

# White phosphorus

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**White phosphorus (WP)** is a material made from a common allotrope of the chemical element phosphorus that is used in smoke, tracer, illumination and incendiary<sup>[1]</sup> munitions.

As an incendiary weapon, WP burns fiercely and can set cloth, fuel, ammunition and other combustibles on fire. Since WWII, it has been extensively used as a weapon, capable of causing serious burns or death.<sup>[2]</sup> White phosphorus is used in bombs, artillery, and mortars, short-range missiles which burst into burning flakes of phosphorus upon impact. White phosphorus is commonly referred to in military jargon as "WP", and the slang term "Whiskey P./Willy/Willie Pete/Peter" (dating from World War I) is still commonly used by infantry and artillery servicemen.<sup>[*citation needed*]</sup>

WP is also a highly efficient smoke producing agent, burning quickly and causing an instant bank of smoke. As a result, smoke producing WP munitions are very common, particularly as smoke grenades for infantry, loaded in defensive grenade dischargers on tanks and other armored vehicles, or as part of the ammunition allotment for artillery or mortars. These create smokescreens to mask movement from the enemy, or to mask his fire.

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## History

WP is believed to have been first used by Fenian arsonists in the 19th century in the form of a solution of WP in carbon disulfide. When the carbon disulfide evaporated, the WP would burst into flames, and probably also ignite the highly flammable carbon disulfide fumes. This mixture was known as "Fenian fire" and allegedly was used by disgruntled itinerant workers in Australia to cause delayed destruction of shabby sleeping quarters.

In 1916, during an intense ideological struggle over conscription for the First World War, twelve members of the I.W.W., a radical union of workers who openly opposed conscription, were arrested and convicted for using or plotting to use incendiary materials, including phosphorus. It is believed that eight or nine men in this group, known as the Sydney Twelve, had been framed by the police.<sup>[3]</sup> Most were released in 1920 after an inquiry.



A USAF Airman inspects 2.75 inch white phosphorus marking rockets in Osan Air Base, Republic of Korea, 1996.

## World War I, the Interwar Period and World War II

The British Army introduced the first factory-built WP grenades in late 1916. In World War II, white phosphorus mortar bombs, shells, rockets and grenades were used extensively by American, Commonwealth, and to a lesser extent Japanese forces, in both smoke-generating and antipersonnel roles. The British used White phosphorus bombs against Kurdish villagers and Al-Habbaniyah in Al-Anbar province during the Great Iraqi Revolution of 1920.

In 1940, when the invasion of Britain seemed imminent, the phosphorus firm of Albright and Wilson suggested that the British government use a material similar to Fenian fire in several expedient incendiary weapons. The only one fielded was the *Grenade, No. 76* or *Special Incendiary Phosphorus grenade*, which consisted of a glass bottle filled with a mixture similar to Fenian fire, plus some latex (see also Molotov cocktail, Greek fire). It came in two versions, one with a red cap intended to be thrown by hand, and a slightly stronger bottle with a green cap, intended to be launched from the Northover projector (a crude 2.5 inch blackpowder grenade launcher). These were improvised anti-tank weapons, hastily fielded in 1940 when the British were awaiting a German invasion after losing the bulk of their modern armaments in France in May 1940. Instructions on each crate of SIP grenades included the observations, among other things:

Store bombs (preferably in cases) in cool places, under water if possible.  
Stringent precautions must be taken to avoid cracking bombs during handling.

It was generally regarded as overly dangerous to its own operators and was never deployed in combat.

At the start of the Normandy campaign, 20% of American 81 mm mortar rounds were WP. At least five American Medal of Honor citations mention their recipients using white phosphorus grenades to clear enemy positions. In the 1944 liberation of Cherbourg alone, a single U.S. mortar battalion, the 87th, fired 11,899 white phosphorus rounds into the city.

The U.S. Army and Marines used WP shells in 107-mm [4.2 Inch] mortars. WP was widely credited by Allied soldiers for breaking up German infantry attacks and creating havoc among enemy troop concentrations during the latter part of the war. American servicemen in the Pacific and otherwise (to this day) were known to call the thrown bottles "Willie Pete" grenades. The origin of the term has been thought to be derived from the British military's phonetic alphabet.

Incendiary bombs were used extensively by the German, British and US air forces against civilian populations and targets of military significance in civilian areas (London, Hamburg, Dresden, Area bombing etc). Late in the war, some of these bombs used white phosphorus (about 1-200 grams) in place of magnesium as the igniter for their flammable mixtures. The use of incendiary weapons against civilians was banned (by signatory countries) in the 1980 Convention on Certain Conventional Weapons Protocol III. The USA signed Protocols I and II on March 24, 1995 (and the amended article II on May 24, 1999) and later Protocols III, IV, and V, on January 21, 2009.

## Others

WP munitions were used extensively in Korea, Vietnam and later by Russian forces in Chechnya. According to GlobalSecurity.org, during the December 1994 battle for Grozny in Chechnya, every fourth or fifth Russian artillery or mortar round fired was a smoke or white phosphorus round.<sup>[4]</sup>

In Iraq, the Saddam Hussein regime used white phosphorus, as well as chemical weapons that are scheduled in the Chemical Weapons Convention, in the Halabja poison gas attack during the Iran–Iraq War in 1988, according to the ANSA news agency.<sup>[5]</sup>

Another news report<sup>[6]</sup> said "US intelligence" called WP a chemical weapon in a declassified Pentagon report from February 1991:

"Iraqi forces loyal to President Saddam may have possibly used white phosphorus chemical weapons against Kurdish rebels and the populace in Erbil and Dohuk. The WP chemical was delivered by artillery rounds and helicopter gunships."

## Use in Iraq (2004)

*Main article: White phosphorus use in Iraq*

Use of WP against enemy areas in Fallujah were reported as early as April 2004:

The boom kicked dust around the pit as they ran through the drill again and again, sending a mixture of burning white phosphorus and high explosives they call "shake 'n' bake" into a cluster of buildings where insurgents have been spotted all week.<sup>[7]</sup>

However, a U.S. official release of December 2004 denied any WP use:

U.S. forces have used [phosphorus shells] very sparingly in Fallujah, for illumination purposes. They were fired into the air to illuminate enemy positions at night, not at enemy fighters.<sup>[8]</sup>

This U.S. Department of State website carried an addendum in November 2005, replacing the previous statement with the comment:

We have learned that some of the information we were provided [in the above paragraph] is incorrect. White phosphorus shells, which produce smoke, were used in Fallujah not for illumination but for screening purposes, i.e., obscuring troop movements and, according to an



A USAF Security Police Squadron member packs an 81 mm white phosphorus smoke-screen mortar round during weapons training, 1980.

article in *Field Artillery* ([http://sill-www.army.mil/famag/2005/MAR\\_APR\\_2005/PAGE24-30.pdf](http://sill-www.army.mil/famag/2005/MAR_APR_2005/PAGE24-30.pdf))<sup>[9]</sup> magazine , "as a potent psychological weapon against the insurgents in trench lines and spider holes...."

The article states that U.S. forces used white phosphorus rounds to flush out enemy fighters so that they could then be killed with high explosive rounds.

The specific aspect of use against humans was highlighted<sup>[10]</sup> after the documentary film *Fallujah, The Hidden Massacre* by Sigfrido Ranucci was aired on Italy's RaiNews24 and released on the internet.<sup>[5]</sup> In the film, Giuliana Sgrena quotes city refugees testimonies from Fallujah about the reported danger of weapons effects:

In particular, some women had tried to enter their homes, and they had found a certain dust spread all over the house. The Americans themselves had told them to clean the houses with detergents, because that dust was very dangerous. In fact, they had some effect on their bodies, leading to some very strange things."

The film also shows U.S. soldiers on film confirming to WP use against insurgents. U.S. ambassador to UK Robert Holmes Tuttle stated in November 2005, that U.S. forces "do not use napalm or white phosphorus as weapons".<sup>[11]</sup>

However, within a week of ambassador Tuttle's statement, on November 15, Pentagon spokesman Lieutenant-Colonel Barry Venable stated to the BBC that WP had been used as an antipersonnel weapon, and was quoted as stating: "It has been used as an incendiary weapon against enemy combatants".<sup>[12]</sup> In particular,

Venable pointed out that WP was effective against enemy forces in covered positions that were protected from high explosives. "One technique is to fire a white phosphorus round into the position because the combined effects of the fire and smoke—and in some case the terror brought about by the explosion on the ground—will drive them out of the holes so that you can kill them with high explosives."<sup>[13]</sup>

WP use is legal for purposes such as illumination and obscuring smoke, and the Chemical Weapons Convention does not list WP in its schedules of chemical weapons.

The March 2005 edition of the U.S. Army magazine *Field Artillery*, contained an article on using white phosphorus as an "effective munition" for flushing out insurgents during the Fallujah attack of November 2004:

"WP proved to be an effective and versatile munition. We used it for screening missions at two breeches and, later in the fight, as a potent psychological weapon against the insurgents in trench lines and spider holes when we could not get effects on them with HE (High Explosive) Rounds. We fired 'shake and bake' missions at the insurgents, using WP to flush them out and HE to take them out."<sup>[14]</sup>

On November 30, 2005, General Peter Pace defended use of WP, declaring that WP munitions were a "legitimate tool of the military", used to illuminate targets and create smokescreens, and that there were better weapons for killing people:

It is well within the law of war to use those weapons as they're being used, for marking and for screening... A bullet goes through skin even faster than white phosphorus does".<sup>[15]</sup>

On June 22, 2007 *New York Times* correspondent Michael R. Gordon was interviewed on National Public Radio in a story called "Baquba Residents Displaced by Insurgents" by Melissa Block and Michele Norris. In this interview, Gordon was asked about civilian casualties in Baquba, Iraq. He responded by saying "Yeah, there have been civilian casualties. I was just talking to our photographer and he had seen people who are hurt by phosphorus shells."<sup>[16]</sup> The photographer was not identified in the interview and the report was not corroborated.

## Israel-Lebanon conflict (2006)

During the 2006 Israel-Lebanon conflict, Israel claimed that it had used phosphorus shells "against military targets in open ground" in south Lebanon. Israel clarified that its use of the white phosphorus bombs was permitted under international conventions.<sup>[17]</sup> President of Lebanon Émile Lahoud claimed that phosphorus shells were used against civilians in Lebanon.<sup>[18]</sup> The first Lebanese official complaint about the use of phosphorus came from Information Minister Ghazi Aridi.<sup>[19]</sup>

## Gaza War (2008-2009)

The Israeli military openly used white phosphorus shells in the Gaza War,<sup>[21]</sup> which were fired from 155mm artillery guns. The type used was the US made marker shell, the M825A1:

"Neil Gibson, technical adviser to Jane's Missiles and Rockets, insisted that the M825A1 was a WP round. "The M825A1 is an improved model. The WP does not fill the shell but is impregnated into 116 felt wedges which, once dispersed [by a high-explosive charge], start to burn within four to five seconds. They then burn for five to ten minutes. The smoke screen produced is extremely effective," he said...*The shell is not defined as an incendiary weapon by the Third Protocol to the Convention on Conventional Weapons because its principal use is to produce smoke to protect troops.* However, Marc Galasco, of Human Rights Watch, said: "Recognising the significant incidental incendiary effect that white phosphorus creates, there is great concern that Israel is failing to take all feasible steps to avoid civilian loss of life and property by using WP in densely populated urban areas. This concern is amplified given the technique evidenced in media photographs of air-bursting WP projectiles at relatively low levels, seemingly to maximise its incendiary effect...*He added, however, that Human Rights Watch had no evidence that Israel was using incendiaries as weapons.*"<sup>[22]</sup>



Israel used white phosphorus marker shells during the 2009 Gaza War<sup>[20]</sup>

The IDF never denied using white phosphorus marker shells, which are used by NATO forces, but revised their use after reports of civilian injuries.<sup>[23]</sup>

Numerous reports from human right groups during the war indicated that white phosphorus shells were being used by Israel.<sup>[24][25][26]</sup> Human Rights Watch said shells exploded over populated civilian areas, including a crowded Palestinian refugee camp<sup>[27]</sup> and a United Nations school where civilians were seeking refuge.<sup>[28]</sup> Additionally, Human Rights Watch said that white phosphorus injuries were suspected in the cases of ten burn victims.<sup>[29]</sup> The International Red Cross stated that phosphorus weapons had been used in the conflict but would not comment publicly on the legality of Israel's use of the weapon, pending further investigation, contrary to what had been attributed to the ICRC in a number of media reports.<sup>[29][30][31]</sup>

Human Rights Watch said its experts in the region had witnessed the use of white phosphorus. Kenneth Roth, the organisation's executive director, added: "This is a chemical compound that burns structures and burns people. It should not be used in populated areas."<sup>[32]</sup>

Amnesty International said a fact-finding team found "indisputable evidence of the widespread use of white phosphorus" in crowded civilian residential areas of Gaza City and elsewhere in the territory.<sup>[33]</sup> Donatella Rovera, the head of an Amnesty fact-finding mission to southern Israel and Gaza, said: "Israeli forces used white phosphorus and other weapons supplied by the USA to carry out serious violations of international humanitarian law, including war crimes."<sup>[34]</sup>

On January 5 the Times reported that tell tale smoke associated with white phosphorus had been seen in areas of a shelling. On January 12 it was reported that more than 50 phosphorus burns victims were in Nasser Hospital. On January 16 the UNRWA headquarters was hit with phosphorus munitions.<sup>[35]</sup> As a result of the hit, the compound was set ablaze.<sup>[36]</sup>

Many other observers, including HRW military expert, reported seeing white phosphorus air bursts over Gaza City and the Jabalya refugee camp.<sup>[37]</sup> The BBC published a photograph of two shells exploding over a densely populated area on 11 January.<sup>[38]</sup>

The IDF stated on January 13 that it "wishes to reiterate that it uses weapons in compliance with international law, while strictly observing that they be used in accordance with the type of combat and its characteristics."<sup>[39]</sup>

On January 14, the Israeli newspaper Haaretz claimed that Hamas had fired a white phosphorus mortar shell which exploded in an open area in the Eshkol area in the western Negev of southern Israel. No injuries or damage were reported by this newspaper.<sup>[27]</sup> Contrary to the report however, which did not mention its source, official foreign press spokesman for the Israeli Police, Micky Rosenfeld, said the shell had landed in a field near Sderot, also stating that no damage or injuries had occurred.<sup>[40][41]</sup>

A day after the alleged attack, a researcher for Human Rights Watch travelled to Sderot to investigate the claim. One resident said he had heard about a mortar shell, possibly with white phosphorus, landing in a field outside of town but could not specify where. Moreover, when pressed for information, Rosenfeld could give no further insight, telling Human Rights Watch that "all I have is what's in the press release." Local authorities in Sderot also told the researcher that they were unaware of the attack.<sup>[41]</sup>

On 15 January, the United Nations compound, housing numerous refugees in Gaza City, was struck by Israeli white phosphorus artillery shells, setting fire to pallets of relief materials and igniting several large fuel storage tanks. A UN spokesperson indicated that there were difficulties in attempting to extinguish the fires because of the white phosphorus and stated "You can't put it [white phosphorus] out with traditional methods such as fire extinguishers. You need sand but we do not have any sand in the compound."<sup>[42][43]</sup> Senior Israeli defense officials maintain that the shelling using white phosphorus munitions was in response to Israeli military personnel being fired upon by Hamas fighters who were in proximity to the UN headquarters.<sup>[44]</sup> The Israeli army claims to be investigating improper use of WP in this conflict, particularly in one incident in which 20 WP shells were fired in a built-up area of Beit Lahiya.<sup>[45]</sup>

On 17 January, Peter Herby, head of the International Committee of the Red Cross Arms Unit, confirmed the use of white phosphorus weapons by Israel in Gaza, outlined the rules applicable to phosphorus weapons and explained the ICRC's approach to the issue.<sup>[46]</sup>

On January 20, Paul Wood of the BBC reports from Gaza on white phosphorus use in civilian areas. Amnesty team weapon expert Christopher Cobb-Smith, who witnessed the shelling by the IDF during the conflict, reported "we saw streets and alleyways littered with evidence of the use of white phosphorus, including still-burning wedges and the remnants of the shells and canisters fired by the Israeli army." [47]

On January 26, the Israel's Ministry of Defence finally confirmed speculations about the use of white phosphorus in the Israeli-Gaza conflict. [48][49]

On March 25, 2009, USA Based Human Rights Organization Human Rights Watch published a 71 page report titled *Rain of Fire, Israel's Unlawful Use of White Phosphorus in Gaza* and said that Israel's usage of the weapon was illegal. [50]

White phosphorus munitions did not kill the most civilians in Gaza – many more died from missiles, bombs, heavy artillery, tank shells, and small arms fire – but their use in densely populated neighborhoods, including downtown Gaza City, violated international humanitarian law (the laws of war), which requires taking all feasible precautions to avoid civilian harm and prohibits indiscriminate attacks. [50]

The Israeli government released a report in July 2009 that confirmed that the IDF used white phosphorus in both exploding munitions and smoke projectiles. The report acknowledged the use of exploding munitions by Israeli ground and naval forces. Contrary to eyewitness testimony and physical evidence, the report argues that the use of these munition was limited to unpopulated areas for marking and signaling and not as an anti-personnel weapon. [51] The Israeli government report further stated that smoke screening projectiles were the majority of the munitions containing white phosphorus employed by the IDF and that these were very effective in that role. The report states that at no time did IDF forces have the objective of inflicting any harm on the civilian population. [51] However, there has been widespread reporting of the damage and injury to civilians resulting from the use of these munitions by the IDF over many years.

Head of the UN Fact Finding Mission Justice Richard Goldstone presented the report of the Mission to the Human Rights Council in Geneva on 29 September 2009, urging the Council and the international community as a whole to put an end to impunity for violations of international law in Israel and the Occupied Palestinian Territory. [52] The Goldstone report accepted that white phosphorus is not illegal under international law but did find that the Israelis were "systematically reckless in determining its use in build-up areas". It also call for serious consideration to be given to the banning of its use as an obscurant. [53]

HRW claimed in its report that instead of White phosphorus, the Israeli military had a non-lethal alternative at its disposal- smoke shells produced by Israel Military Industries.

Two senior Israeli officers who were responsible for firing white phosphorus artillery shells on a United Nations compound were reprimanded in early 2010. [54]

## **Afghanistan (2009)**

There are confirmed cases of white phosphorus burns on bodies of civilians wounded in Afghanistan US-Taliban clashes near Bagram. The United States has accused Taliban militants of using white phosphorus weapons illegally on at least 44 occasions. [55] In May 2009, Colonel Gregory Julian, a spokesman for General David McKiernan, the overall commander of U.S. and NATO forces in

Afghanistan, confirmed that Western military forces in Afghanistan use white phosphorus in order to illuminate targets or as an incendiary to destroy bunkers and enemy equipment.<sup>[56][57]</sup> The Afghan government later launched an investigation into the use of white phosphorus munitions.<sup>[58]</sup>

### Use in Yemen (2009)

Houthi fighters in Yemen claimed Saudi warplanes dropped phosphorus bombs on villages in north Yemen in November 2009.<sup>[59]</sup> The Saudi government denied military use of phosphorus munitions against the rebels, saying they were flares, not phosphorus.<sup>[60]</sup>

### Israeli-Palestinian conflict (2010)

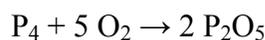
In September, 2010, Palestinian militants fired two mortar shells containing white phosphorus into Israel from the Gaza Strip.<sup>[61][62][63]</sup>

On November 19, 2010, the Salah al-Din Brigade fired four mortar shells containing white phosphorus into southern Israel from the Gaza Strip.<sup>[64]</sup>

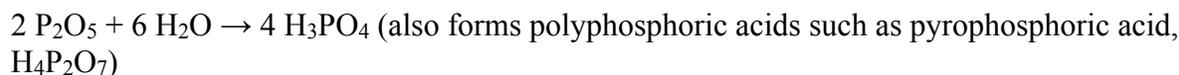
## Smoke-screening properties

Weight-for-weight, phosphorus is the most effective smoke-screening agent known, for two reasons: first, it absorbs most of the screening mass from the surrounding atmosphere and secondly, the smoke particles are an aerosol, a mist of liquid droplets which are close to the ideal range of sizes for Mie scattering of visible light. This effect has been likened to three dimensional textured privacy glass—the smoke cloud does not simply obstruct an image, but thoroughly scrambles both visual and infrared radiation, interfering with infra-red optics and weapon-tracking systems, serving as a protection for military forces from guided weapons such as anti-tank missiles.

When phosphorus burns in air, it first forms diphosphorus pentoxide (which exists as tetraphosphorus decoxide except at very high temperatures):



Diphosphorus pentoxide is extremely hygroscopic and quickly absorbs even minute traces of moisture to form liquid droplets of phosphoric acid:



Since an atom of phosphorus has an atomic mass of 31 but a molecule of phosphoric acid has a molecular mass of 98, the cloud is already 68% by mass derived from the atmosphere (i.e. 3.2 kilograms of smoke for every kilogram of WP); it may absorb more because phosphoric acid and its variants are hygroscopic. Given time, the droplets will continue to absorb more water, growing larger and more



Air burst of a white phosphorus bomb over the USS *Alabama* during a test exercise conducted by General Billy Mitchell, September 1921.

dilute until they reach equilibrium with the local water vapour pressure. In practice, the droplets quickly reach a range of sizes suitable for scattering visible light and then start to dissipate from wind or convection.

Because of the great weight efficiency of WP smoke, it is particularly suited for applications where weight is highly restricted, such as hand grenades and mortar bombs. An additional advantage for hand smoke grenades—which are more likely to be used in an emergency—is that the WP smoke clouds form in a fraction of a second. Because WP is also pyrophoric, most munitions of this type have a simple burster charge to split open the casing and spray fragments of WP through the air, where they ignite spontaneously and leave a trail of rapidly thickening smoke behind each particle. The appearance of this cloud forming is easily recognised; one sees a shower of burning particles spraying outward, followed closely by distinctive streamers of white smoke, which rapidly coalesce into a fluffy, very pure white cloud (unless illuminated by a coloured light source).

Various disadvantages of WP are discussed below, but one which is particular to smoke-screening is "pillaring". Because the WP smoke is formed from fairly hot combustion, the gasses in the cloud are hot, and tend to rise. Consequently the smoke screen tends to rise off the ground relatively quickly and form aerial "pillars" of smoke which are of little use for screening. Tactically this may be counteracted by using WP to get a screen quickly, but then following up with emission type screening agents for a more persistent screen. Some countries have begun using red phosphorus instead. Red phosphorus ("RP") burns cooler than WP and eliminates a few other disadvantages as well, but offers exactly the same weight efficiency. Other approaches include WP soaked felt pads (which also burn more slowly, and pose a reduced risk of incendiarism) and PWP, or plasticised white phosphorus.

## Effects on people

White phosphorus can cause injuries and even death in three ways: by burning deep into tissue, by being inhaled as a smoke, and by being ingested. Extensive exposure by burning and ingestion is fatal.

### By burning

Incandescent particles of WP cast off by a WP weapon's initial explosion can produce extensive, deep second and third degree burns. One reason why this occurs is the tendency of the element to stick to the skin. Phosphorus burns carry a greater risk of mortality than other forms of burns due to the absorption of phosphorus into the body through the burned area, resulting in liver, heart and kidney damage, and in some cases multiple organ failure.<sup>[67]</sup> These weapons are particularly dangerous to exposed people because white phosphorus continues to burn unless deprived of oxygen or until it is completely consumed. In some cases, burns are limited to areas of exposed skin because the smaller WP particles do not burn completely through personal clothing before being consumed.



Injuries from white phosphorus.

[65][66]

## By inhalation of smoke

Burning WP produces a hot, dense, white smoke consisting mostly of phosphorus pentoxide. Most forms of the smoke are not hazardous in the likely concentrations produced by a battlefield smoke shell. Exposure to heavy smoke concentrations of any kind for an extended period (particularly if near the source of emission) does have the potential to cause illness or even death.

WP smoke irritates the eyes, mucous membranes of the nose, and respiratory tract in moderate concentrations, while higher concentrations may produce severe burns. However, no casualties have been recorded from the effects of WP smoke alone in combat operations and there are no confirmed deaths resulting from exposure to phosphorus smoke.<sup>[*citation needed*]</sup>

The Agency for Toxic Substances and Disease Registry has set an acute inhalation Minimum Risk Level (MRL) for white phosphorus smoke of 0.02 mg/m<sup>3</sup>, the same as fuel oil fumes. By contrast, the chemical weapon mustard gas is 30 times more potent: 0.0007 mg/m<sup>3</sup>.<sup>[68]</sup>

## By oral ingestion

The accepted lethal dose when white phosphorus is ingested orally is 1 mg per kg of body weight, although the ingestion of as little as 15 mg has resulted in death.<sup>[69]</sup> It may also cause liver, heart or kidney damage.<sup>[67]</sup> There are reports of individuals with a history of oral ingestion who have passed phosphorus-laden stool ("smoking stool syndrome")<sup>[69]</sup>

## Arms control status and military regulations

There are multiple international laws that could be seen to regulate WP use [3] (<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=3576772>). Article 1 of Protocol III of the Convention on Certain Conventional Weapons defines an incendiary weapon as 'any weapon or munition which is primarily designed to set fire to objects or to cause burn injury to persons through the action of flame, heat, or combination thereof, produced by a chemical reaction of a substance delivered on the target'. The same protocol also prohibits the use of incendiary weapons against civilians (already forbidden by the Geneva Conventions) or in civilian areas.

However, the use against military targets outside civilian areas is not explicitly banned by any treaty. There is a debate on whether white phosphorus should be considered a chemical weapon and thus be outlawed by the Chemical Weapons Convention (CWC) which went into effect in April 1997. The convention is meant to prohibit weapons that are "dependent on the use of the toxic properties of chemicals as a method of warfare" (Article II, Definitions, 9, "Purposes not Prohibited" c.).

The convention defines a "toxic chemical" as a chemical "which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals" (CWC, II). An annex lists chemicals that fall under this definition and WP is not listed in the Schedules of chemical weapons or precursors.<sup>[70]</sup>

In an 2005 interview with RAI, Peter Kaiser, spokesman for the Organisation for the Prohibition of Chemical Weapons (an organization overseeing the CWC and reporting directly to the UN General Assembly), questioned whether the weapon should fall under the convention's provisions:

No it's not forbidden by the CWC if it is used within the context of a military application which does not require or does not intend to use the toxic properties of white phosphorus. White phosphorus is normally used to produce smoke, to camouflage movement.

If that is the purpose for which the white phosphorus is used, then that is considered under the convention legitimate use.

If on the other hand the toxic properties of white phosphorus are specifically intended to be used as a weapon, that of course is prohibited, because the way the convention is structured or the way it is in fact applied, any chemicals used against humans or animals that cause harm or death through the toxic properties of the chemical are considered chemical weapons".<sup>[71]</sup>

Kaiser was a staff spokesman for the Organisation for the Prohibition of Chemical Weapons.<sup>[72]</sup> The OPCW, using member votes, creates Schedules of chemical weapons or dual-use chemicals of concern and white phosphorus is not in any of these schedules.

The Convention on Certain Conventional Weapons, not the Chemical Weapons Convention, goes on, in its Protocol III, to prohibit the use of all air-delivered incendiary weapons against civilian populations, or for indiscriminate incendiary attacks against military forces co-located with civilians.<sup>[73]</sup> However, that protocol also specifically excludes weapons whose incendiary effects are secondary, such as smoke grenades. This has often been read as excluding white phosphorus munitions from this protocol, as well. Several countries, most notably Israel, are not signatories to Protocol III.<sup>[74]</sup>

The legal position however, is not the only consideration in any war. For instance, concerning the U.S. use of WP in Iraq, the British Liberal Democrat foreign affairs spokesman Sir Menzies Campbell, said

"The use of this weapon may technically have been legal, but its effects are such that it will hand a propaganda victory to the insurgency. The denial of use followed by the admission will simply convince the doubters that there was something to hide".<sup>[75]</sup>

## Military regulations

Within the US Army, there appears to be conflicting advice on the use of WP against humans. According to the field manual on the Rule of Land Warfare, "The use of weapons which employ fire, such as tracer ammunition, flamethrowers, napalm and other incendiary agents, against targets requiring their use is not violative of international law."<sup>[76]</sup> However, the 11 year old *ST 100-3 Battle Book*, a student text published by the US Command and General Staff College at Fort Leavenworth states that "It is against the law of land warfare to employ WP against personnel targets."<sup>[77]</sup> At the same time, other field manuals discuss the use of white phosphorus against personnel.<sup>[78]</sup>

Though white phosphorus is still used in modern armed conflict, it is regulated by international humanitarian law, or the law of war.<sup>[79]</sup>

## See also

- Phosphorus
- White phosphorus use in Iraq
- Mark 77 bomb
- Fallujah, The Hidden Massacre
- Weapons of the 2003 invasion and occupation of Iraq

## References

- <sup>1</sup> <sup>^</sup> "Pyrotechnics, Explosives, & Fireworks" (<http://www.faqs.org/docs/air/tpyro.html>) . <http://www.faqs.org/docs/air/tpyro.html>. Retrieved December 4, 2005.
- <sup>2</sup> <sup>^</sup> WP burns are particularly painful, as phosphorus burns slowly and cannot be extinguished by water. "DET.WP" (<http://chppm-www.apgea.army.mil/dts/docs/detwp.pdf>) (PDF). <http://chppm-www.apgea.army.mil/dts/docs/detwp.pdf>. Retrieved December 4, 2005.
- <sup>3</sup> <sup>^</sup> Ian Turner, *Sydney's Burning - The real conspiracy*, (1969). Sydney,,: Alpha Books,. <http://members.optushome.com.au/spainter/Turner.html>. Retrieved 2007-06-24.
- <sup>4</sup> <sup>^</sup> Joint Staff (1991). "White Phosphorus (WP)" (<http://www.globalsecurity.org/military/systems/munitions/wp.htm>) . <http://www.globalsecurity.org/military/systems/munitions/wp.htm>.
- <sup>5</sup> <sup>^</sup> <sup>a</sup> <sup>b</sup> Sigfrido Ranucci. "Fallujah, The Hidden Massacre (see the video)" (<http://www.rainews24.rai.it/ran24/inchiesta/en/video.asp>) . <http://www.rainews24.rai.it/ran24/inchiesta/en/video.asp>. Retrieved 2007-04-04.
- <sup>6</sup> <sup>^</sup> Popham, Peter; Anne Penketh (2005-11-23). "US intelligence classified white phosphorus as 'chemical weapon'" (<http://www.independent.co.uk/news/world/americas/us-intelligence-classified-white-phosphorus-as-chemical-weapon-516523.html>) . *The Independent* (London). <http://www.independent.co.uk/news/world/americas/us-intelligence-classified-white-phosphorus-as-chemical-weapon-516523.html>. Retrieved 2009-01-21.
- <sup>7</sup> <sup>^</sup> Darrin Mortenson (2004-04-10). "Violence subsides for Marines in Fallujah" ([http://www.nctimes.com/articles/2004/04/11/military/iraq/19\\_30\\_504\\_10\\_04.txt](http://www.nctimes.com/articles/2004/04/11/military/iraq/19_30_504_10_04.txt)) . North County Times. [http://www.nctimes.com/articles/2004/04/11/military/iraq/19\\_30\\_504\\_10\\_04.txt](http://www.nctimes.com/articles/2004/04/11/military/iraq/19_30_504_10_04.txt). Retrieved 2007-04-04.
- <sup>8</sup> <sup>^</sup> "Illegal Weapons in Fallujah - US Department of State" ([http://usinfo.state.gov/media/Archive\\_Index/Illegal\\_Weapons\\_in\\_Fallujah.html](http://usinfo.state.gov/media/Archive_Index/Illegal_Weapons_in_Fallujah.html)) . 2004-12-09 updated 2005-11-10. [http://usinfo.state.gov/media/Archive\\_Index/Illegal\\_Weapons\\_in\\_Fallujah.html](http://usinfo.state.gov/media/Archive_Index/Illegal_Weapons_in_Fallujah.html). Retrieved 2007-04-04.
- <sup>9</sup> <sup>^</sup> Cobb, Captain James T.; First Lieutenant Christopher A. LaCour, Sergeant First Class William H. Hight (March–April 2005). "TF 2-2 IN FSE AAR: Indirect Fires in the Battle of Fallujah" ([http://sill-www.army.mil/famag/2005/MAR\\_APR\\_2005/PAGE24-30.pdf](http://sill-www.army.mil/famag/2005/MAR_APR_2005/PAGE24-30.pdf)) (PDF). *Field Artillery magazine*,: 24–30. [http://sill-www.army.mil/famag/2005/MAR\\_APR\\_2005/PAGE24-30.pdf](http://sill-www.army.mil/famag/2005/MAR_APR_2005/PAGE24-30.pdf). Retrieved 2007-09-25.
- <sup>10</sup> <sup>^</sup> "US 'uses incendiary arms' in Iraq" ([http://news.bbc.co.uk/2/hi/middle\\_east/4417024.stm](http://news.bbc.co.uk/2/hi/middle_east/4417024.stm)) . BBC. November 8, 2005. [http://news.bbc.co.uk/2/hi/middle\\_east/4417024.stm](http://news.bbc.co.uk/2/hi/middle_east/4417024.stm).
- <sup>11</sup> <sup>^</sup> name="news.bbc.co.uk.nov30"
- <sup>12</sup> <sup>^</sup> "U.S. official admits phosphorus used as weapon in Iraq" (<http://www.cbc.ca/world/story/2005/11/16/phosphorus-fallujah051116.html>) . CBC News. 2005-11-16. <http://www.cbc.ca/world/story/2005/11/16/phosphorus-fallujah051116.html>. Retrieved 2007-04-04.
- <sup>13</sup> <sup>^</sup> Andrew Buncombe and Solomon Hughes (2005-11-15). "The fog of war: white phosphorus, Fallujah and some burning questions" (<http://news.independent.co.uk/world/americas/article327379.ece>) . London: The Independent. <http://news.independent.co.uk/world/americas/article327379.ece>. Retrieved 2007-04-04.
- <sup>14</sup> <sup>^</sup> "The Fight for Fallujah (Nov 2004)" ([http://sill-www.army.mil/FAMAG/2005/MAR\\_APR\\_2005/PAGE24-30.pdf](http://sill-www.army.mil/FAMAG/2005/MAR_APR_2005/PAGE24-30.pdf)) (PDF). *Field Artillery (magazine)*: 24–46. March–April 2005. [http://sill-www.army.mil/FAMAG/2005/MAR\\_APR\\_2005/PAGE24-30.pdf](http://sill-www.army.mil/FAMAG/2005/MAR_APR_2005/PAGE24-30.pdf). Retrieved December 4, 2005.
- <sup>15</sup> <sup>^</sup> "BBC NEWS: US general defends phosphorus use" (<http://news.bbc.co.uk/2/hi/americas/4483690.stm>) . *BBC News*. November 30, 2005. <http://news.bbc.co.uk/2/hi/americas/4483690.stm>. Retrieved December 13, 2005.
- <sup>16</sup> <sup>^</sup> NPR. "Baquba Residents Displaced by Insurgents (Jun 2007)" (<http://www.npr.org/templates/story/story.php?storyId=11259008>) . <http://www.npr.org/templates/story/story.php?storyId=11259008>. Retrieved July 20, 2007.
- <sup>17</sup> <sup>^</sup> "Israel admits phosphorus bombing" ([http://news.bbc.co.uk/2/hi/middle\\_east/6075408.stm](http://news.bbc.co.uk/2/hi/middle_east/6075408.stm)) . BBC. 22 October 2006. [http://news.bbc.co.uk/2/hi/middle\\_east/6075408.stm](http://news.bbc.co.uk/2/hi/middle_east/6075408.stm). Retrieved 2006-10-24.
- <sup>18</sup> <sup>^</sup> "Israel admits using phosphorus bombs during war Lebanon" (<http://www.haaretz.com/hasen/pages/777549.html>) . Haaretz. 2006-10-22. <http://www.haaretz.com/hasen/pages/777549.html>. Retrieved 2007-04-04.

19. ^ Jansen, Jaime (July 17, 2006). "Lebanon claims Israel using banned weapons against civilians". *Paper Chase Newsburst, Jurist Legal News & Research* (University of Pittsburgh School of Law).
20. ^ [1] (<http://www.geenstijl.nl/archives/images/fosforgroot.jpg>)
21. ^ "Israel admits using white phosphorus in attacks on Gaza" ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5575070.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5575070.ece)) . *The Times* (London). 2009-01-24. [http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5575070.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5575070.ece). Retrieved 2009-03-10.
22. ^ Evans, Michael; Frenkel, Sheera (January 8, 2009). "Gaza victims burns increase concern over phosphorus" ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5470047.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5470047.ece)) . *The Times* (London). [http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5470047.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5470047.ece).
23. ^ Frenkel, Sheera (April 23, 2009). "Israel backs down over white phosphorus" ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article6150448.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article6150448.ece)) . *The Times* (London). [http://www.timesonline.co.uk/tol/news/world/middle\\_east/article6150448.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article6150448.ece).
24. ^ "UN accuses Israel over phosphorus" ([http://news.bbc.co.uk/2/hi/middle\\_east/7831424.stm](http://news.bbc.co.uk/2/hi/middle_east/7831424.stm)) . BBC News. 2009-01-15. [http://news.bbc.co.uk/2/hi/middle\\_east/7831424.stm](http://news.bbc.co.uk/2/hi/middle_east/7831424.stm). Retrieved 2009-01-16.
25. ^ "Gaza: Israel under fire for alleged white phosphorus use", (<http://www.csmonitor.com/2009/0114/p07s01-wome.html>) Christian Science Monitor, January 24, 1009, by Robert Marquand and Nicholas Blanford
26. ^ "Israel: Stop Unlawful Use of White Phosphorus in Gaza" (<http://www.hrw.org/en/news/2009/01/10/israel-stop-unlawful-use-white-phosphorus-gaza>) . Human Rights Watch. 2009-01-10. <http://www.hrw.org/en/news/2009/01/10/israel-stop-unlawful-use-white-phosphorus-gaza>. Retrieved 2009-01-16.
27. ^ <sup>a</sup> <sup>b</sup> "For the first time, Gaza militants fire phosphorus shell at Israel", (<http://www.haaretz.com/hasen/spages/1055472.html>) Haaretz.com, January 14, By Yanir Yagna, Haaretz Correspondent, and Haaretz Service
28. ^ [[http://www.pbs.org/newshour/bb/middle\\_east/jan-june09/ceasefire\\_01-19.html](http://www.pbs.org/newshour/bb/middle_east/jan-june09/ceasefire_01-19.html)] "A worker here filmed on his mobile phone the aftermath of the first two white phosphorous (*sic*) shells to explode at 6:45 in the morning... which exploded over the school, burning some of the children." pbs.org, January 19, 2009, Jonathan Miller
29. ^ <sup>a</sup> <sup>b</sup> "Red Cross: Israel's use of white phosphorus not illegal" (<http://fr.jpost.com/servlet/Satellite?cid=1231866575577&pagename=JPost%2FJPArticle%2FShowFull>) . JPost. 13 January 2009. <http://fr.jpost.com/servlet/Satellite?cid=1231866575577&pagename=JPost%2FJPArticle%2FShowFull>. Retrieved 14 January 2009.
30. ^ "Phosphorus weapons – the ICRC's view" (<http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/weapons-interview-170109?opendocument>) . International Committee of the Red Cross. 2009-01-17. <http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/weapons-interview-170109?opendocument>. Retrieved 30 March 2010.
31. ^ Bronner, Ethan (2009-01-21). "Outcry Erupts Over Reports That Israel Used Phosphorus Arms on Gazans" ([http://www.nytimes.com/2009/01/22/world/middleeast/22phosphorus.html?\\_r=1](http://www.nytimes.com/2009/01/22/world/middleeast/22phosphorus.html?_r=1)) . The New York Times. [http://www.nytimes.com/2009/01/22/world/middleeast/22phosphorus.html?\\_r=1](http://www.nytimes.com/2009/01/22/world/middleeast/22phosphorus.html?_r=1). Retrieved 30 March 2010.
32. ^ "'Illegal bombs' outrage" (<http://www.independent.co.uk/opinion/commentators/kim-sengupta-claims-that-israel-is-using-illegal-bombs-wont-go-away-1380409.html>) . *The Independent* (London). January 16, 2009. <http://www.independent.co.uk/opinion/commentators/kim-sengupta-claims-that-israel-is-using-illegal-bombs-wont-go-away-1380409.html>.
33. ^ "New Israel phosphorus accusation" ([http://news.bbc.co.uk/1/hi/world/middle\\_east/7838598.stm](http://news.bbc.co.uk/1/hi/world/middle_east/7838598.stm)) . *BBC News*. January 20, 2009. [http://news.bbc.co.uk/1/hi/world/middle\\_east/7838598.stm](http://news.bbc.co.uk/1/hi/world/middle_east/7838598.stm).
34. ^ "Israel-Hamas arms embargo urged" ([http://news.bbc.co.uk/1/hi/world/middle\\_east/7904929.stm](http://news.bbc.co.uk/1/hi/world/middle_east/7904929.stm)) . *BBC News*. February 23, 2009. [http://news.bbc.co.uk/1/hi/world/middle\\_east/7904929.stm](http://news.bbc.co.uk/1/hi/world/middle_east/7904929.stm).
35. ^ "Israel admits using white phosphorus in attacks on Gaza" ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5575070.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5575070.ece)) The Times January 24, 2009.
36. ^ Israel reprimands top officers over UN compound strike ([http://news.bbc.co.uk/2/hi/middle\\_east/8490646.stm](http://news.bbc.co.uk/2/hi/middle_east/8490646.stm)) , BBC, February 1, 2010
37. ^ "The Incendiary IDF" (<http://www.hrw.org/en/news/2009/01/22/incendiary-idf-kenneth-roth>) The Israel Defense Forces use phosphorus shells--and forfeit credibility. HRW report. 22nd January 2009.

38. ^ "Israel denies banned weapons use" ([http://news.bbc.co.uk/1/hi/world/middle\\_east/7823078.stm](http://news.bbc.co.uk/1/hi/world/middle_east/7823078.stm)) BBC 11th January 2009.
39. ^ Press, Associated. "'IDF white phosphorus use not illegal'" (<http://fr.jpost.com/servlet/Satellite?cid=1231866575577&pagename=JPArticle%2FShowFull>) . Fr.jpost.com. <http://fr.jpost.com/servlet/Satellite?cid=1231866575577&pagename=JPArticle%2FShowFull>. Retrieved 2010-03-24.
40. ^ Press, Associated (2009-01-14). "'Proposal emerges for 10-day Gaza truce as Palestinian death toll tops 1,000'" ([http://www.ctv.ca/servlet/an/local/CTVNews/20090114/090114\\_israel?hub=EdmontonHome](http://www.ctv.ca/servlet/an/local/CTVNews/20090114/090114_israel?hub=EdmontonHome)) . ctv.ca. [http://www.ctv.ca/servlet/an/local/CTVNews/20090114/090114\\_israel?hub=EdmontonHome](http://www.ctv.ca/servlet/an/local/CTVNews/20090114/090114_israel?hub=EdmontonHome). Retrieved 2010-07-24.
41. ^ <sup>a</sup> <sup>b</sup> "Rain of Fire" (<http://www.hrw.org/en/node/81726/section/4>) . Human Rights Watch. <http://www.hrw.org/en/node/81726/section/4>. Retrieved 2010-07-24.
42. ^ "UN headquarters in Gaza hit by Israeli 'white phosphorus' shells", January 15, Times Online; By Sheera Frenkel, Jerusalem, and Philippe Naughton ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5521925.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5521925.ece))
43. ^ "UN: Israelis hit our headquarters in Gaza with 'white phosphorus' shells", January 15, Belfast Telegraph (<http://www.belfasttelegraph.co.uk/news/world-news/un-israelis-hit-our-headquarters-in-gaza-with-white-phosphorus-shells-14142716.html>)
44. ^ "'Shelled UN building used by Hamas'", January 15, Jerusalem Post; By YAAKOV KATZ AND AP (<http://fr.jpost.com/servlet/Satellite?cid=1231950855726&pagename=JPost/JPArticle/ShowFull>)
45. ^ Harel, Amos (2009-01-21). "IDF probes improper use of phosphorus shells in Gaza Strip" (<http://haaretz.com/hasen/spages/1057361.html>) . *Haaretz*. <http://haaretz.com/hasen/spages/1057361.html>. Retrieved 18 January 2009.
46. ^ Phosphorus weapons – the ICRC's view (<http://www.icrc.org/web/eng/siteeng0.nsf/html/weapons-interview-170109>)
47. ^ "New Israel phosphorus accusation" ([http://news.bbc.co.uk/2/hi/middle\\_east/7838598.stm](http://news.bbc.co.uk/2/hi/middle_east/7838598.stm)) . *BBC News*. January 20, 2009. [http://news.bbc.co.uk/2/hi/middle\\_east/7838598.stm](http://news.bbc.co.uk/2/hi/middle_east/7838598.stm).
48. ^ The Sunday Times: Israel Finally Admits Using White Phosphorus in Attacks on Gaza (<http://www.commondreams.org/headline/2009/01/25-4>)
49. ^ The Times: Israel admits using white phosphorus in attacks on Gaza ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article5575070.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article5575070.ece))
50. ^ <sup>a</sup> <sup>b</sup> Rain of Fire, *Israel's Unlawful Use of White Phosphorus in Gaza* (2009) (<http://www.hrw.org/en/reports/2009/03/25/rain-fire>) PDF (<http://www.hrw.org/sites/default/files/reports/iopt0309webwcover.pdf>)
51. ^ <sup>a</sup> <sup>b</sup> "THE OPERATION IN GAZA, 27 DECEMBER 2008 – 18 JANUARY 2009 FACTUAL AND LEGAL ASPECTS" (<http://www.mfa.gov.il/NR/rdonlyres/E89E699D-A435-491B-B2D0-017675DAFEF7/0/GazaOperation.pdf>) . Israel Ministry of Foreign Affairs. 2009-07-29. <http://www.mfa.gov.il/NR/rdonlyres/E89E699D-A435-491B-B2D0-017675DAFEF7/0/GazaOperation.pdf>.
52. ^ <http://www2.ohchr.org/english/bodies/hrcouncil/specialsession/9/factfindingmission.htm>
53. ^ Goldstone report (<http://www2.ohchr.org/english/bodies/hrcouncil/docs/12session/A-HRC-12-48.pdf>) , Goldstone report, UNHRC, para. 49
54. ^ Frenkel, Sheera (February 2, 2010). "Israeli officers get slap on wrist for white phosphorus use in Gaza" ([http://www.timesonline.co.uk/tol/news/world/middle\\_east/article7010851.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article7010851.ece)) . *The Times* (London). [http://www.timesonline.co.uk/tol/news/world/middle\\_east/article7010851.ece](http://www.timesonline.co.uk/tol/news/world/middle_east/article7010851.ece).
55. ^ Straziuso, Jason (May 11, 2009). "U.S.: Afghan Militants Use White Phosphorus" (<http://www.guardian.co.uk/world/2009/may/11/taliban-phosphorus-attacks-afghanistan>) . *guardian.co.uk*. Associated Press (London). <http://www.guardian.co.uk/world/2009/may/11/taliban-phosphorus-attacks-afghanistan>. Retrieved December 2, 2009.
56. ^ "EXCLUSIVE - Afghan girl's burns show horror of chemical strike" (<http://in.reuters.com/article/southAsiaNews/idINIndia-39498520090508?sp=true>) . *Reuters India*. May 8, 2009. <http://in.reuters.com/article/southAsiaNews/idINIndia-39498520090508?sp=true>. Retrieved December 2, 2009.
57. ^ Chivers, C. J. (April 19, 2009). "Pinned Down, a Sprint to Escape Taliban Zone" ([http://www.nytimes.com/2009/04/20/world/asia/20ambush.html?\\_r=1&ref=world&pagewanted=all](http://www.nytimes.com/2009/04/20/world/asia/20ambush.html?_r=1&ref=world&pagewanted=all)) . *New York Times*. [http://www.nytimes.com/2009/04/20/world/asia/20ambush.html?\\_r=1&ref=world&pagewanted=all](http://www.nytimes.com/2009/04/20/world/asia/20ambush.html?_r=1&ref=world&pagewanted=all). Retrieved December 2, 2009.

58. ^ Synovitz, Ron (May 13, 2009). "Investigation Launched Into White Phosphorus Claims In Afghanistan" ([http://www.rferl.org/content/Investigation\\_Launched\\_Into\\_White\\_Phosphorus\\_Claims\\_In\\_Afg\\_Radio\\_Free\\_Europe/Radio\\_Liberty](http://www.rferl.org/content/Investigation_Launched_Into_White_Phosphorus_Claims_In_Afg_Radio_Free_Europe/Radio_Liberty)). [http://www.rferl.org/content/Investigation\\_Launched\\_Into\\_White\\_Phosphorus\\_Claims\\_In\\_Afghanistan/1731](http://www.rferl.org/content/Investigation_Launched_Into_White_Phosphorus_Claims_In_Afghanistan/1731) Retrieved December 2, 2009.
59. ^ Houthis release photos of Saudi phosphorus bombs (<http://www.presstv.ir/detail.aspx?id=111524&sectionid=351020206>) , PressTV, November 17, 2009.
60. ^ Saudi jets using phosphorus bombs, claim Yemen rebels ([http://www.dailytimes.com.pk/default.asp?page=2009%5C11%5C10%5Cstory\\_10-11-2009\\_pg20\\_6](http://www.dailytimes.com.pk/default.asp?page=2009%5C11%5C10%5Cstory_10-11-2009_pg20_6)) , Daily Times, November 10, 2009.
61. ^ "Police: Terrorists fired phosphorus shells into Israel," (<http://www.jpost.com/MiddleEast/Article.aspx?id=188206>) Yaakov Lappin, Yaakov Katz, September, 15, 2010, Jerusalem Post
62. ^ "Two phosphorous mortars hit Israel as tensions rise," (<http://www.haaretz.com/print-edition/news/two-phosphorous-mortars-hit-israel-as-tensions-rise-1.314057>) Anshel Pfeffer and Yanir Yagna, September 16, 2010, Haaretz.
63. ^ "Israel: Phosphorus bombshells launched from Gaza; Israeli officials said white phosphorus – an incendiary banned for offensive use under international law – was in two of nine mortar shells fired from Gaza into southern Israel. Israel itself has been accused of using the weapon in Gaza," (<http://www.csmonitor.com/World/Global-News/2010/0915/Israel-Phosphorus-bombshells-launched-from-Gaza>) Dan Murphy, September 15, 2010, Christian Science Monitor
64. ^ FM tells UN envoy to file complaint on Gaza rockets (<http://www.jpost.com/Israel/Article.aspx?id=196019>) , Jerusalem Post, November 20, 2010
65. ^ Khalili, Mustafa; Tait, Michael (January 19, 2009). "White phosphorus in Gaza: the victims" (<http://www.guardian.co.uk/world/video/2009/jan/19/gaza-phosphorus-victim>) . *The Guardian* (London). <http://www.guardian.co.uk/world/video/2009/jan/19/gaza-phosphorus-victim>.
66. ^ [2] (<http://www.flickr.com/photos/ismpalestine/3210017706/>)
67. ^ <sup>a</sup> <sup>b</sup> Agency for Toxic Substances and Disease Registry (ATSDR). "White Phosphorus: Health Effects" (<http://www.atsdr.cdc.gov/toxprofiles/tp103-c2.pdf>) (PDF). *Toxicological Profile Information Sheet*. <http://www.atsdr.cdc.gov/toxprofiles/tp103-c2.pdf>.
68. ^ "ATSDR - Minimal Risk Levels for Hazardous Substances (MRLs)" (<http://www.atsdr.cdc.gov/mrls.html>) . <http://www.atsdr.cdc.gov/mrls.html>. Retrieved December 4, 2005.
69. ^ <sup>a</sup> <sup>b</sup> Lisandro Irizarry, MD, MPH, FAAEM. "eMedicine - CBRNE - Incendiary Agents, White Phosphorus" (<http://www.emedicine.com/emerg/topic918.htm>) . <http://www.emedicine.com/emerg/topic918.htm>. Retrieved December 4, 2005.
70. ^ Organisation for the Prohibitions of Chemical Weapons. "Schedules of Chemicals" ([http://www.opcw.org/html/db/cwc/eng/cwc\\_annex\\_on\\_chemicals.html#b](http://www.opcw.org/html/db/cwc/eng/cwc_annex_on_chemicals.html#b)) (– Scholar search ([http://scholar.google.co.uk/scholar?hl=en&lr=&q=intitle%3ASchedules+of+Chemicals&as\\_publication=&as\\_ylo=&as\\_yhi=&btnG=Search](http://scholar.google.co.uk/scholar?hl=en&lr=&q=intitle%3ASchedules+of+Chemicals&as_publication=&as_ylo=&as_yhi=&btnG=Search))). [http://www.opcw.org/html/db/cwc/eng/cwc\\_annex\\_on\\_chemicals.html#b](http://www.opcw.org/html/db/cwc/eng/cwc_annex_on_chemicals.html#b).
71. ^ Paul Reynolds (2005-11-16). "BBC NEWS : Americas : White phosphorus: weapon on the edge" (<http://news.bbc.co.uk/2/hi/americas/4442988.stm>) . *BBC News*. <http://news.bbc.co.uk/2/hi/americas/4442988.stm>. Retrieved 2007-04-04.
72. ^ "Organisation for the Prohibition of Chemical Weapons (OPCW)" (<http://www.opcw.org/>) . <http://www.opcw.org/>. Retrieved 2007-09-25.
73. ^ "Protocol III - Convention on Certain Conventional Weapons" ([http://www.globalsecurity.org/military/library/policy/int/convention\\_conventional-wpns\\_prot-iii.htm](http://www.globalsecurity.org/military/library/policy/int/convention_conventional-wpns_prot-iii.htm)) . [http://www.globalsecurity.org/military/library/policy/int/convention\\_conventional-wpns\\_prot-iii.htm](http://www.globalsecurity.org/military/library/policy/int/convention_conventional-wpns_prot-iii.htm). Retrieved December 4, 2005.
74. ^ "Convention on Certain Conventional Weapons - States parties and signatories" ([http://www.unog.ch/\\_80256ee600585943.nsf/%28httpPages%29/3ce7cfc0aa4a7548c12571c00039cb0c?OpenDocument&ExpandSection=1%2C2#\\_Section1](http://www.unog.ch/_80256ee600585943.nsf/%28httpPages%29/3ce7cfc0aa4a7548c12571c00039cb0c?OpenDocument&ExpandSection=1%2C2#_Section1)) . The United Nations at Geneva. [http://www.unog.ch/\\_80256ee600585943.nsf/%28httpPages%29/3ce7cfc0aa4a7548c12571c00039cb0c?OpenDocument&ExpandSection=1%2C2#\\_Section1](http://www.unog.ch/_80256ee600585943.nsf/%28httpPages%29/3ce7cfc0aa4a7548c12571c00039cb0c?OpenDocument&ExpandSection=1%2C2#_Section1). Retrieved 2010-04-13.
75. ^ Buncombe, Andrew; Brown, Colin (November 17, 2005). "Incendiary weapons: The big white lie" (<http://news.independent.co.uk/world/politics/article327543.ece>) . London: The Independent. <http://news.independent.co.uk/world/politics/article327543.ece>.

76. ^ "FM27-10 :: Rule of Land Warfare (GlobalSecurity.org)" (<http://www.globalsecurity.org/military/library/policy/army/fm/27-10/Ch2.htm>) . <http://www.globalsecurity.org/military/library/policy/army/fm/27-10/Ch2.htm>. Retrieved December 12, 2005.
77. ^ "5sect3" (<http://www.fas.org/man/dod-101/army/docs/st100-3/c5/5sect3.htm>) . <http://www.fas.org/man/dod-101/army/docs/st100-3/c5/5sect3.htm>. Retrieved December 4, 2005.
78. ^ "FM 3-06.11 Appendix F" (<http://atiam.train.army.mil/soldierPortal/atia/adlsc/view/public/4651-1/fm/3-06.11/appf.htm>) . <http://atiam.train.army.mil/soldierPortal/atia/adlsc/view/public/4651-1/fm/3-06.11/appf.htm>. Retrieved December 12, 2005.
79. ^ The Program for Humanitarian Policy and Conflict Research, "IHL and White Phosphorus Munitions" Accessed at <http://ihl.ihlresearch.org/index.cfm?fuseaction=page.viewpage&pageid=2105>

## External links

- The Legality of the Use of White Phosphorus by the United States Military During the 2004 Fallujah Assaults (<http://law.bepress.com/expresso/eps/1959/>) (Roman Reyhani)
- Globalsecurity.org on WP (<http://www.globalsecurity.org/military/systems/munitions/wp.htm>) (including use during the Battle of Fallujah and during the December 1994 battle for Grozny during the First Chechen War)
- Buncombe, Andrew; Brown, Colin (November 17, 2005). "Incendiary weapons: The big white lie" (<http://news.independent.co.uk/world/politics/article327543.ece>) . London: The Independent. <http://news.independent.co.uk/world/politics/article327543.ece>.

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