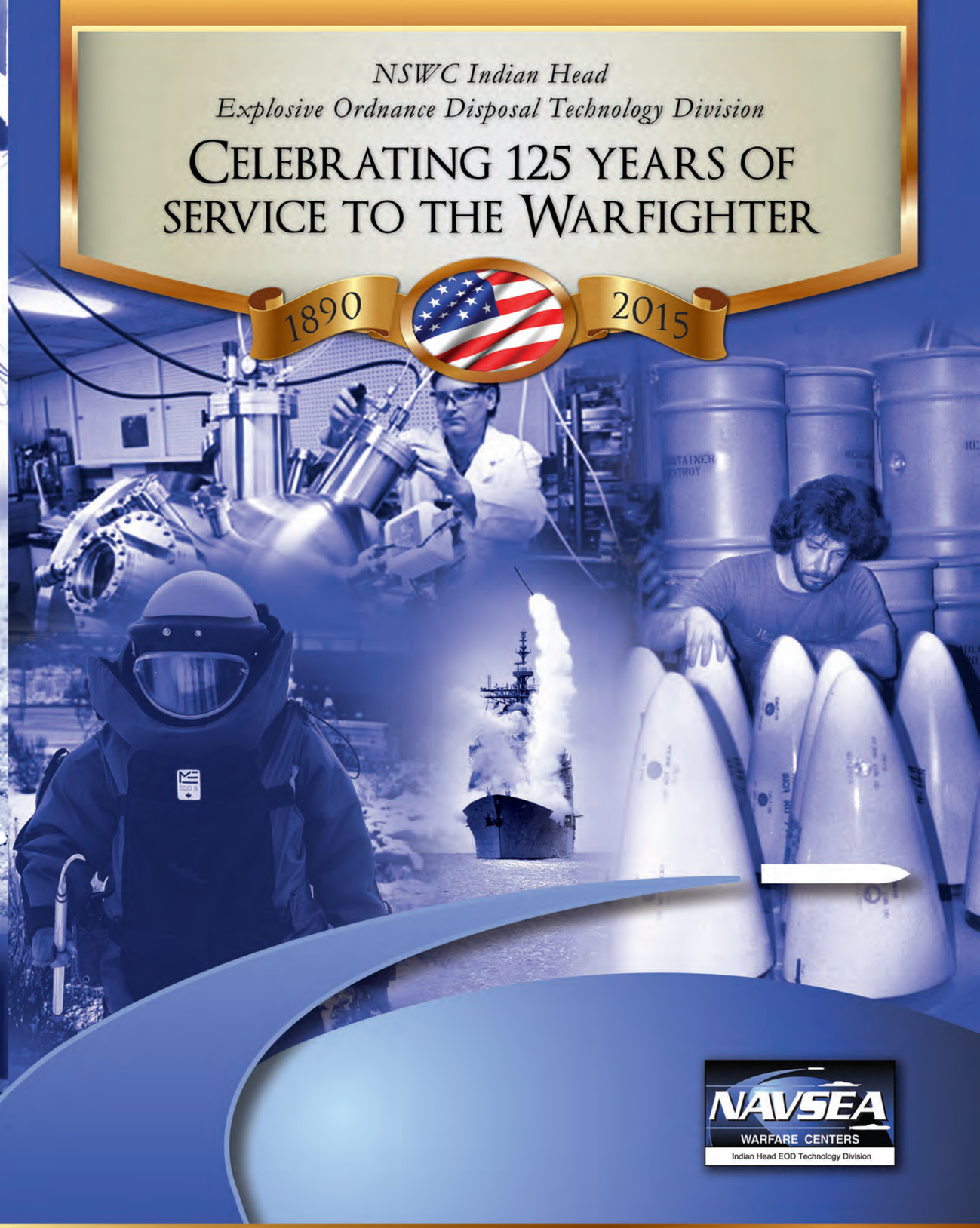
NSWC Indian Head

Explosive Ordnance Disposal Technology Division

CELEBRATING 125 YEARS OF SERVICE TO THE WARFIGHTER

1890 2015



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125 YEARS OF SERVICE TO THE WARFIGHTER

It was the summer of 1890 when Ens. Robert Dashiell received orders to travel 21 miles south from Washington, D.C., to supervise the construction of the Navy's newest proving ground at Indian Head, Md. This quiet agrarian parcel of land situated between the banks of the Potomac River and Mattawoman Creek was considered by the U.S. Navy's Bureau of Ordnance to be an ideal location for the transfer of responsibilities of its proving grounds located off the Severn River near the U.S. Naval Academy in Annapolis, Md. Commercial and recreational boat traffic on the Severn made ordnance testing both difficult and dangerous, hindered test frequency, and make any argument for expansion there wholly untenable.

So it was in 1890 that the Navy purchased the Potomac River acreage of Indian Head– referred to as Cornwallis Neck by the local population – and ordered Dashiell to oversee the operations.

With a skeleton workforce of just over 40 men, Dashiell and his men combined ingenuity, perseverance, and passion to transform Indian Head's swampy marshland into a valley thundering with canon fire. Ordnance from the site's massive 13-inch guns frequently flew great distances down the Potomac, while great steel ship hulls were delivered to Indian Head from the Carnegie and Bethlehem steel companies to test and bear witness to the Navy's firepower.

Originally designated as the Naval Proving Ground in 1890, Indian Head became a station with many different names and missions. Whether it was ordnance proofing, experimentation and production of smokeless powder and other propellants, or research and disposal of recovered enemy or "friendly" ordnance, the goal of Indian Head has always been to supply the warfighter with the most effective and reliable equipment needed to win the fight.

Indian Head has adapted and evolved over the years to meet ever-shifting requirements set by the joint services and the fleet, but the professionalism, spirit and reputation of its staff holds as steadfast today as it did 125 years ago.

FLY FARTHER, HIT HARDER, SAVE LIVES!

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Material from *Powder and Propellant: Energetic Materials at Indian Head, Maryland, 1890 – 2001, Second Edition* written by Rodney Carlisle was used in the research and development of this publication.

All photos are U.S. Navy unless otherwise credited.

For more information on NSWC Indian Head Explosive Ordnance Disposal Technology Division, please contact the public affairs office at 301-744-6505 or by email at **nswc.iheodtd.pao@navy.mil**, or at **www.navsea.navy.mil/Home/WarfareCenters/NSWCIndianHeadEODTechnology.aspx**

1890 - 1895

Indian Head employees rest outside their tents after a day's work. Difficult living conditions contributed to labor shortages during the initial operating years of Indian Head.

1890: The Naval Proving Ground relocates from Annapolis, Md., to Indian Head, Md. Ens. Robert Dashiell receives orders from the Bureau of Ordnance to travel to Indian Head to take over construction and supervision of the new proving ground on the banks of the Potomac River. Dashiell wastes no time in channeling the stream that divided the valley and draining the surrounding marshes to prepare the area for testing.

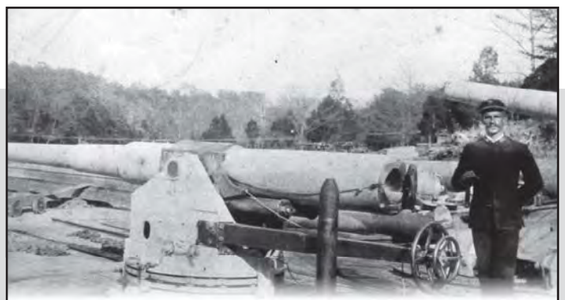
When not overseeing the construction of the fledgling operation at Indian Head, Dashiell spent his evenings in a drafty fishing shack on the banks of the Mattawoman Creek designing a new mechanism for the breech loading of ordnance for large naval guns.

1891: First shots are fired at Indian Head as testing commences with the proof-test of a 6-inch breech loading rifle.

1891: The Indian Head labor force grows to more than 110 from the original workforce of just 40 individuals.

1891: Nickel-steel armor developed by American industry for Navy ships is shipped to Indian Head for testing. Dashiell would have sections of the metal sheets set up directly across from gun batteries where they would then be fired upon with shells ranging from four to 10 inches in diameter.

1893: Lt. Newton Mason relieves Dashiell as the commanding officer of Naval Proving Ground Indian Head. Mason begins efforts to combat the dwindling workforce caused by poor living conditions by building homes for the workforce, improving the station water supply, and approving the construction of an electric power plant.



Ens. Robert Dashiell stands next to a gun equipped with his "Dashiell Breech" at the Naval Proving Ground in 1892. The Dashiell Breech becomes one of the Navy's standard mechanisms for large rapid-fire guns and the first innovation to come from Indian Head. *(Coster/Parran Collection)*

An employee works to clear land during the initial development of the Naval Proving Ground in 1890. *(Coster/Parran Collection)*

1896 - 1900

1896: Dashiell wins a patent infringement case filed against him by another Navy officer. Shortly thereafter, the "Dashiell Breech" becomes one of the Navy's standard mechanisms for large rapid-fire guns and the first innovation to come from Indian Head.

1898: Following the United States' entry into the Spanish-American War, U.S. Navy protected cruisers USS *Olympia* (C 6), USS *Boston* (1884), USS *Baltimore* (C 3), and USS *Raleigh* (C 8) attached to the U.S. Asiatic Squadron under the helm of Commodore George Dewey, decimate the Spanish fleet at Manila Bay in the Philippines. The majority of the damage caused by the U.S. ships is thought to have been caused by the Dashiell 5-inch rapid-fire guns developed at Indian Head.

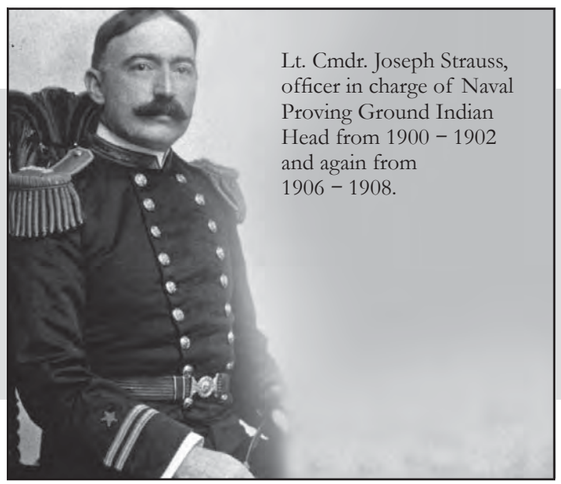
The fleet sunk eight Spanish ships, leaving 77 dead and 271 wounded. The U.S. forces suffered only slight damage to one of their cruisers and recorded one death by apparent heart attack.

1898: Congress passes a bill authorizing the Navy to proceed with the construction of a smokeless powder factory at Naval Proving Ground Indian Head.

A Naval Proving Ground worker stands under an early bomb-proof shelter circa 1900.

1900–1902: Lt. Cmdr. Joseph Strauss relieves Cmdr. Albert Couden as Indian Head commanding officer. Strauss later became Chief, Bureau of Ordnance from 1913–1916 and the Commander, North Sea Mine Barrage from 1917–1918. Strauss is the only person to serve more than one tour as the Indian Head commanding officer. He served his second tour of duty from 1906–1908.

1900: The first lot of Indian Head Smokeless Powder (S.P. lot #148) begins production at Indian Head. In order to further develop and standardize the station's powder production, Indian Head brings aboard Dr. George W. Patterson. Patterson becomes the station's first chief chemist and stays at the command for more than 40 years as the nation's foremost expert on smokeless powder.



Lt. Cmdr. Joseph Strauss, officer in charge of Naval Proving Ground Indian Head from 1900 – 1902 and again from 1906 – 1908.

This lithograph of the Battle of Manila Bay displays USS *Olympia* (C 6) in the left foreground, leading the U.S. Asiatic Squadron in destroying the Spanish fleet. *(Photo courtesy of the Navy History and Heritage Command)*

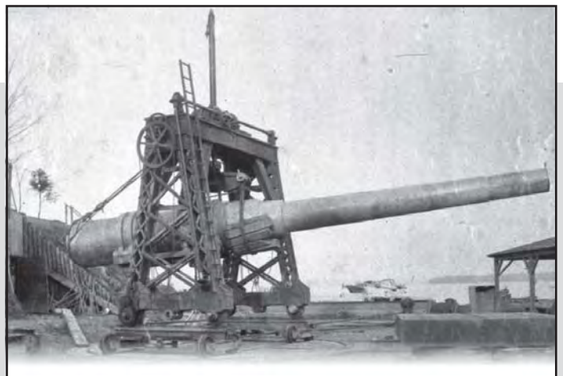
1901 - 1905

1901: In its first year of powder production, Indian Head supplies the Navy with more than 250,000 pounds of smokeless powder.

1901: As size and number of the guns at Indian Head increased, so did the frequency of testing. As the frequency of testing increased, so did complaints from locals residing near the station. Residents of nearby Stump Neck, Md., complained about the numerous ordnance shells that whistled over their residences. In response, then-Lt. Joseph Strauss recommends to either buy or lease the land to "obviate the annoyance to people now residing in the vicinity when shells pass close to this point." Shortly thereafter, the Stump Neck acreage is acquired from the Gaffield family.

1905: Patterson utilizes rosaniline dye as the stabilizer for smokeless powder. Patterson came aboard Indian Head in 1900 after several years working on powder production at the Navy Torpedo Station Newport, R.I. By 1912, Patterson ran Indian Head's chemical laboratory where he continually researched and experimented on methods to stabilize smokeless powder. It was during this period that the Navy began referring to him as their official "powder expert." Patterson would spend the next 40 years at Indian Head, revolutionizing the way the Navy developed and used smokeless powder.

Powder factory workers make their way aboard the Naval Proving Grounds to collect their pay. *(Coster/Parran Collection)*



A 13-inch gun stands ready for testing at Indian Head Naval Proving Ground. *(Coster/Parran Collection)*

An Indian Head powder factory crew.

(Coster/Parran Collection)

Workers tend to the facilities at the Naval Proving Ground's smokeless powder production plant. *(Coster/Parran Collection)*

The power house at the Naval Proving Ground, circa 1900. *(Coster/Parran Collection)*

1906 - 1910

1906: Indian Head finishes construction of a sulfuric acid plant. Following Patterson's calculations that smokeless powder cost the Navy approximately $.45 a pound, the Bureau of Ordnance requested funds from Congress to justify the building of a sulfuric acid plant at Indian Head.

1907: In addition to its duties of proofing and powder production, Indian Head is authorized to perform special experimental work to include the effect of electric light on powder and the effects of salt water in powder manufacturing, while establishing a method for the detection of mercuric chloride in the smokeless powder.

1908: Strauss, in his second command tour at Indian Head, oversees the station's expansion with the construction of a 1 million pound magazine, a 1.2 million pound sodium nitrate storehouse, a new ether vault and a powder reworking plant among other buildings.

1909: Indian Head receives more than $75,000 in funding for experimental ordnance testing. The funding results in the expansion of the station and produces more than 100 separate projects.

1909: Dr. Patterson reports on a wider range of experimental work conducted at Indian Head, including testing the effects of stabilizing agents on smokeless powder and the effects of the different methods and temperatures on drying powder.

The Indian Head baseball team poses in uniform. *(Coster/Parran Collection)*

1911 - 1915

1913: Following a congressional investigation into the private industrial "powder trust," Congress inserted a clause into the 4 March 1913 Naval Appropriations Act requiring that the Army and Navy accept no bids from industry for more than $.53 a pound. Due to this decision, Indian Head was ordered to produce powder at full capacity, with the Navy purchasing the remaining amount from private industry.

This decision was made after former Secretary of the Navy Josephus Daniels found the total cost of powder production to be approximately $.35 a pound, compared to the $.60 a pound charged by the DuPont company.

Capt. Henry E. Lackey was the commanding officer of Naval Proving Ground Indian Head from 1917–1920. Lackey is credited with improving much of the harsh living conditions endured by the town's early workforce.

(Coster/Parran Collection)

A variety of shell types and sizes are lined in a row for inspection.

1913: Pres. Woodrow Wilson's yacht *Mayflower* is nearly struck by a shell fired from a 14-inch gun by Lt. Garret L. Schuyler at the Naval Proving Ground. "It would be a good plan to do away with the testing of guns there, selecting some spot where there would be no danger to passing ships," Wilson later remarked. The incident added to the argument that the Navy's proving ground should be moved to a more strategic area with less boat traffic.

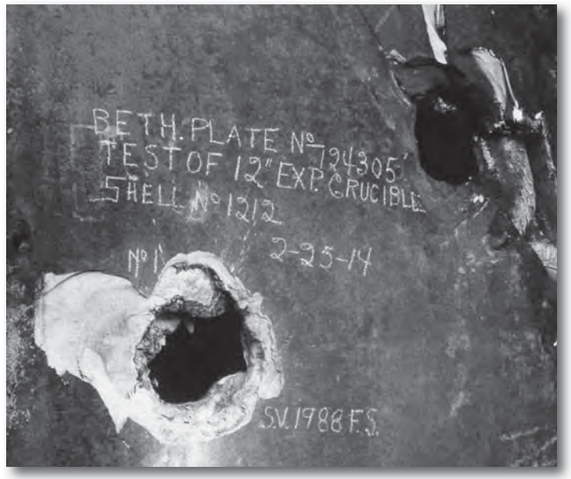
1914: World War I begins.

1914–1915: The Navy purchases approximately 3.1 million pounds of powder from private plants, while Indian Head produced more than 56 percent of the need with approximately 4 million pounds produced.

1915–1916: More than 330 employees out of the total 805 person workforce leave Indian Head, sometimes in the middle of their shifts. Employees were wooed by better salaries and living conditions offered by private industry. One year later, Capt. Henry Lackey makes a push to improve working and living conditions in and around Indian Head.

"First and foremost the station suffers from not having a village near large enough to accommodate the force necessary to carry on our work," said Lackey of the dwindling workforce. "Men from laborers to mechanics, clerks and assistant chemists have reported for work but upon looking over the living conditions as to quality, sufficiency and cost of same have declined appointment and left on the next boat."

1915: Indian Head begins construction of an Explosive D, also know as ammonium picrate, plant. The plant was declared fully operational in 1917.



A steel plate displays damage caused by Naval Proving Ground ordnance.

1917: The United States enters World War I, and Indian Head is called upon to continue being a major producer of smokeless powder. Continued labor shortages at Indian Head, as well as attempts to modernize the powder plant, placed constraints on the fleet's desire for powder.

1917: The Explosive D, also known as ammonium picrate, plant opens at Indian Head. The chemical was used as explosive shell filler due to its high chemical stability, insensitivity to shock, and inability to combine with metals to form more sensitive compounds.

1918: Indian Head's powder production pushes past 80,000 pounds per day and approximately 6.4 million pounds per year.

1918: World War I ends.

1918: Construction begins on a new weapons proving ground range at nearby Dahlgren, Va.

1918: Indian Head purchases land surrounding the station, expanding the site to approximately 3,208 acres. The expansion allows for the enlargement of Indian Head's battery and increased capacity of the powder factory.

1919: A spur railroad connecting nearby White Plains, Md., and Indian Head is completed. The railroad was built as a means to quickly transport large and heavy machinery to the station.

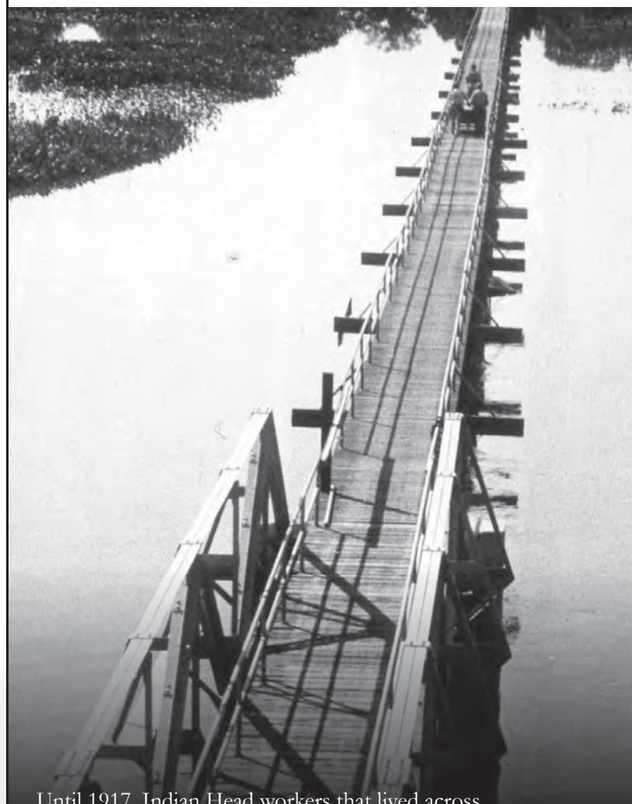
1919–1924: Experimental Ammunition Unit operated at Indian Head, later incorporated into the Naval Ordnance Laboratory at White Oak, Md.

Circa 1920: The Bureau of Ordnance begins assigning projects to Indian Head that specifically deal with propellants, explosives and special purpose devices such as signal pyrotechnics. The staff at Indian Head studied these weapons without regard to which service branch platform they were attached.

The spur railroad connecting Indian Head with nearby White Plains, Md., allowed for the quick transportation of heavy machinery.

1916 - 1920

A Sailor operates a three-inch, .50-caliber field gun.



Until 1917, Indian Head workers that lived across Mattawoman Creek relied on a dilapidated footbridge to reach a landing where rowboats or a cable-ferry would bring them aboard the station. Several workers were reported to have drowned as a result of the hazardous journey across the footbridge. Local congressman Sydney Mudd advocated the construction of a new footbridge to provide a safer way for local workers to cross the creek to access Indian Head. On 22 May 1916, the House Committee for Naval Affairs approved the funding for the footbridge, which opened the following year.

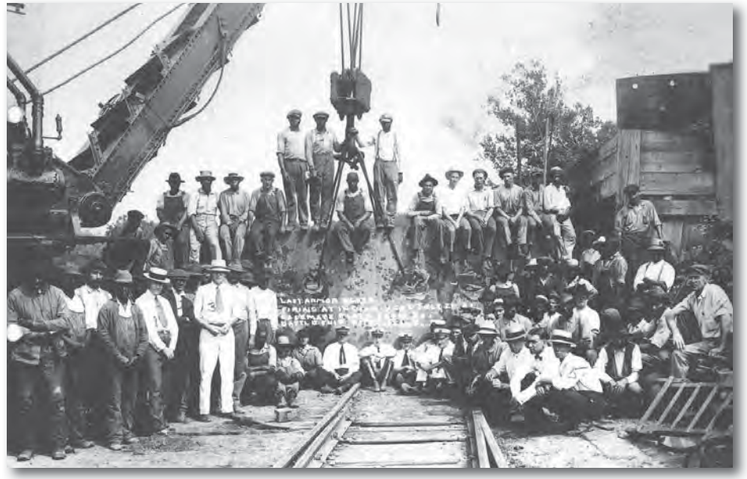
1921: Gun testing shifts to Dahlgren, Va., which operates until 1932 as Indian Head's lower station. On 21 July, Indian Head, Md. fires its last round.

1921: As ordnance research and test became the primary focus areas for the Indian Head staff, the Bureau of Ordnance orders Indian Head to begin research into the intricacies of anti-aircraft weapons, tracer shells and aircraft distress signals.

1923: Indian Head changes its name from the Naval Proving Ground to the Naval Powder Factory. The workforce focuses on producing good quality and stable powder, while improving Explosive D for shell fillers and studying new explosive and propellant mixtures.

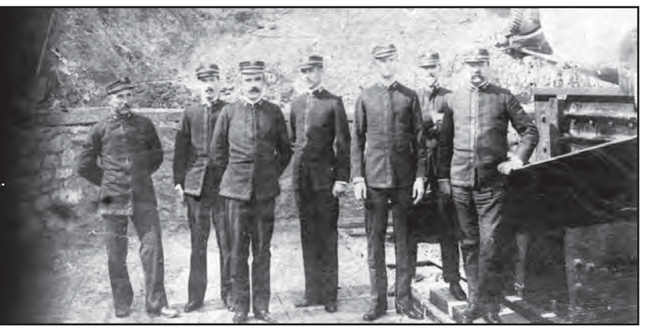
1924 - 1927: Indian Head workers conduct tests to develop a variable-delay, armor-penetrating fuze for major armor-piercing projectiles. This fuze was of great interest and importance to the fleet as it would allow ordnance to penetrate an enemy ship's armor, instead of exploding on impact with the hull, ensuring the maximum extent of damage is done to the inside of the ship.

Dr. Robert Goddard, known as the father of American rocketry, came to Indian Head in the early 1920s to initiate research on rocket ordnance and served as a part-time consultant until his departure in 1923. Indian Head later built the Goddard Power Plant in his name. The coal-fired power plant was built in 1957 to supply Indian Head with steam, compressed air and the majority of its electric power. The Goddard Power Plant closed its doors in late summer 2015 following the opening of a $68 million combination natural gas turbine and heat recovery steam generator.



Naval Proving Ground employees pose in front of the last armor plate used for ordnance test firing at Indian Head on 21 July 1921. The plate came from the famed German battleship SMS *Ostfriesland*, which was surrendered to Allied forces after the end of World War I. The ship was transferred to the U.S. Navy, which used the battleship as a target for U.S. Army and U.S. Navy bombers led by Gen. Billy Mitchell, the father of the modern air force. The ship was sunk off the coast of Cape Hatteras, N.C., on 21 July 1921: the same day the final ordnance test occurred at Indian Head.

1927: Indian Head begins work on torpedo fuzes, anti-submarine fuzes, signals and buoys used in practice torpedo and submarine work.



1931 - 1935

As naval operations at Indian Head grew, so did the surrounding town and its residents. Pres. Franklin Roosevelt, both a staunch supporter and frequent visitor to Indian Head, instructed the Civilian Conservation Corps to open a branch to improve some of the infrastructure needed to feed the area's continued growth.

(Coster/Parran Collection)

1931: The Mk-7 variable delay fuze emerges as the Navy standard. For more than 15 years, engineers at Indian Head, Dalhgren and the Experimental Ammunition Unit worked to develop a fuze that would penetrate a ship's hull before exploding. The Bureau of Ordnance concluded the new fuze was superior to its predecessors and rated it "satisfactory for service."

1932: After a year of renovation, Indian Head's Explosive D plant reopens. The plant was reconstructed to meet the fleet requirement to recrystallize material from obsolete warheads.

1933: Indian Head begins renovation of the Powder Factory following the announcement the Navy is allotting $71,000 to Indian Head for the production of smokeless powder.

1933: The Civilian Conservation Corps – a New Deal program instituted in 1933 by Pres. Franklin D. Roosevelt – opened a branch at Indian Head and worked to improve roads, plant trees, and improve the overall aesthetic beauty aboard the Naval Powder Station.

1936: Maryland Sen. Millard Tydings convinces Secretary of the Navy Claude Swanson to reverse a ruling that prevented off-station government employees from receiving medical assistance from the station dispensary. The ruling was reversed since the nearest other medical facility was more than 30 miles north in Washington D.C.

This 1935 photograph shows government employees working to improve the conditions of an alley located behind a section of the officer's quarters.

A 50-caliber gun after being unloaded from the Indian Head-White Plains railroad spur.
(Coster/Parran Collection)

1935 – 1940: Powder production increases as the fleet expands under direction from Pres. Franklin Roosevelt. The growth of the Naval Powder Factory results in an influx of government workers and laborers to the growing waterfront community and surrounding locales. By 1940, approximately 1,000 houses had been built to accommodate the incoming powder plant workforce. To offset the stress to the station's health facilities and to accommodate the overflow from the influx of residents, Physicians Memorial Hospital is built in nearby La Plata, Md., in 1939.

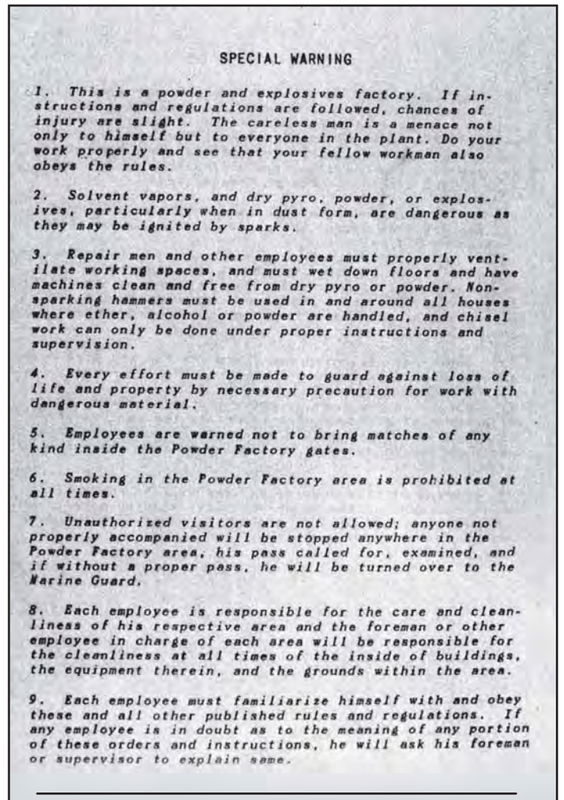
1939: Germany invades Poland, triggering World War II.

1940: Patterson retires after 50 years of service.

Dr. George Patterson, Indian Head Director of Production and Research (1899 – 1940)

Patterson was the only college-educated chemist of the civilian workforce upon his arrival in 1900 and would remain the only one until 1912. Patterson directed both powder production and chemical research at Indian Head, and was also responsible for a wide range of experimental test work.

1936 - 1940



SPECIAL WARNING

1. This is a powder and explosives factory. If instructions and regulations are followed, chances of injury are slight. The careless man is a menace not only to himself but to everyone in the plant. Do your work properly and see that your fellow workman also obeys the rules.

2. Solvent vapors, and dry pyro, powder, or explosives, particularly when in dust form, are dangerous as they may be ignited by sparks.

3. Repair men and other employees must properly ventilate working spaces, and must wet down floors and have machines clean and free from dry pyro or powder. Non-sparking hammers must be used in and around all houses where ether, alcohol or powder are handled, and chisel work can only be done under proper instructions and supervision.

4. Every effort must be made to guard against loss of life and property by necessary precaution for work with dangerous material.

5. Employees are warned not to bring matches of any kind inside the Powder Factory gates.

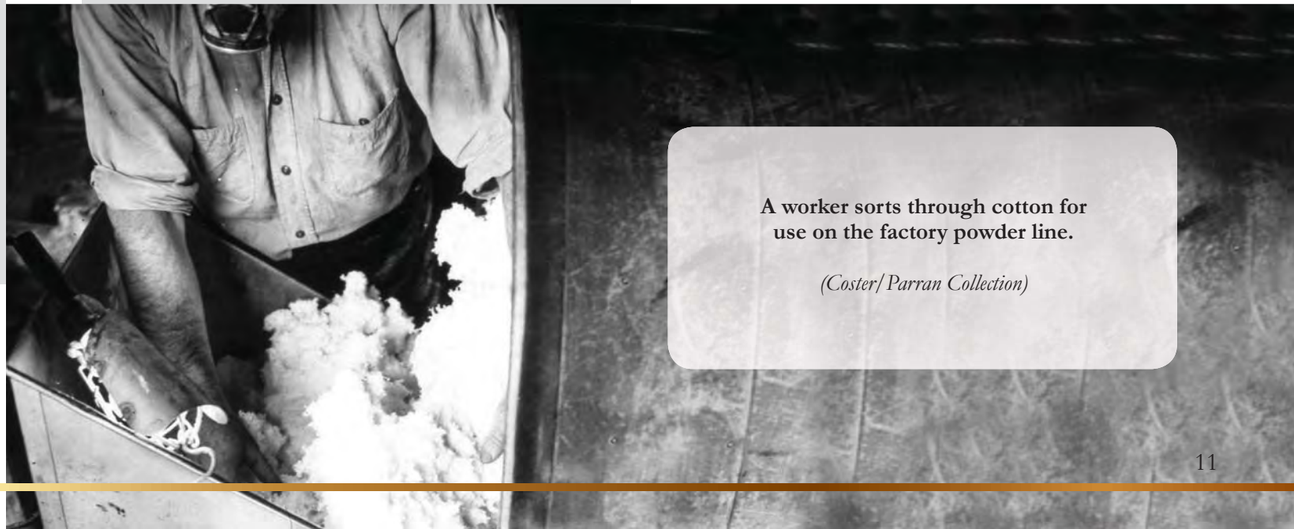
6. Smoking in the Powder Factory area is prohibited at all times.

7. Unauthorized visitors are not allowed; anyone not properly accompanied will be stopped anywhere in the Powder Factory area, his pass called for, examined, and if without a proper pass, he will be turned over to the Marine Guard.

8. Each employee is responsible for the care and cleanliness of his respective area and the foreman or other employee in charge of each area will be responsible for the cleanliness at all times of the inside of buildings, the equipment therein, and the grounds within the area.

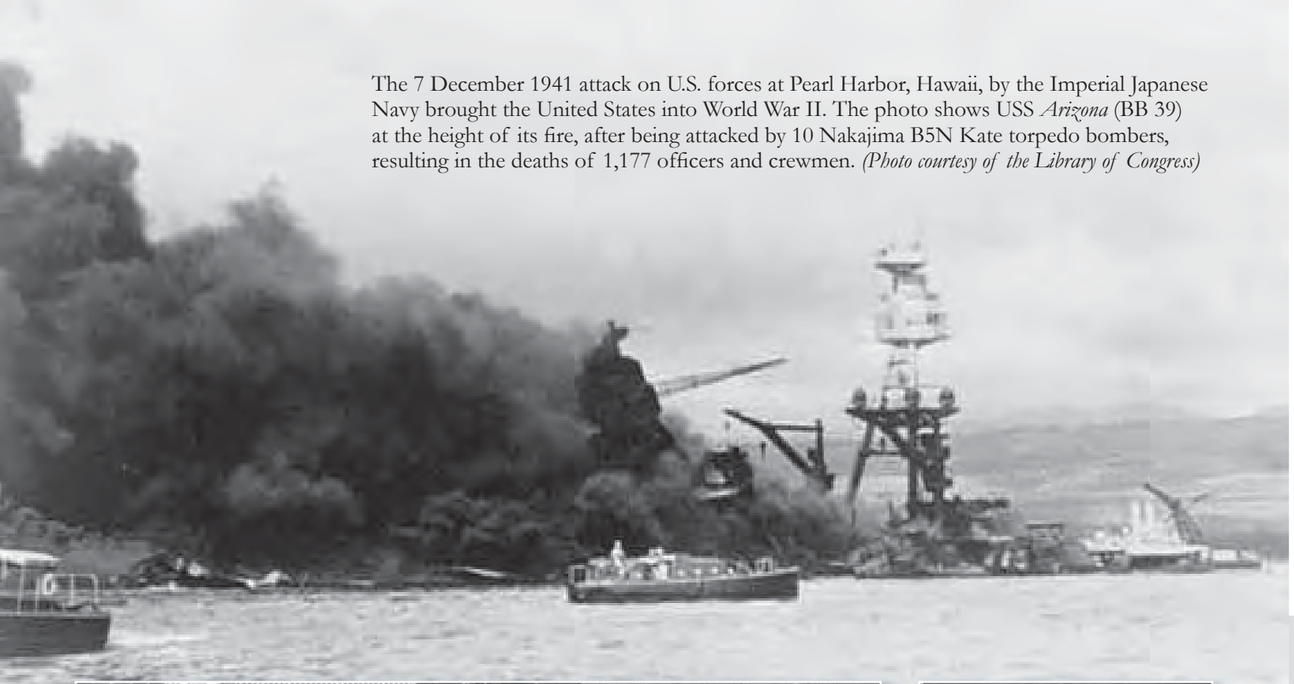
9. Each employee must familiarize himself with and obey these and all other published rules and regulations. If any employee is in doubt as to the meaning of any portion of these orders and instructions, he will ask his foreman or supervisor to explain same.

A notice posted outside the Indian Head Powder Factory stating that "… a careless man is a menace not only to himself but to everyone in the plant."



A worker sorts through cotton for use on the factory powder line.

(Coster/Parran Collection)



The 7 December 1941 attack on U.S. forces at Pearl Harbor, Hawaii, by the Imperial Japanese Navy brought the United States into World War II. The photo shows USS *Arizona* (BB 39) at the height of its fire, after being attacked by 10 Nakajima B5N Kate torpedo bombers, resulting in the deaths of 1,177 officers and crewmen. *(Photo courtesy of the Library of Congress)*

Indian Head workers at a war bonds rally. Following the United States' entry into World War II in December 1941, the demands for Indian Head jet propellant grains saw exponential growth to meet the needs of the Pacific naval campaign. By 1944, the Bureau of Ordnance urged Indian Head to deliver approximately 900,000 pounds of jet propellant monthly. *(Coster\Parran Collection)*

1941: Production of both smokeless powder and Explosive D is increased and the powder plant is expanded in the lead up to America's entry into World War II. The Naval Powder Factory was given orders to produce 1.3 million pounds of smokeless powder and 600,000 pounds of Explosive D.

1941: The Japanese Imperial Navy attacks the U.S. Navy at Pearl Harbor, Hawaii. United States enters World War II.

1942: Indian Head becomes the temporary home of the Jet Propulsion Laboratory (JPL) as a joint activity between the National Defense Research Council and the Powder Factory. Initial funding for the laboratory's equipment, employees and administrators came from the operating budget of Indian Head's Naval Powder Factory. JPL was instrumental in early experimental rocket work, such as a photoflash rocket for night photography, a rocket flare for post-attack illumination, and a rocket that was designed to deploy anti-radar chaff during its flight. JPL would transfer to Inyokern, Calif., in 1944.

1941 - 1945

1942: The Bureau of Ordnance authorizes establishment of an ordnance investigation station. The Explosives Investigation Laboratory (EIL) is established in July at Indian Head's Stump Neck Annex. The laboratory is responsible for stripping and disassembly of recovered enemy ordnance; research, method of location, identification and disposal of enemy and "friendly" ordnance; and demonstration of ordnance disposal techniques.

Under the leadership of Lt. D. Klein, the EIL's first officer in charge, the original operating staff is comprised of only officers and enlisted personnel. The laboratory worked on thousands of pieces of enemy ordnance, which included anti-aircraft projectiles, bombs, hand grenades and artillery projectiles. The role of the EIL was to safely open and disassemble the weapons, label the parts, and refer the materials to other labs for further detailing and study. Following World War II, the EIL became the Ordnance Disposal Technical Center and was responsible for operating the Navy's Explosive Ordnance Disposal (EOD) School.

An Indian Head employee extracts powder from the finishing press. *(Coster\Parran Collection)*

1942: The Advanced Mine School opens at Indian Head's `Stump Neck Annex.

1942: An extrusion plant opens at Indian Head, allowing for the production of double-based propellants of nitrocellulose and nitroglycerine.

1943: Indian Head begins operating presses for extrusion and finishing of double-based, jet-propellant powder grains. With five presses ready to be used full-time, Naval Powder Factory Commanding Officer Capt. Mark L. Hersey (1940 – 1943) requests authorization to hire approximately 200 more employees to operate the presses.

1944: After the Bureau of Ordnance gained control of the development of jet assisted take-off units (JATOs), nine of the completed JATOs are shipped to Indian Head for further test and study.

1944: Indian Head begins producing extruded grains for rockets, bazookas and air-to-ground anti-tank weapons. Six firing bays were constructed for testing of grains at what was then dubbed Naval Powder Factory's "ballistics laboratory." Indian Head reported production of more than 670,000 pounds of extruded grains. As wartime demands for the grains continued to surge, the Bureau of Ordnance would request Indian Head step up production to produce approximately 900,000 pounds of grain a month.

1944: The EIL is redesignated as Ordnance Investigation Laboratory.

1945: World War II ends.

A U.S. Army M24 tank crew along the Nakdong River in South Korea.
(U.S. Army photo)

1946: A research and development (R&D) division is established at Indian Head, which encounters difficulties almost immediately. Budget limitations, difficulties in attracting and keeping talented chemists and more established sites such as Naval Ordnance Laboratory White Oak hampered Indian Head's ability to establish a significant role in post-war rocket propulsion R&D.

The first monthly R&D report from Indian Head states "… the Powder Factory has been greatly handicapped, by reduction in force transfer of employees and the red-tape connected with allotments, attempts to procure new personnel, etc." By 1947, however, the Bureau of Ordnance converted 45 assignments already in progress at Indian Head into a formalized assigned R&D agenda.

1946: First shipment of JATOs arrives at Indian Head for testing.

1947: The Bureau of Ordnance approves pilot plants at Indian Head and the EIL is converted into a formal tenant activity. The EIL would become the EOD Technical Center and also operate the Navy's EOD school.

1947: With the decline of the armed services' consumption of smokeless powder, powder production at Indian Head declines and the station begins to lay off its workforce. State legislative officials meet with senior Navy officials to develop a plan to keep Indian Head active and substantially staffed.

On June 1947, Secretary of the Navy James Forrestal noted the construction of the pilot plants were "… further evidence that the Navy plans to keep the Naval Powder Factory in the forefront of research and powder manufacturing development, a project is being sponsored at this time to construct additional pilot plant facilities for the production of double base powder…[The project] will include additional facilities for a nitroglycerine plant, a pilot plant for rolled sheet ballistite, and a cast powder pilot plant."

1947: Indian Head establishes its Research and Development Department. Although 58 professional positions were originally allotted to the department, staffing issues and slow personnel procurement caused 19 positions to go unfilled: a problem not uncommon with other military technical laboratories during the postwar period.

1950: Korean War begins.

An 8AS-200 JATO Rocket Motor, developed and built by the Aerojet Engineering Corporation to help lift light planes or for rescue work. Indian Head began JATO testing in 1946.

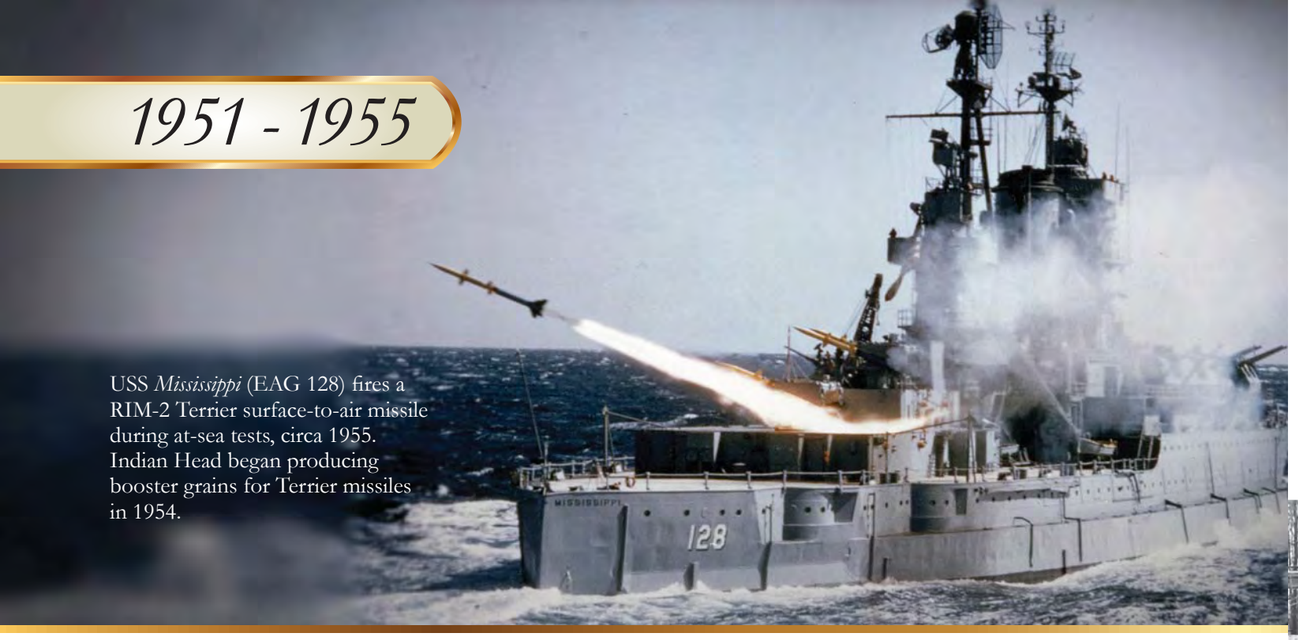
(Photo courtesy of the Smithsonian National Air and Space Museum)

1946 - 1950

The Biazzi nitroglycerine manufacturing plant's desensitizing building under construction, circa 1950. The decision to build a continuous flow nitroglycerine plant was made in 1947.

Navy World War II veterans employed at Indian Head's extrusion plant pose for a group photo on 17 January 1946.
(Coster/Parran Collection)

1951 - 1955



USS *Mississippi* (EAG 128) fires a RIM-2 Terrier surface-to-air missile during at-sea tests, circa 1955. Indian Head began producing booster grains for Terrier missiles in 1954.

1951: The Navy is assigned joint service explosive ordnance disposal responsibilities for basic training, and R&D. Two years later, R&D tasks are established as a separate organization and re-designated as the Naval Ordnance Technical Center at Indian Head's Stump Neck Annex. The activity was renamed Naval EOD School and remained at the main base of the Indian Head Powder Factory.

1952: Indian Head increases production of MK-31, 2.75-inch rocket grains to meet Korean War demand. Production of these grains requires expansion of Indian Head's extrusion plant facility, as the plant is limited to producing just 25,000 grains monthly. After facility expansion, the plant increases monthly production to 80,000 grains per month.

1953: Cast Propellant Plant is completed and begins operation one year later.

1954: The Biazzi Nitroglycerine Plant opens and begins production at Indian Head. Planning for this Swiss-designed continuous process nitroglycerine manufacturing facility began in 1947. The Bureau of Ordnance originally wanted a plant at Indian Head to act not just as a production source of nitroglycerine, but also other nitrated materials. The Chief of the Bureau of Ordnance, Albert G. Noble, later indicated that a continuous flow process plant had some advantages that would make the Biazzi design more beneficial in the long term.

1954: Indian Head begins producing booster grains for the Terrier missile: a large, short-range surface-to-air weapon.

1954: A Naval Research Laboratory engineer spoke into a microphone at a laboratory located at Stump Neck's radio antenna facility during the Operation Moon Bounce project. Approximately three seconds later, his words echoed back to him at the laboratory after traveling 500,000 miles via an Earth-Moon circuit. For the first time ever, the sound of a human voice had been transmitted beyond the ionosphere and returned to earth.

Indian Head's Biazzi Nitroglycerine Plant under construction in the early 1950s.

1956 - 1960

1958: Indian Head begins construction of Polaris missile propellant facility. Polaris was a long-range ballistic missile designed to launch from submarines below the surface of the ocean. The facility was completed in 1960 and quickly began producing Polaris missile base grains.

1958: Indian Head's designation changes from Naval Powder Factory to Naval Propellant Plant, 14 August. The name change was suggested by acting commanding officer, Cmdr. Francis W. Scanland, Jr., in 1952 during his one-year tour. Scanland believed by having the facility referred to as the Naval Powder Factory, implied that it only operated to produce gunpowder.

"While the facility's name had been correct in the 1940s, it is no longer correct and is becoming more and more incorrect," he said. Scanland recommended the station be redesignated as "Naval Propellant Development Station." Although his suggestion was not immediately adopted by the Bureau of Ordnance, Scanland went on to develop a restatement of the station's mission, recommend a more in-depth focus on pilot plants, and advocate for continued housing of EOD School.

Indian Head's Biazzi Nitroglycerin Plant opened in 1954. Photo taken circa 1956.

Indian Head's Goddard Power Plant Complex begins operations in 1957 to generate steam and compressed air to majority of the station. The power plant provides almost 67 percent of the station's electric power until it is replaced by a combination natural gas turbine and heat recovery steam generator in 2015.

An overhead shot of Indian Head Polaris Plant.

1960: Indian Head receives a patent for Otto Fuel II: a propulsion composition for high-speed submarine torpedoes. The fuel is named after Dr. Otto Reitlinger, a Navy scientist at nearby Newport, Va. Reitlinger was concerned about the instability of monopropellant fuel then used to power torpedoes, a fear that proved prophetic when an accident involving the propellant killed five people.

Following his move to the Bureau of Ordnance, Reitlinger made several visits to Indian Head to challenge its chemists there to develop a liquid monopropellant that would replace existing fuels. In 1963, Reitlinger and the chemists at Indian Head develop the final version of Otto Fuel II.

1960: Engineers at Indian Head produce the first propulsion and gas units for Sidewinder missiles.

1961 - 1965

Workers at Indian Head stabilize a Polaris missile motor in May 1964. The Polaris missile was the first U.S. submarine-launched ballistic missile.

1962: The Navy redesignates EOD Technical Division as Naval EOD Facility.

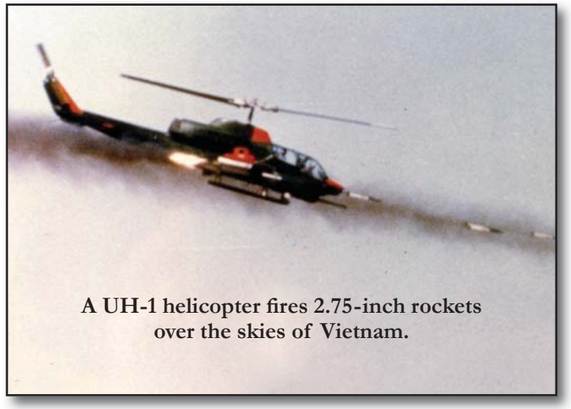
1962: Indian Head begins work on the X-259 Athena and X-259 Scout experimental space rockets.

1962: Joe Browning is named the first civilian technical director at Indian Head. Browning came to Indian Head as a researcher in the early 1950s and worked on R&D projects focused on creating powder-based catapult propellants for aircraft carriers. Although the Navy ultimately decided against adopting the use of "powder power" catapults, Browning made a mark for himself at Indian Head by developing more than 100 new propellants for the catapults.

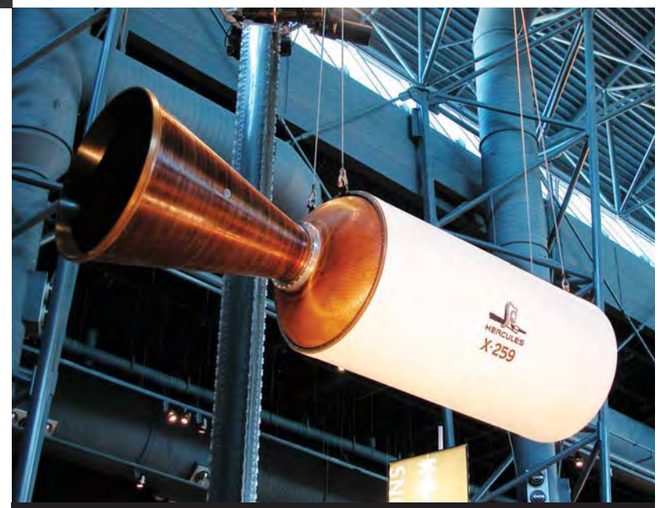
Browning left Indian Head to join the emerging Polaris missile program at the Navy's Special Projects Office in 1956, but returned two years later to manage the emerging planning and management department.

1963: Construction at Indian Head begins on an inert diluent plant. The plant would allow for continuous solid propellant production by suspending ingredients in inert liquid, mixing them in liquid form, then removing and reprocessing the inert carrier for reuse. The inert carrier would then transport ingredients from a separate dispersion area to a facility for blending and mixing.

1965: Indian Head revives propellant production for 2.75-inch rockets for use in Vietnam. The rockets were taken out of production in 1957, but would be revived for mass production in 1965. The rocket was the signature weapon of helicopter gunships during the war.



A UH-1 helicopter fires 2.75-inch rockets over the skies of Vietnam.



The rocket motor for an X-259 Scout experimental space rocket on display at the Smithsonian National Air and Space Museum in Washington D.C. The Scout was conceived in 1958 as a low-cost launch vehicle for light payloads. *(Photo courtesy of the Smithsonian National Air and Space Administration)*

1966 - 1970

Front page of 22 December 1967 station newspaper, *Missile Aneous,* runs a front page article on the explosion at the holding house.

1966: Indian Head was once again redesignated from Naval Propellant Plant to Naval Ordnance Station (NOS), Indian Head in October: a change intended to reflect the continued diversification from simply propellant production to broader areas of chemistry, engineering and other areas.

1967: The inert diluent plant opens at Indian Head.

1967: The concept for Project Gunfighter – a long-range ordnance study conducted using a 5-inch shell fired from an 8-inch barrel – is initiated at NOS Indian Head. One of the outcomes of the project is the long range bombardment ammunition (LBRA) that was produced in 1968 and had an approximate range of 36 nautical miles. Operational evaluation for LBRA occurred in 1970 in South Vietnam when USS *St. Paul* (CA 73) proved the accuracy of the shells by firing the ordnance from 60,000 yards offshore, missing the intended target by a matter of feet.

The LBRA was directly responsible for the destruction of at least six North Vietnamese structures during the war.

1967: A holding house attached to Indian Head's Biazzi Plant is leveled on 14 December 1967 following a nitroglycerine explosion. The blast completely destroyed the building and left one individual with minor injuries. Safety features built into the systems surrounding the holding house stopped the explosion from traveling directly to the main nitrating building. The direct cause of the blast was never identified.

1969: With cutback of troops to Vietnam and diminishment of other projects, Indian Head sees the beginning of an employee reduction that would ultimately scale down the 3,500 person workforce to approximately 2,000.

1970: Development of Sub-Caliber Anti-Material Projectile (SCAMP) SCAMP anti-material projectiles begins at Indian Head. SCAMP was a high-powered weapon that utilized 30 grain flechettes that would clear ship decks or intercept and destroy incoming missiles.

1971 - 1975

1971: The joint service EOD program is designated as an Echelon 4 activity under the Naval Ordnance Systems Command. Later that year, the Secretary of the Navy (SECNAV) was assigned as the single manager for military technology and training. The Naval EOD Facility was subsequently tasked with providing research and development in carrying out SECNAV's responsibility for meeting joint service EOD technology requirements.

1972: Indian Head Technical Director Joe Browning creates a special programs department comprised of four divisions: Electronics, Cartridge Actuated Devices, Gun Systems and Documentation. The department serves as Indian Head's central nervous system for innovation in the coming years.

1973: Cartridge Actuated Device/Propellant Actuated Device (CAD/PAD) work is consolidated for three armed service branches and is assigned to Indian Head. By the time a working agreement with the Naval Air Systems Command (NAVAIR), the Army and the Air Force was finalized in 1977, the CAD/PAD market consisted of more than 800 different cartridge actuated units. CAD/PAD work at Indian Head included production and product improvement, surveillance programs, design engineering, research and development, and maintenance and upkeep of older units.

1974: Joe Browning retires after serving 12 years as Indian Head's first civilian technical director.

1975: The Navy jointly designates Indian Head and Dahlgren as the Ordnance Environmental Support Office. The office was responsible for working on environmental inquiries and finding resolutions for pollution issues relating to naval ordnance.

A Mk-11 Talos long-range surface-to-air missile is test fired at Indian Head's Large Motor Test Facility, circa 1975.

A BQM-34 Firebee target drone utilizing Indian Head-produced Mk-23 JATO units launches during a training mission.

A crane operator lifts inert propellant canisters near an empty Indian Head magazine.

Mid-1970s: Naval EOD Facility begins evaluation of robotics with the Wheelbarrow robot: a U.K. device that was used to counter Irish Republican Army bombs.

1977: NOS Indian Head finishes production of seven consecutive lots of the standard anti-radar missile motors. The RIM-66 Standard missile was notably used during Operation Praying Mantis when USS *Wainwright* (CG 28) and USS *Simpson* (FFG 56) fired multiple Standard missiles at Iranian fast attack craft *Joshan,* crippling it before a Harpoon missile from USS *Bagley* (FF 1069) sunk the craft.

1977: Following a program management meeting between Indian Head and NAVAIR to discuss the production of JATOs, both organizations agreed that Indian Head was best suited to continue production because their older design did not lend itself to the more modern facilities of industry.

Shortly thereafter, Indian Head received approximately $300,000 from NAVAIR for JATO improvements, which resulted in production of two weekly JATO batches. By December 1977, Indian Head had shipped reloaded JATOs designed for cold weather testing to U.S. Navy units in Antarctica for testing.

1980: Naval EOD Facility is redesignated as Naval EOD Technology Center.

Naval EOD Technology Center at Indian Head's Stump Neck Annex.

1976 - 1980

Mk-6 JATOs were used to aid the launching of a C-130 during Antarctic testing in the late 1970s. NOS Indian Head engineers were on site in Antarctica to aid with testing.

A Harpoon anti-ship missile is launched from a battleship. Indian Head was responsible for the construction of 22 mock-up Harpoon missiles used for training purposes beginning in 1977.

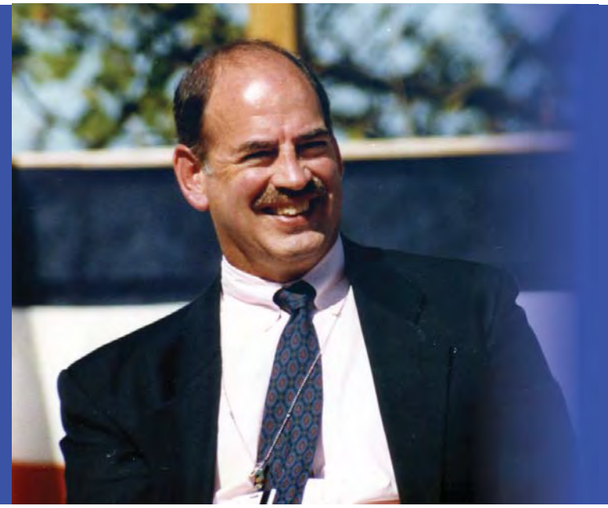
1980: Naval EOD Technology Center begins using the commercially available Remote Controlled Transport (RCT). EOD would deploy more than 260 RCTs, becoming the Department of Defense's (DoD) largest user of ground robots.

1981: Indian Head Technical Director David Lee readopts the Professional Development Council (PDC) to emphasize training and production of case studies. The PDC was established by former Indian Head Technical Director Joe Browning in the late 1950s as a means to engage and develop young employees. Originally called the "Assistant Management Board," the program was successful in motivating younger Indian Head professionals by allowing them access to and potential mentoring by senior Indian Head managers.

Lee understood the value of recruiting and retaining young professionals into the Indian Head workforce. During the early 1980s, Lee asked his department heads to develop training plans for the young engineers. He also implemented a plan that rotated young professionals who displayed high motivation and potential to other departments of their choosing.

Although Lee left Indian Head in 1986, senior leadership felt these programs were valuable to training, recruiting and retention and suggested further study and improvement upon his ideas.

1987: Indian Head program management shifts to functional departments, while support departments shift to function under the leadership of civilian management.



Roger Smith is named Indian Head's technical director in 1989. Smith previously served as the technical director for undersea warfare before being rotated out by then-Secretary of the Navy John Lehman. He served as Indian Head's technical director until his death in January 1999.

Indian Head workers prepare the Distributed Mine Explosive Neutralization System (DEMNS) for operation. DEMNS was developed at Indian Head to neutralize all surface-laid and buried mines. The system uses a rocket deployed net and small shaped charge munitions to neutralize the targeted minefield.

1981 - 1990

1987-1989: NAVSEA reorganizes several agency roles at Indian Head into separate "Centers of Excellence," which guarantee the Navy will not duplicate any specific effort elsewhere and treats the facility as the lead collector of experts for that locale.

By 1989, the six Centers of Excellence designated at Indian Head are:

- Guns, Rocket and Missile Propulsion;
- Energetic Chemicals;
- Ordnance Devices (CAD/PAD);
- Missile Weapon Simulators;
- Explosive Process Development Engineering; and
- Explosives Safety, Occupational Safety and Health and Environmental Protection.

1988: An explosive bombproof shelter is built at Indian Head for the testing of developmental explosives to determine their detonation properties.

1990: Indian Head celebrates its 100th anniversary.

Station employees and visitors celebrated 100 years of Indian Head's technical excellence in 1990.

1991 - 1995

The post-war 1990s are a turbulent period for military bases due to a decline in the Department of Defense's budget and a Reduction-of-Force initiative. Born out of these budget-conscious decisions is Congress' approval of Base Realignment and Closure (BRAC) procedures in 1991, 1993 and 1995.

In 1993, more than 250 employees of the Navy's White Oak Laboratory Explosive Development and Underwater Warheads branch in Silver Spring, Md., are relocated to Indian Head following the 1993 BRAC decision to shutter the laboratory.

Local Charles County, Md., businesses get involved to prevent Indian Head from becoming a casualty of the 1995 BRAC. Leadership at Indian Head is informed on 10 May 1995 that the station is not among those activities selected for closure.

1991: Indian Head ramps up production of propellant grains for the Mk-66 2.75-inch rocket and for the U.S. Army's and Marine Corps' Mine Clearing Line Charge (MCLC) in support of Operations Desert Shield and Desert Storm. The command rapidly produced 30,000 grains for the 2.75-inch rocket and 2,000 MCLC grains per month to meet the warfighter's needs for these critical weapons.

1992: Naval Ordnance Station Indian Head is administratively reassigned and renamed the Naval Surface Warfare Center (NSWC) Indian Head Division.

1994: Indian Head is designated as the Center of Excellence for Energetics by the Office of Naval Research.

1995: The Cast Assembly Facility opens at Indian Head.

1995: Naval EOD Technology Center becomes the Naval EOD Technology Division after aligning under the newly established Naval Ordnance Center.

An H-1 helicopter launches 2.75-inch rockets during a training mission. Indian Head was designated as a tri-service agent for the rocket in 1992.

Indian Head is the design and in-service agent for the Smokey Sam: a dummy surface-to-air missile (SAM) used to help train pilots in evasion tactics against enemy SAMs.

1996 - 2000

1997: Indian Head receives the Defense Environmental Quality Award and Natural Resources Conservation Award for Small Institutions. Indian Head also receives the Hammer Award from former Vice Pres. Al Gore. The award is presented to teams of federal employees who have made significant contributions in support of reinventing government principles. Indian Head achieved this recognition based on Roger Smith's ability to navigate through force reductions while minimizing departmental overhead costs and applying quicker methods of rocket motor development and production.

A Tomahawk missile launches from a submarine. Functional ground testing for the Tomahawk Missile was demonstrated at Indian Head in 1998.

1998: The CAD/PAD Joint Program Office is established at Indian Head, recognizing the success in serving both their Navy and Air Force customers.

1998: Following 1993 BRAC, several naval facilities that were victims of the BRAC decisions were in need of a central host command. Indian Head recommended including these facilities in their workforce since they could provide the technical expertise in their chains of command. Indian Head subsequently absorbed detachments from Yorktown, Va.; Earle, N.J.; Concord, Calif.; Seal Beach, Calif.; and McAlester, Okla.; bringing approximately 240 personnel to the workforce.

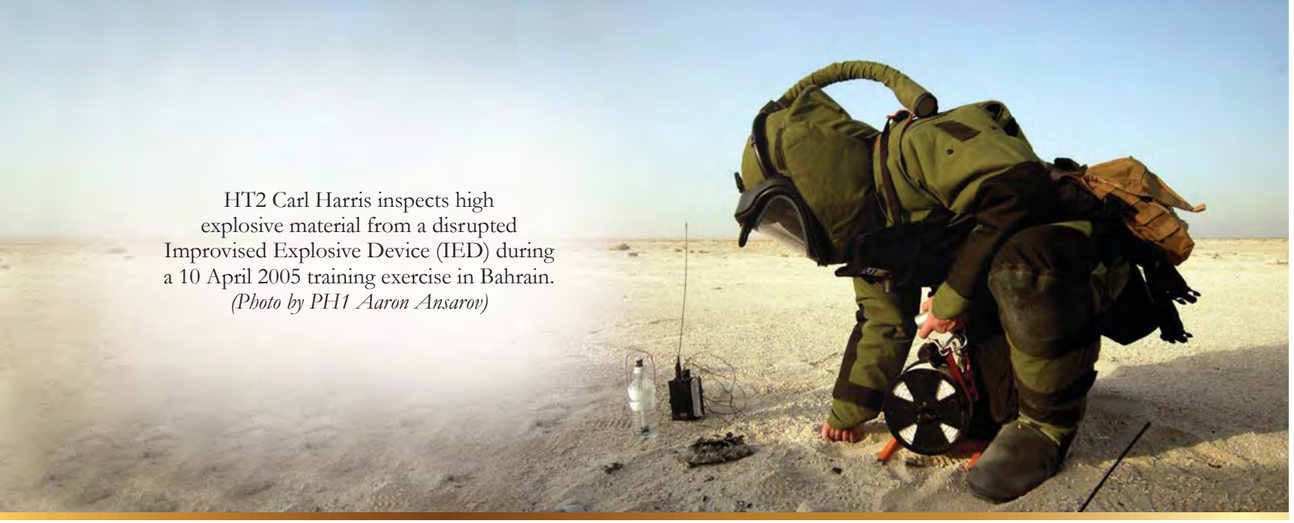
1998: An explosion in Indian Head's gun propellant batch facility hampers the Navy's ability to meet high-performance gun propellant requirements. To mitigate the slowdown, Indian Head receives an emergency military construction allocation of $6.5 million for production of a continuous processing scale-up facility.

1998: Indian Head and the University of Maryland, College Park sign a cooperative agreement establishing the Center of Energetics Concepts Development. The agreement allows for students in the university's Masters of Engineering program to work with Indian Head subject matter experts in specific fields of their choice.

1999: The EOD School leaves Indian Head for relocation to Eglin Air Force Base, Fla.

A Naval EOD Technology Division employee provides visitors a demonstration of the site's EOD robots, circa 1996.

Indian Head's CAD/PAD test area.



HT2 Carl Harris inspects high explosive material from a disrupted Improvised Explosive Device (IED) during a 10 April 2005 training exercise in Bahrain. *(Photo by PH1 Aaron Ansarov)*

2001: Engineers begin work on the Advanced Technology Ordnance Surveillance (ATOS) Demonstration Program following approval from Congress. ATOS allows users to remotely monitor and maintain ordnance inventory, while also providing the ability to maintain ideal environmental conditions for the stockpile.

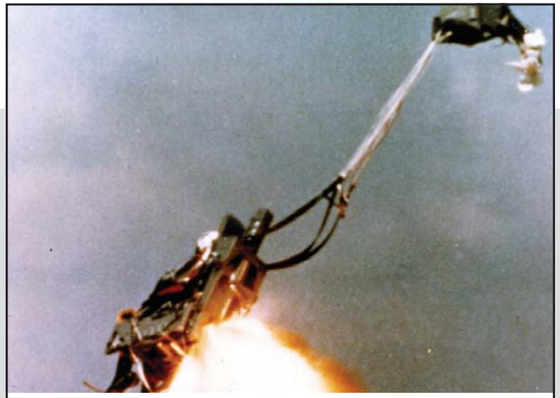
2001: Indian Head engineers, in partnership with German naval engineers, complete first bilateral international project agreement for development of Dynamic System Mechanics Advanced Simulation (DYSMAS) – a software program that simulates and analyzes weapon design and target reaction. Accomplishments included a validated ability to predict underwater explosion effects (shock wave and bubble phenomena) and target damage at small and medium scales.

2001: Indian Head completes enhanced blast explosives qualification for BLU-118 thermobaric bomb. BLU-118 provides higher sustained blast pressures against enemy targets in confined spaces, tunnels, underground bunkers and other facilities.

2001: Indian Head employees complete Evolved Sea Sparrow Missile (ESSM) inert operational missile testing, marking the first time ESSM was tested in conjunction with the Aegis weapon system.

2001: Indian Head delivers 2,074 pieces of CAD/PAD government-furnished equipment to Boeing for installation into low-rate initial production F/A-18E/F Super Hornet aircraft safety harnesses.

Personnel assigned to EOD Mobile Unit Six, Detachment Two, detonate a floating mine during a 6 December 2004 exercise in the Gulf of Mexico. *(Photo by MN2 Patrick Connerly)*



CKU-5C/A rocket catapult, Venier Rocket Motor, used in the Advanced Concept Ejection Seat II is manufactured at Indian Head.

A RIM-7 Sea Sparrow missile launches during a 2002 training exercise aboard USS *Harry S. Truman* (CVN 75) in the Atlantic. (*Photo by PH3 Dwain Willis*)

A completed BLU-118B thermobaric bomb is ready for shipping at Indian Head. Thermobaric explosives were first used against Al Qaida and Taliban forces in 2002 during combat missions in eastern Afghanistan.

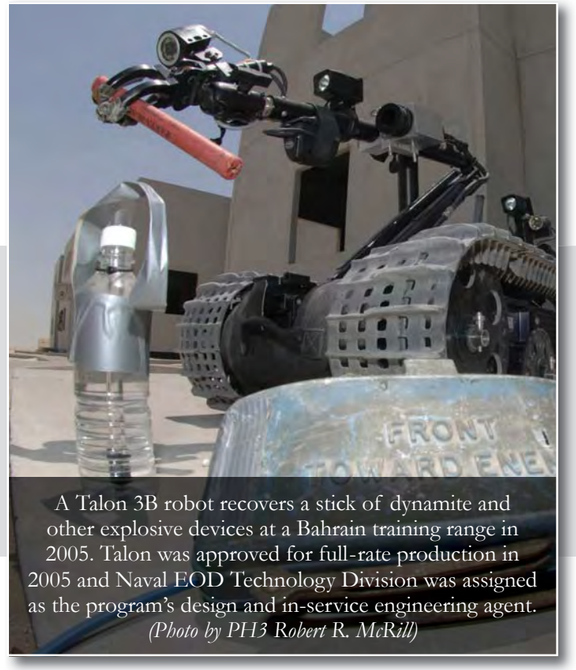
2001 - 2005

2002: Newly developed Tactical Tomahawk missile completes a functional ground test 17 May at Indian Head. The test consisted of securing the missile to a mount and "flying" a simulated mission to gauge and demonstrate various Tomahawk components.

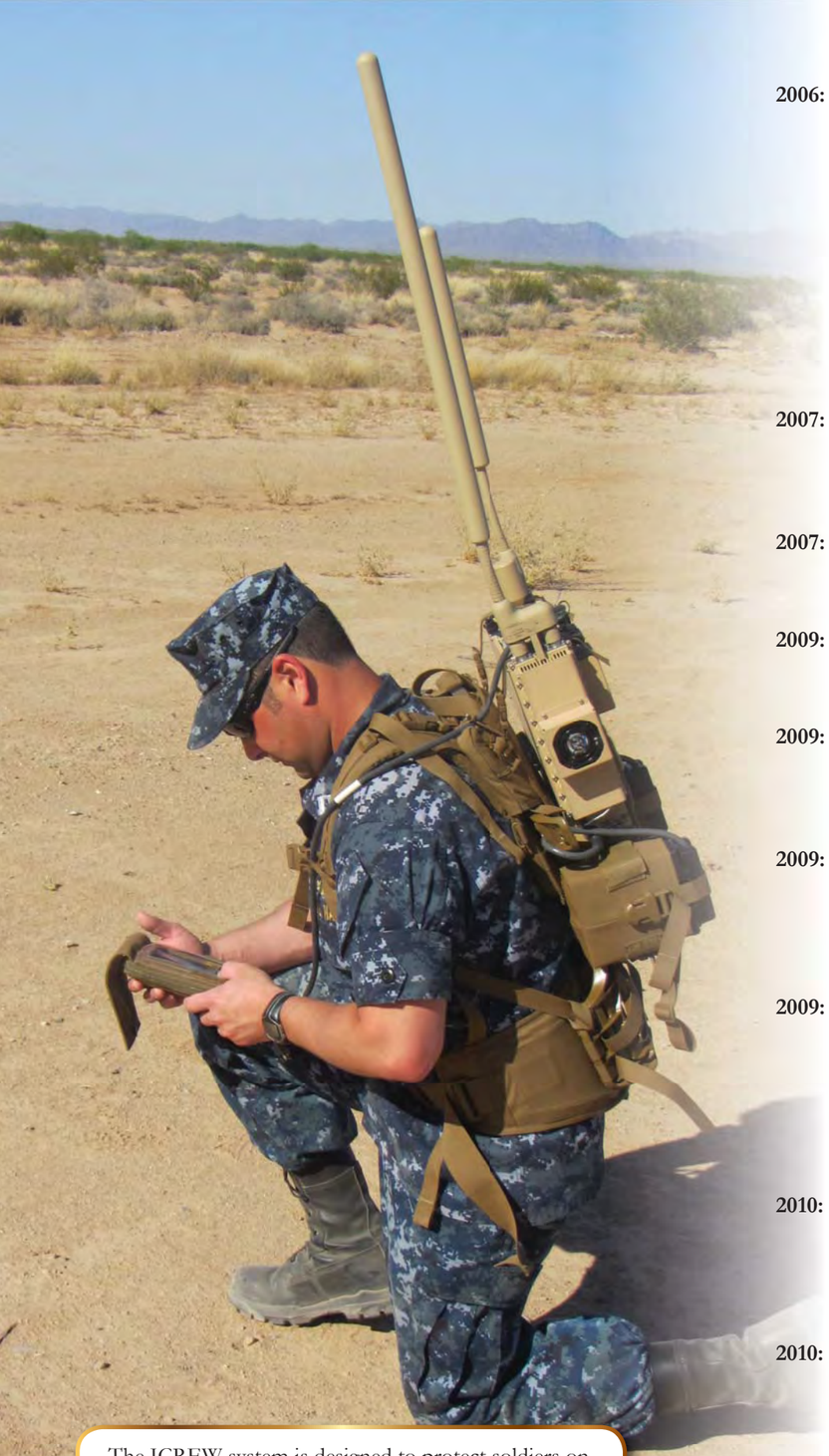
2003: Naval District Washington (NDW) becomes Indian Head's host organization and NSWC Indian Head Division becomes an official NDW tenant. Support functions such as public works, facility management and technical services once under the command of NSWC Indian Head are migrated to NDW.

2005: NSWC Indian Head Division establishes the Systems Integration Department at the Army arsenal in Picatinny, N.J., 18 October, as a result of the 2005 BRAC decision. Three primary functions relocated to Picatinny are ammunition engineering and acquisition support of conventional ordnance; gun systems in-service engineering for minor, medium, and major caliber naval gun systems; and packaging, handling, storage and transportation test and evaluation for all naval surface ordnance.

2005: Indian Head completes enhanced blast explosives qualification for thermobaric grenades.



A Talon 3B robot recovers a stick of dynamite and other explosive devices at a Bahrain training range in 2005. Talon was approved for full-rate production in 2005 and Naval EOD Technology Division was assigned as the program's design and in-service engineering agent. *(Photo by PH3 Robert R. McRill)*



The JCREW system is designed to protect soldiers on patrol, in vehicles, or in forward operating bases from advanced radio-controlled IEDs.

2006: The Office of the Chief of Naval Operations establishes the Technical Support Detachment (TSD) Combined Explosives Exploitation Cell (CEXC) as an Echelon V activity of Naval EOD Technology Division. Senior- and Master-level EOD technicians assigned to TSD provide collection, exploitation, reporting, forensic analysis and technical intelligence from explosive-related incidents. TSD would deploy the first CEXC to Bagram, Afghanistan, in 2007.

2007: Indian Head employees design and develop Capacitive Discharge Firing System to replace the current system used aboard BQM-74 Chukar aerial target.

2007: Naval EOD Technology Division aligns under NAVSEA as a division of Naval Surface Warfare Center.

2009: Dr. Richard Muscato receives NAVSEA Engineer and Scientist award for twin screw extrusion process development.

2009: Indian Head opens a new sensitive compartmented information facility to support higher classified projects for the Navy and other national interests.

2009: Indian Head engineers develop software and firmware allowing for over-the-air joint counter radio-controlled improvised explosive device electronic warfare (JCREW) updates.

2009: Indian Head personnel complete tests demonstrating the feasibility of Dial-A-Yield warheads: adaptable explosive charges which can be adjusted to match requirements for defeating the target while reducing or eliminating collateral damage.

2010: Indian Head opens Joint Aircrew Escape Component Center, centralizing local CAD/PAD stock point operations, magazine operations, shipping and ammunition distribution.

2010: NSWC headquarters realigns gun and ammunition technical capabilities from NSWC Crane, Ind., and NSWC Port Hueneme, Calif., divisions to NSWC Indian Head – officially reflecting the realignment of those functions and capabilities with Picatinny, N.J., detachment.

2006 - 2010

BU1 Rob Anderson, a Navy Reservist stationed with EOD Technical Support Unit in Indian Head, Md., signals that he is ready to descend to the former Soviet submarine Juliett 484 Providence, R.I., in 2008. *(Photo by MC1 Eric Lippmann)*

2010: NSWC Indian Head Division's Dr. Victor J. Bellitto receives NAVSEA's Scientist of the Year award for his development of techniques and equipment that encapsulates high-explosive particles with metals. His research enables development of new and better energetic materials and propellants.

2010: Picatinny breaks ground on a new packaging, handling, storage and transportation facility to house transferred naval operations.

2010: Dr. Christine Michienzi and Ms. Christine Knott receive a Dr. Delores M. Etter Top Scientists and Engineers of the Year award for their work on the Navy Insensitive Low Erosion gun propellant, which allows greater stand-off distance for operators and increases target set. The Etter award – named after former Assistant Secretary of the Navy for Research, Development and Acquisition Dr. Delores Etter – recognizes Navy civilian and military personnel for exceptional science and engineering achievements.

2010: Engineers complete design, development and manufacture of the insensitive munitions warhead for 2.75 unguided and guided rocket systems to replace standard Army M229 and M151 warheads.

Warren Tibbs, a Naval EOD Technology Division robot operator, shows robots developed at Indian Head and used by EOD technicians and civilian police department SWAT team members. *(Photo by MC2 Jhi L. Scott)*

Lt. Peter McGuire, an EOD officer assigned to NSWC IHEODTD, Platoon 4, gathers evidence from around a blast crater during a mine strike training exercise at Indian Head's Stump Neck Annex. *(Photo by MC2 Micah P. Blechner)*

An Mk-38, Mod 2 machine gun system is tested on 15 January 2014 at NSWC IHEODTD's Picatinny, N.J., detachment. *(U.S. Army photo by Todd Mozes)*

2011: Nine Indian Head Reactive Materials Team engineers receive a Dr. Delores M. Etter Top Scientist and Engineer of the Year award for developing reactive materials replacing inert steel in bomb casings of next generation weapons systems.

2011: Biazzi Nitration Plant closes its doors 24 May after more than five decades of use. The facility allowed Indian Head to make nitroglycerin, a key ingredient for double-base propellants. Producing double-based propellants helped move the command from a smokeless powder factory to a propellant plant.

2012: Indian Head opens the new Advanced Energetics Research Laboratory, allowing scientists to more safely handle explosive material, conduct analytical research, and pursue development activities.

2012: NSWC Indian Head Division's Densified Propellant Team receives a Dr. Delores M. Etter Top Scientist and Engineer of the Year award for developing, manufacturing and demonstrating a high-density rocket propellant that increases the range of the tube-launched, optically-tracked, wire command data link guided missile by 40 percent.

2012: Indian Head and Army Research Laboratory begin DYSMAS enhancements to simulate shallow soil-buried explosion effects against vehicles.

2013: The second underwater post-blast investigation course for EOD technicians and first responders is completed in October.

2013: NAVSEA announces the merger of NSWC Indian Head Division and Naval EOD Technology Division. The new command is called the NSWC Indian Head EOD Technology Division (NSWC IHEODTD).

2013: Indian Head breaks ground on the Agile Chemical Facility to modernize manufacturing procedures, reduce maintenance costs, improve production flexibility, provide safer operations, and reduce the command's environmental footprint. The facility was designed to replace the Moser Plant, built in 1948, and the Biazzi Nitration Plant, built in 1954.

2013: Three NSWC IHEODTD teams receive Dr. Delores M. Etter Top Scientist and Engineer of the Year awards:

- Biological Agent Defeat Team for developing a test facility and a process for determining efficacy of gram-quantity explosive formulations in neutralizing bio-agents;
- Counter IED R&D Team for identifying counter-IED process observables and signatures instrumental in capturing IEDs in the field, and in training U.S. personnel in addressing homemade explosives and IEDs;
- Green Primary Explosives Team for developing and testing DBX-1, an environmentally-benign, drop-in replacement for lead azide, which aids both DoD and industry partners in reducing the amount of hazardous material used in detonators and fuzes.

2014: EOD Information Management Division is awarded the NAVSEA Excellence Award for development and release of more than 10,000 EOD publications covering approximately 39,000 foreign and domestic ordnance items, IEDs, components, aircraft and EOD procedures.

2011 - 2015

Indian Head engineers prepare a Tomahawk missile for a functional ground test on 17 March 2015 at the site's large motor test facility. *(Photo by Monica McCoy)*

2014: NSWC IHEODTD dedicates its new energetics facility to U.S. Marine Corps Lance Cpl. Terry Edward Honeycutt, Jr., in August. Honeycutt, a Charles County, Md., resident assigned to 2nd Battalion, 9th Marine Regiment, 2nd Marine Division, II Marine Expeditionary Force at Camp Lejune, N.C., was killed during 2010 combat operations in Helmand Province, Afghanistan.

2014: NSWC IHEODTD's triamino-trinitrobenzene (TATB) project team is recognized by DoD and Department of Energy leadership for their contributions in establishing a U.S. production source of the TATB energetics material. TATB is an integral component of booster and fuzing systems for missiles, bombs and artillery warheads.

2014: Indian Head engineers complete delivery of 16 early operational capability LAU-61G/A Digital Rocket Launchers for NAVAIR's Direct and Time Sensitive Strike Weapons program office in March.

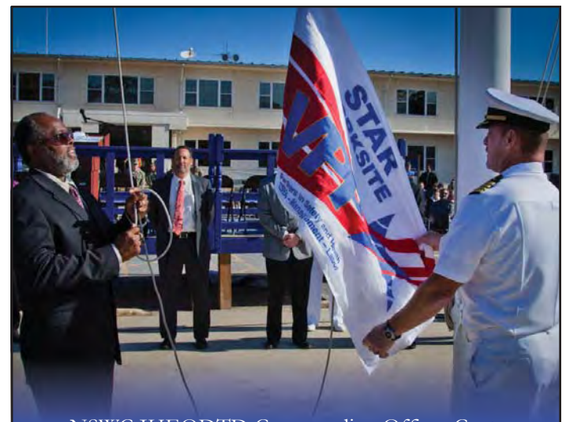
2014: Dr. Aaron O'Toole and Jesse Moran received individual Dr. Delores M. Etter Top Scientist and Engineers of the Year awards. O'Toole was recognized for developing a method for enhancing semi-autonomous EOD tele-operations. Moran received his award for his characterization of improvised detonators used in IEDs and demonstrating responses to homemade explosive threats in Afghanistan.

2015: Indian Head's Advanced EOD Robotic System (AEODRS) team receives the 2014 Defense Standardization Program's Outstanding Achievement Award in March.

2015: NSWC IHEODTD announces its first public-private partnership agreement under its Center for Industrial and Technical Excellence designation.

2015: NSWC IHEODTD's Dr. Greg Young and Dr. Vasant Joshi receive a Dr. Delores M. Etter Top Scientist and Engineer of the Year award for the development of a hybrid rocket fuel that performs as well as solid rockets while creating a safer system that is throttleable and able to be stopped and restarted in flight.

2015: Indian Head celebrates its 125th Anniversary.



NSWC IHEODTD Commanding Officer Capt. Vincent Martinez, right, and safety officer Anthony Brown raise the Occupational Safety and Health Administration Voluntary Protection Program Star Site flag at Indian Head, Md., on 22 September 2014. Only 18 units out of 7,000 DoN commands hold Star Site status.

NSWC IHEODTD engineers demonstrate the command's diamond wire vertical saw during a visit by the Commander, NAVSEA, Vice Adm. William Hilarides (center). *(Photos by Matt Poynor)*

Research, Development, Test and Evaluation Department

1. Material development continuum
2. Comprehensive analytical capabilities
3. Detonation characterization advanced diagnostics
4. Ordnance dissection
5. Non-destructive evaluations

Kevin Genson, a systems engineer with NSWC IHEODTD's Systems Engineering Department, operates the Concept Laser M2 metal additive manufacturing system. The system uses a high-powered laser to precisely melt complex shapes out of a bed of hardened steel powder. *(Photo by Matt Poynor)*

Systems Engineering Department

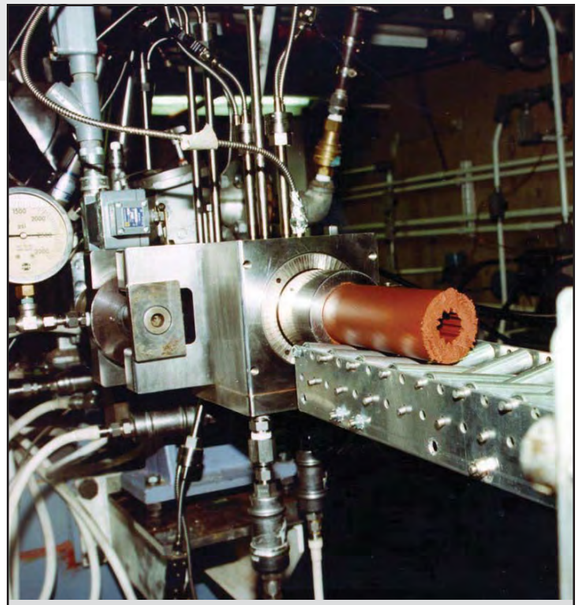
1. DYSMAS
2. Micro-electro mechanical systems explosive-certified cleanroom
3. Polymer and metal additive manufacturing capability (3D printing)
4. CAD/PAD virtual fleet support

EOD technicians assigned to NSWC IHEODTD TSD measure blast damage on a hull shape during a weapons effect assessment.

TSD

1. Weapons effect assessments
2. Environmentally-controlled labs
3. Triage equipment
4. Electronic exploitation equipment
5. Biometric and forensic preservation
6. Maritime interdiction operations underwater and post-blast analysis

Capabilities and Facilities



Extrusion machines allow NSWC IHEODTD engineers to develop propellants for joint service products.

EOD Department

1. Joint service EOD information management, including 24/7 EOD technical support
2. Joint service EOD equipment engineering and development
3. Joint service EOD equipment lifecycle logistics support and sustainment
4. Additive manufacturing and prototyping for development
5. Robotics test range

Energetics Manufacturing Department

1. Cast composite propellant and polymer-bonded explosive mixing/casting
2. Chemical manufacturing and scale up
3. Pressed explosives and warheads
4. Cartridge, igniter and CAD/PAD assembly
5. Explosive decontamination and disposal
6. Extruded double base propellant

Systems Integration Department

1. 16,000 sq. ft. PHST weapon container test facility
2. Gun stand complex
3. 12,000 sq. ft. minor caliber lab
4. Medium caliber gun range facility




Unique Opportunities

Type of Agreement	NSWC IHEODTD Division with	Purpose and Advantage	Description
Center for Industrial and Technical Excellence	Private industry	Partners can team with command to perform work and use command's facilities and equipment under its safety and security protocols.	Grants statutory authority to enter into public/private partnerships under Title 10, USC, Section 2474. Applies only to depot maintenance and/or military arsenal facilities. Initiated as a business case analysis and is approved by NSWC IHEODTD commander.
Broad agency announcement	U.S. or foreign business, universities and individuals	Used for competitive selection of proposals for scientific study and experimentation. Invitation to submit a proposal for research and development.	Provides general description of Navy needs and future requirements; not a formal request for proposal (RFP). May be open up to a year. Contracts may or may not be awarded. Publication in the Commerce Business Daily.
Work for private parties agreement	Any business, university or private entity	Rapid contract process whereby unique NSWC IHEODTD facilities and personnel can be directly accessed and paid for by a non-government customer.	Tasking based on statement of work by customer and cost estimate provided by NSWC IHEODTD personnel. Approval at local level; not subject to federal acquisition regulations. Requires indemnification and advanced or phased payment.
Memorandum of understanding or agreement	Any federal government entity, university, or business entity	Shows intent to work together in a partnership or collaborative manner. No funding, contracting or accounting.	A high-level agreement documenting and identifying areas of potential collaboration and/or a strategy to do so. Requires approval by senior managers.
Cooperative research and development agreement	Any non-federal government entity	Joint development and sharing of facilities, knowledge, experience and/or intellectual property. Provides data and intellectual property protection from Freedom of Information Act for an established period of time.	An agreement that provides for joint research and development; however, NSWC IHEODTD personnel and facilities costs may be paid for by the non-government partner. Approval by NSWC IHEODTD commander. Not subject to federal acquisition regulations.
Patent license agreement	Any entity	Commercially exploit patented government-developed technology. Licensees have competitive advantage for commercialization of a product or process.	Assigns the right to make, use or sell government intellectual property. License fees and/or royalties may be involved. Approved by the NSWC IHEODTD commander.
Small business innovative research program	Any U.S. small business with less than 500 employees	Take advantage of special funding set aside by Congress to develop innovative solutions to Navy problems having a potential for commercial use.	Contracts are phased to permit technology feasibility and demonstration before full-scale development commercialization. Award amounts generally range from $100K to $750K, depending upon phase.
Intergovernmental Personnel Act	State or local government, universities, and qualified non-profit entities	Assigned personnel act as employees of institution to which they are assigned. Promotes inter-governmental understanding and collaboration for mutual benefit.	Personnel temporarily assigned to another organization between one to four years. Salary may be paid by receiving or assigning organization or the cost may be shared.
Integrated product and process development or integrated product teams	Parties involved in development and delivery of a product or concept	Empowerment of a team to develop or deliver a product at best cost, schedule and quality that is supportable.	Encourages coordination, communication and innovation for development of new products or technologies for the benefit of all parties.

NAVSEA
WARFARE CENTERS
Indian Head EOD Technology Division

NSWC Indian Head Commanding Officer

Ens. Robert B. Dashiell
1890 – 1893

Lt. Newton E. Mason
1893 – 1896

Cmdr. Albert R. Couden
1896 – 1900

Lt. Joseph Strauss
1900 – 1902

Lt. John B. Patton
1902 – 1903

Lt. Alfred C. Dieffenbach
1903 – 1906

Lt. Cmdr. Joseph Strauss
1906 – 1908

Lt. Cmdr. Richard H. Jackson
1908 – 1910

Lt. Cmdr. Jonas H. Holden
1910 – 1913

Lt. Cmdr. Julius Hellweg
1913 – 1916

Cmdr. Ralph Earle
1916 – 1917

Cmdr. Henry E. Lackey
1917 – 1920

Capt. John W. Greenslade
1920 – 1923

Capt. Claude C. Bloch
1923 – 1923

Capt. Andrew C. Pickens
1923 – 1925

Capt. Harold R. Stark
1925 – 1928

Capt. Herbert F. Leary
1928 – 1931

Capt. Garret L. Schuyler
1931 – 1932

Cmdr. Lee P. Johnson
1932 – 1935

Capt. William W. Wilson
1935 – 1938

Capt. Preston B. Haines
1938 – 1940

Capt. Mark L. Hersey, Jr.
1940 – 1943

Capt. James B. Glennon
1943 – 1946

Rear Adm. Byron H. Hanlon
1946 – 1948

Capt. Philip D. Gallery
1948 – 1948

Capt. Clarence E. Voegeli
1948 – 1952

Cmdr. Francis W. Scanland
1952 – 1952

Capt. William H. Benson
1952 – 1955

Capt. George E. King
1955 – 1958

Capt. Griswold T. Atkins
1958 – 1960

Cmdr. Amedeo H. Galvani
1960 – 1960

Capt. Otis A. Wesche
1960 – 1963

Capt. Oscar F. Dreyer
1963 – 1965

Capt. Leslie R. Olsen
1965 – 1969

Capt. Bernard W. Frese, Jr.
1969 – 1972

Capt. Stanley P. Gary
1972 – 1976

Capt. Thomas C. Warren
1976 – 1980

Capt. Fred S. Underwood
1980 – 1983

Capt. James D. Tadlock
1983 – 1987

Capt. George F. Wendt
1987 – 1989

Capt. Edwin P. Nicholson
1989 – 1992

Capt. David G. Maxwell
1992 – 1994

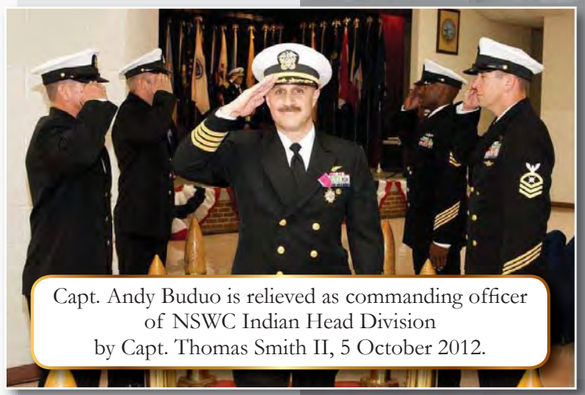
Capt. Wayne J. Newton
1994 – 1997

Capt. John J. Walsh
1997 – 2000

Capt. Marc Seidband
2000 – 2003

Capt. Joseph N. Giaquinto
2003 – 2006

Capt. Neil Stubits
2006 – 2009



Capt. Andy Buduo is relieved as commanding officer of NSWC Indian Head Division by Capt. Thomas Smith II, 5 October 2012.

Capt. Andrew Budou III
2009 – 2012

* Capt. Thomas B. Smith
2012 – 2014

Capt. Vincent R. Martinez
2014 – Current

* Denotes served as commanding officer of NSWC IHEODTD and NSWC Indian Head Division.

Naval EOD Technology Division Commanding Officers

Cmdr. Dominic R. Traina, USNR
1953 – 1954

Cmdr. Ivan G. Nelson
1954 – 1956

Cmdr. Robert W. Eigell
1956 – 1959

Lt. Cmdr. Ralph E. Swisher, USNR
1959 – 1959

Lt. Cmdr. Wilbur R. Brooks
1959 – 1960

Lt. Cmdr. Ralph E. Swisher, USNR
1960 – 1961

Cmdr. Robert J. Fay
1961 – 1962

Cmdr. Ralph E. Graham
1962 – 1963

Lt. Cmdr. Jerry C. Van Winkle, USNR
1963 – 1964

Cmdr. John H. Gano
1964 – 1967

Cmdr. Bobby J. Brown
1967 – 1972

Capt. Charles K. Naylor
1972 – 1973

Cmdr. Dewhitt H. Moody
1973 – 1975

Cmdr. Jerome R. Heck
1975 – 1976

Cmdr. William S. Cadow, Jr.
1976 – 1979

Cmdr. Michael K. Heinz
1979 – 1980

Capt. Richard M. Dunbar
1980 – 1983

Capt. Robert L. Masten
1983 – 1986

Capt. Lawrence M. Kelly
1986 – 1988

Capt. Joseph T. Kennedy
1988 – 1991

Capt. John H. Cocowitch
1991 – 1994

Capt. William B. Bacon
1994 – 1996

Capt. Theodore K. McCarley
1996 – 1999

Capt. Daniel M. Renwick
1999 – 2003

Capt. Thomas P. Dee
2003 – 2006

Capt. Brian J. Brakke
2006 – 2008

Capt. Brett A. Reissener
2008 – 2010

* Capt. Thomas B. Smith
2010 – 2013

Senior Civilians

Dr. George W. Patterson
Director of Production and Research
1899 – 1940

Dr. Walter W. Farnum
Director of Production
1940 – 1953

Dr. Francis C. Thames
Director of Research and Development
1947 – 1953
Director of Production and Production Engineering
1953 – 1957

Joe Browning
Director of Research and Development
1958 – 1962
Technical Director
1962 – 1975

Joe Browning signs a guest book during a visit to Indian Head circa 1980. Browning was Director of Research and Development at Indian Head from 1958 – 1962, and the Technical Director between 1962 – 1975.

David E. Lee
Technical Director
1975 – 1985

Dr. Dominic J. Monetta
Technical Director
1986 – 1989

Roger M. Smith
Technical Director
1989 – 1999

Mary E. Lacey
Director
1999 – 2002

Stephen E. Mitchell
Executive Director
2002 – 2003

Jerry J. LaCamera
Technical Operations Manager
2003 – 2007

Dr. Robert Gates
Technical Director
2007 – 2010

Dennis M. McLaughlin
Technical Director
2010 – 2013

Ashley G. Johnson
Technical Director
2014 – Current