used a walkie-talkie set to communicate with the B-29s and asked the 315th crews to pass on a message "that 'Captain Campbell and nine members are in a POW camp at Mukden'; these were survivors of the 462nd's 'Wild-Hair', downed by an aerial bomb before reaching the target on December 21, 1944." The 315th crews copied the message and proudly relayed it to help a fellow Superfort crew.

Between 30 August and 2 September, the 315th flew two major and three smaller POW mercy missions. On 30 August, 29 crews flew the second major POW mission to camps in the Mukden and Tokyo areas. Two days later, on 1 September, 52 crews dropped 1,872 packages to POWs at camps in the Kobe-Osaka, Shikoku, Nagoya, and northern Honshu areas. Subsequently, the 315th flew three smaller mercy missions to camps at Osaka, Honshu, Kyushu, Hokkaido, and Narumi. Up to seven 315th aircraft were involved in these smaller missions and dropped between 72 and 252 packages to the waiting POWs.

On the 2 September mercy mission to Osaka, the 16th Bomb Group lost 10 of its members in an aircraft accident. A few hours after takeoff, First Lieutenant George R. Hutchinson's crew contacted the tower at Northwest Field and reported mechanical difficulties with their aircraft. Lt. Clark and Captain Lewis P. Town, returned to base to land. After circling the field for a few hours to burn off fuel, the crew prepared for landing.

Finally, it came in for what at first seemed to be a normal landing. But at the last moment, it swerved, hit a wingtip on a tree, and burst into flames. The only members of the crew saved were two gunners—Sergeant Davis R. Flynt, Jr. and Corporal James A. Humbird. The aircraft broke into two parts, and they were able to get out of the tail section.

The men of the 16th paid their respects to their deceased comrades during a funeral held the following day in the group's briefing room. Later, the deceased members were buried in a Marine Corps cemetery south of Agana.

On V-J Day, 2 September 1945, the 315th participated in a B-29 Show of Force mission over Tokyo Bay. The mission was the culminating event in an escalating B-29 air power display ordered by Gen. Spaatz, the Commander of USASTAF.

Immediately after hostilities ceased, Spaatz directed that the Twentieth provide 'a display of air power...continuing and increasing between August 19 and V-J Day.' Operational plans called for almost daily flights over the Tokyo plain by B-29s drawn in rotation from the five wings, all planes to carry ammunition, but no bombs.

The 315th immediately began planning for its scheduled participation in the V-J Day ceremony because it would be

the wing's first attempt at formation flying since it arrived overseas. The air power flights didn't begin until 30 August due to weather. Three days later, on 2 September 1945, the surrender ceremonies were conducted aboard the battleship Missouri in Tokyo Bay. The 315th's Superforts were among a force of over 400 B-29s circling above Tokyo Bay at 3,000 feet. The crews watched the events below and listened to the broadcast of the ceremonies on their radios. For the first time, many of the 315th's crews flew over Japan in the daylight and saw the awesome destruction the B-29s had rained on the cities of Japan.

The period after V-J Day was one of frustration, boredom, and constant thoughts of one goal—going home. Most of the men felt they would be the last to go home because they had been overseas for less than six months and hadn't accumulated enough discharge points to leave the Army. Moreover, there was insufficient work to keep the men busy. To meet this problem, education, athletic, and recreation programs were started. Officers clubs and service clubs for the enlisted men were built. Although the tiny island of Guam provided few diversions, there were frequent visits to the beaches at Tumon Bay and Talefafo Bay as well as numerous sightseeing and social trips up and down the island. Movies, letter writing, and bull sessions about post-war plans helped to fill the hours. The postwar atmosphere became resort-like, but the weeks turned into months and by November only a trickle of men had shipped out for home.

The 315th's last major achievement as part of Twentieth Air Force occurred on 1 November 1945. On that day, Gen. Armstrong, leading a flight of three Superforts, flew nonstop from Chitose Airfield in Hokkaido, Japan, to Washington D.C., over the great circle route. This was the first such flight of its kind, and all participating crew members were awarded the Distinguished Flying Cross.

In November 1945, the 315th began a rapid withdrawal to the States. Under Project Sunset,* each bomb group's authorized aircraft strength was reduced from 50 to 30, and the Superforts were ferried to the States by the flight crews. This first stage aircraft transfer was also used to carry personnel eligible for discharge from the Army. However, most of the men boarded slow-moving troop ships for the long voyage to San Francisco via Honolulu. By February 1946, the wing's manpower strength had been reduced from 11,500 to 3,000 men, and the wing was directed to reduce its total aircraft to 24 B-29Bs.

On 15 February 1946, the wing was consolidated for the final withdrawal period. All remaining bomb group personnel joined the 501st Bomb Group, reducing the 16th, 331st, and 502nd to "paper unit" status. The Sunset Project was set in motion again, and a steady stream of aircraft headed for the States. The three unmanned bomb groups were deactivated on 15 April, and all remaining 315th Wing Headquarters personnel were transferred to the 501st. For

the next month, the 501st Group staff also served as the wing staff. According to official documents, the 315th was transferred in nonoperational status (without personnel or equipment) to the Fifth Air Force on 15 May 1946.

*The Sunset Project directed the postwar return to the United States of all surplus flyable very heavy, heavy, and medium bombardment aircraft, transport aircraft, and crews from the Pacific Theater of Operation (PTO).

Conclusion

Twelve hundred sorties flown;
nine thousand tons of HE bombs dropped;
and four airplanes lost. Quite a record
General Curtis E. LeMay

The devastating impact of air power marked the beginning and the end of World War II for the United States. Japan's stunning, debilitating attack at Pearl Harbor instantly proved the offensive value of air power. In response, America built the world's most powerful air arsenal, and Gen. H. H. Arnold ensured the B-29 Superfortress was part of it. Despite early developmental setbacks, American industry provided the B-29 to its military forces so they could carry the war across the vast Pacific Ocean to Japan's homeland.

The Superfortress, pride of the AAF, did all this and more, but the road to victory had been a long and tedious one. History books will say little about the men who conceived, modified, and produced World War II's most intricate and effective aerial weapon. Yet the midnight oil they burned in laboratories and factories in America was the pilot flame that ignited all of Japan in the conflagration that reduced that nation's economic and social life to ashes.

America's first very heavy bomber had been placed in the hands of the Twentieth Air Force, and its leaders charged to use it effectively against Japan. They did!

The Twentieth Air Force decisively accomplished its strategic bombardment mission. In 14 months of combat operations, it amassed a force of over 1,000 B-29s and repeatedly struck Japan's industrial heart. Its leaders built bases in the Pacific and carried the war right to Japan's doorstep, destroying Japanese military claims that American B-29s would never strike Japan from the Marianas.

In 1945, concentrated American air power forced an enemy's surrender without land invasion for the first time in military history. Because of the precedent-shattering performance of the 20th Air Force from March to August 1945, no United

States soldier, sailor, or marine had to land on bloody beachheads or fight through strongly prepared ground defenses to ensure victory in the Japanese home islands of Honshu, Kyushu, Hokkaido, and Shikoku. Very long-range air power gained victory, decisive and complete.

Its concentrated strategic bombing campaign not only destroyed Japan's capacity to wage war but also undermined the will of its people to continue the war. Thus, Twentieth Air Force accomplished the strategic mission assigned to it by the Joint Chiefs of Staff.

Twentieth Air Force fulfilled its mission through the dedicated efforts of its very heavy bombardment (VHB) wings. The arrival of the 315th Bomb Wing (VH) in the spring of 1945 brought Twentieth Air Force up to full strength with more than 1,000 B-29s and 83,000 men. This large striking force conducted an around-the-clock bombing campaign against Japan, dropping a total of "165,000 tons of bombs and mines, plus 2 atomic bombs." Approximately 90 percent of this tonnage was delivered during the final five months of the war and was the final blow that reduced Japan from an antagonistic world power to a vanquished enemy. The success of this campaign was made possible by the courage and untiring efforts of the members of Twentieth Air Force with each VHB Wing, making a notable contribution. The 315th's special assignment was the destruction of one type of target—the petroleum industry.

The 315th's strategic campaign against the Japanese oil industry was highly successful. The wing's bombing effort left 11 of Japan's newest refineries inoperable or completely destroyed. The 315th destroyed or badly damaged 5 percent of Japan's total square footage of oil industry buildings and knocked out 6,055,000 barrels of storage capacity.

Oil targets are reported as only 5 percent destroyed. However, due to the fact that most production was confined to a relatively few modern facilities, the 315th Wing, by concentrating on 11 of Japan's newest refineries, reduced overall output by 30 percent in little more than a month of operations. Synthetic production sagged even more sharply with a drop of 44 percent, which represents an actual loss of 265,000 barrels.

Japan's petroleum industry had provided the life blood for its military machine, but its capability was decimated by the end of the war. As a result, Gen. LeMay stated that he was "ready to switch the 315th to other targets" when the war ended.

Although postwar analysis revealed the strategic effects of the 315th's oil industry campaign were more apparent than real, the operation was necessary. Since most of Japan's oil supplies came in from overseas, the American blockade and mining operations had dried up the supply that

might otherwise have been stored and struck by the 315th. Thus, by the time the 315th began its operations, many oil tanks were empty, and Japan's oil refining production had fallen to only 4 percent of capacity. Nevertheless, Gen. LeMay's decision to attack the oil industry was logical based on military intelligence estimates. Unfortunately, military intelligence on the state of Japan's economy relied on photo-reconnaissance efforts often hampered by Japan's cloudy weather. Thus, "In the absence of adequate intelligence on the actual state of Japan's war economy, the strategic bombing attacks served as guarantee that the oil industry had been eliminated." As a result, the 315th's attacks on the oil industry not only contributed to strategic bombing efforts, but it also provided an opportunity to test the wing's special radar capability.

The 315th proved the feasibility of all-weather, selective precision bombing, while the other VHB wings continued the area saturation bombing tactic, the 315th tried to show it was unnecessary to destroy an urban area just to hit a specific part of it. The wing's APQ-7 Eagle radar gave the definition and resolution required to pinpoint a target. Japan's oil refineries provided ideal test targets because they were relatively undamaged, well-defined, and located near the coastline. Although the oil targets were less than a mile square and frequently hidden by clouds, the 315th repeatedly hit the target using the APQ-7 synchronous radar bombing technique.

The operations of the 315th Wing showed conclusively that it was feasible to destroy targets by radar bombing when the target location is well known and the radar returns of the target itself are clear or its location relative to a prominent radar feature is well known.

The 315th's remarkable performance revolutionized heavy bombardment by showing it was possible to destroy small, difficult targets without seeing them visually. "The 315th and the Eagle radar reaffirmed and assured the U.S. Air Force philosophy that 'we can sink a battleship' not only in daylight, but anytime regardless of visibility to the naked eye."

The 315th Bomb Wing's Pacific campaign was relatively short but impressive. Between April and August 1945, the 315th transitioned from a "green" combat unit with no operational runway or aircraft to a B-29 unit carrying the heaviest payloads on the longest missions of the war. The wing flew 15 missions in 50 days between 26 June and 14 August. Of the 1,225 aircraft scheduled to participate, 1,200 planes became airborne and 1,114 (or 93 percent) bombed the primary target with 9,084 tons of bombs. The average bomb load increased from 14,631 pounds on the first mission to a record setting 20,648 pounds on the 9 August strike against Amagasaki. The wing lost only four aircraft, or .33 percent of the 1,200 airborne planes, with 66 damaged. Unfortunately, 27 men were listed as killed or missing

in action during the 15 Empire strikes. The 315th also flew five major POW supply missions, including a record setting 4,000-mile trip to camps in Mukden, Manchuria. In sum, "Twelve hundred sorties flown; nine thousand tons of HE bombs dropped; and four airplanes lost. Quite a record." Several factors help to explain this outstanding performance.

Despite numerous adversities, the 315th's demanding and lengthy training program was a key element in its success. By the time the unit left for overseas, the men had received eight to ten months of intensive instruction. Throughout this period, the 315th had to surmount the manpower, supply, equipment, and facility shortages afflicting all units in the massive AAF B-29 program. The reorganized, streamlined air service groups were thoroughly trained to provide integrated combat support for B-29 operations. Although he did not have operational control over the groups during training, Gen. Armstrong knew what it took to perform in combat and made it abundantly clear what training standards he expected the men to meet. Even though the Gypsy Task Force created immense logistical problems for the bomb groups, it provided an ideal, and crucial, training environment for the 315th. In the Caribbean, the bomb groups trained intensively to develop and perfect the revolutionary APQ-7 synchronous radar bombing technique. Due to unit reassignments in the Pacific, the 315th's operational date was delayed. "But the delay was used to good effect in terms of training. The training in radar bombing accuracy was particularly intense. As a result, the performance of the 315th with the AN/APQ-7 bombing system was spectacular." This performance reflected Gen. Armstrong's demand to have the 315th "go out the best trained Wing in the B-29 program."

Leadership was another important factor in the success of the 315th Bomb Wing. Although each leader had his own style, they all led by example with Gen. Armstrong setting the pace. He set high standards but never asked anyone to do anything he would not do. Gen. Armstrong and his bomb group commanders were out in front on the tough missions, thus letting the crews know their leaders were supporting them on every mission. The air service group commanders led their men through the difficult, demoralizing reorganization period on Guam and established a well organized and responsive wing service center. The 315th's leaders were also concerned about the welfare of their men and did everything they could to satisfy their needs. This was particularly difficult during the lengthy deployment and early days on Guam. The 315th's leaders embodied the high standards they set, earning them the respect and support of their men.

Finally, an intangible and dominant factor leading to the 315th's success in combat was the spirit and dedication of its men. Despite the often unpleasant living conditions and long duty hours in the States and overseas, they met every challenge and worked together to complete the task at

hand. Although the bomb groups and the air service groups trained separately, they united to form a potent combat unit. On Guam, they not only had to build their own base facilities, but they did it while readying the wing for the start of combat operations. The wing flew 15 combat missions in 50 days and achieved a remarkable record of bombing accuracy using new equipment and procedures. This is a tribute not only to the men who flew the Superforts, but also to those who ensured the planes and crews were ready to fly the long missions to strike Japan. There were many unsung heroes in the 315th's revolutionary air campaign against Japan, but every member's skill and sacrifice contributed to its success in combat. This is their story. "The wings of victory are yours. Wear them proudly."

**315th BOMBARDMENT WING
COMBAT MISSION STATISTICS
15 JULY 1945**

Mis- sion #	date	Primary Target	Radar Visua	Sched uled	Air- borne	Bombed Primary	% of Airborne	Failed to Bomb Primary Target				Bomb Tonnage				AC Lost	% of Airborne Lost	
												Primary						Other Targets
								Mec	Per	Oth	Tot.	G.P	I.B.	Oth.	Total			
1	26	Utsube Oil Ref., Yokkaichi	R	38	35	33	94%	1	1	-	2	223	-	-	223	7	0	-
2	29	Nippon Oil Co. Kudamaisu	R	39	36	32	89%	3	-	1	4	209	-	-	209	-	0	-
July																		
3	2	Maruzen Oil Ref., Minoshima	R	41	40	39	98%	1	-	-	1	297	-	-	297	8	0	-
4	6	Maruzen Oil Ref., Minoshima	R	60	60	59	98%	-	-	1	1	442	-	-	442	8	0	--
5	9	Utsube Oil Ref.; Yokkaichi	R	65	64	61	95%	3	-	-	3	469	-	-	469	8	0	-
6	12	Petroleum Center Kawasaki	R	71	62	55	89%	6	-	1	7	452	-	-	452	8	2	3%
7	15	Nippon Oil Co., Kudamatsu	R	71	62	61	86%	6	4	-	10	494	-	-	494	29	0	-
8	19	Nippon Oil Ref., Amagasaki	R	87	86	85	99%	1	-	-	1	702	-	-	701	5	0	-
9	22	Ube Coal Liqui- ficatn Co., Ube	R	82	82	74	90%	7	-	1	8	637	-	-	637	36	0	-
10	25	Mitsubishi Oil Ref. & Hayama Petroleum Ref.	R	82	85	77	91%	6	1	1	8	668	-	-	658	9	1	1.2%
11	28	Shimotsu Oil Refinery	R	87	84	78	93%	5	-	1	6	658	-	-	658	17	0	--
Aug.																		
12	1	Mitsubishi Oil Ref. & Hayman Pet. Refinery, Kawasaki	R	132	130	121	93%	8	-	1	8	1025	-	-	1025	26	0	-
13	5	Ube Coal Liqui- fication Co. Ube	R	113	113	108	96%	4	1	-	5	938	-	-	938	23	0	-
14	9	Nippon Oil Ref., Amagasaki	R	112	109	97	89%	12	-	-	12	918	-	-	918	22	0	-
15	14	Nippon Oil Ref., Akita	R	145	143	134	94%	9	-	-	9	954	-	-	954	3	0	-
TOTALS				1225	1200	1114	93%	72	7	6	85	9086		9086	209	3	.25%	