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Incendiary Weapons: Government Positions and Practices

Memorandum to Convention on Conventional Weapons Delegates

Human Rights Watch and the Harvard Law School International Human Rights Clinic

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I. Introduction

At the Fourth Review Conference of the Convention on Conventional Weapons (CCW)¹ in November 2011, states parties actively took on the issue of incendiary weapons for the first time since the adoption in 1980 of CCW Protocol III on Prohibitions or Restrictions on the Use of Incendiary Weapons. While the final documents from the first three Review Conferences merely “note[d] the provisions” of Protocol III,² the Fourth Review Conference’s Final Document stated:

The Conference notes the concerns raised during the discussions on Protocol III by some High Contracting Parties about the offensive use of white phosphorus against civilians, including suggestions for further discussion on this matter. The Conference further notes that there was no agreement on various aspects of this matter.³

¹ The full title of the CCW is the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects.

² See CCW Third Review Conference Final Document, CCW/CONF.III/11 (Part II), Geneva, November 7-17, 2006, [http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/84E7CBDD66F28699C125729E00605345/\\$file/CCW+CONF.III+11+PART+II+E.pdf](http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/84E7CBDD66F28699C125729E00605345/$file/CCW+CONF.III+11+PART+II+E.pdf) (accessed April 12, 2012), p. 12; CCW Second Review Conference Final Document (Part II), CCW/CONF.II/2, Geneva, December 11-21, 2001, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/Go2/602/61/IMG/Go260261.pdf?OpenElement> (accessed April 12, 2012), p. 17; CCW First Review Conference Final Document (Part I), CCW/CONF.I/16, Geneva, 1996, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G96/617/03/PDF/G9661703.pdf?OpenElement> (accessed April 12, 2012), p. 40.

³ CCW Fourth Review Conference Final Document (Part II), CCW/CONF.IV/4/Add.1, Geneva, November 14-25, 2011, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G11/652/03/PDF/G1165203.pdf?OpenElement> (accessed April 12, 2012), p. 9

With this language, CCW states parties raised concerns about the harmful effects of white phosphorus munitions, an issue that could be addressed under Protocol III on incendiary weapons. Moreover, states opened the door for further discussion about strengthening prohibitions or restrictions on incendiary weapons, including white phosphorus, under the protocol.

As the Fourth Review Conference's Final Document suggests, Protocol III is ripe for reexamination. The protocol has failed to live up to its promise of protecting civilians from the effects of incendiary weapons, which cause horrific burns, permanent disfigurement, and death.⁴ States adopted Protocol III "in order to assure complete protection of civilians from incendiary weapons"⁵; however, loopholes and inconsistent restrictions have limited its effectiveness.⁶

Over the past year and a half, the situation has taken on increasing urgency in the international community. States have voiced their concerns about the dangers of incendiary weapons and the inadequacy of the protocol in letters to Human Rights Watch and in statements at CCW meetings. In addition, recent use of weapons with incendiary effects has posed an ongoing threat to civilians, while continued production and stockpiling raise concerns about potential civilian casualties from future use. In 2011, actors ranging from a high-tech military power to a non-state armed group used white phosphorus in Afghanistan, while in Libya, weapons depots containing napalm and white phosphorus were left unsecured.

To minimize the harm to civilians from the use of incendiary weapons, Human Rights Watch and Harvard Law School's International Human Rights Clinic (IHRC) call on CCW states parties to agree, at their November 2012 annual meeting, to a mandate for further discussions on Protocol III. These discussions, held in a Group of Governmental Experts, should then lead to a mandate to amend the protocol. A comprehensive ban on the

⁴ Human Rights Watch and the Harvard Law School International Human Rights Clinic, *Memorandum to Convention on Conventional Weapons Delegates: The Human Suffering Caused by Incendiary Munitions*, March 2011, http://www.hrw.org/sites/default/files/related_material/2011_arms_incendiariespastharmanduse.pdf.

⁵ Letter from Valentin Zellweger, Director for International Law, Swiss Federal Department of Foreign Affairs, to Human Rights Watch, March 22, 2011.

⁶ Human Rights Watch and the Harvard Law School International Human Rights Clinic, *Memorandum to Convention on Conventional Weapons Delegates: The Need to Re-Visit Protocol III on Incendiary Weapons*, November 2010, <http://www.hrw.org/en/news/2010/11/22/memorandum-ccw-delegates>.

weapons would have the most far reaching humanitarian benefits. But at a minimum, states should address the key shortcomings of the instrument by:

- 1) Adopting a broader, effects-based definition of incendiary weapons that encompasses multipurpose munitions with incendiary effects, such as white phosphorus ones, and
- 2) Prohibiting the use of *all* incendiary weapons in civilian areas, regardless of whether they are air or ground launched.⁷

This memorandum details government positions and practices regarding incendiary weapons, which have bolstered the argument for revisiting Protocol III. It analyzes the concerns of states as well as those of the International Committee of the Red Cross (ICRC) about the humanitarian harm from these weapons and highlights their willingness to consider ways to strengthen existing international law. In addition, it lays out the current threats posed by incendiary weapons, focusing on recent use and stockpiling of incendiary munitions in Afghanistan and Libya, and identifying states that have produced the weapons. The memorandum concludes that, building on the Review Conference's Final Document, states should initiate formal discussions as soon as possible with an eye to eliminating the flaws of the protocol and the harmful effects of white phosphorus and other incendiary weapons.

II. Background

*A. Incendiary Weapons*⁸

Incendiary weapons are munitions that produce fire through a chemical reaction. Burns from incendiary weapons inflict excruciating injuries, disfigure victims, and often lead to death. In modern warfare, these weapons are generally used to ignite fuel and ammunition supplies, destroy tanks and other equipment, and attack personnel. Napalm, widely used

⁷ For further discussion of these recommendations, see Human Rights Watch and the Harvard Law School International Human Rights Clinic, *Strengthening the Humanitarian Protections of Protocol III on Incendiary Weapons: Memorandum to Convention on Conventional Weapons Delegates*, August 2011, <http://www.hrw.org/news/2011/08/22/strengthening-humanitarian-protections-protocol-iii-incendiary-weapons>.

⁸ For more information, see Human Rights Watch and the Harvard Law School International Human Rights Clinic, *Q&A on Incendiary Weapons and CCW Protocol III*, November 2011, <http://www.hrw.org/news/2011/11/11/qa-incendiary-weapons-and-ccw-protocol-iii>; Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Human Suffering Caused by Incendiary Munitions*; Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Need to Re-Visit Protocol III on Incendiary Weapons*.

during the Vietnam War, is the most notorious incendiary substance, but more than 180 models of incendiary weapons currently exist. The harm caused by white phosphorus munitions, used in more recent conflicts, exemplifies the specific humanitarian problems weapons with incendiary effects present. As discussed below, while some states believe white phosphorus munitions do not fall under Protocol III's definition of "incendiary weapon," other states and Human Rights Watch believe that because of their incendiary effects, they produce the same kind of harm, and therefore should be treated as incendiary weapons.

B. White Phosphorus⁹

White phosphorus is a chemical substance that ignites when exposed to atmospheric oxygen. The chemical reaction creates intense heat of about 1,500 degrees Fahrenheit (815 degrees Celsius) and produces light and a thick smoke. White phosphorus is highly soluble in fat, so when it touches human skin it causes severe thermal and chemical burns, often down to the bone, that are slow to heal and likely to develop infections. Wounds that have been cleaned and dressed can reignite when the dressings are removed. Moreover, white phosphorus can enter the bloodstream through the burns and cause multiple organ failure.

While white phosphorus munitions are frequently used for creating smokescreens, illuminating targets, and marking and signaling, they are also often used to ignite fuel supplies, ammunition, and other materiel. In addition, armed forces have used white phosphorus munitions to "smoke out" enclosures, forcing anyone inside to flee the smoke and fire by going outside where they can be attacked with high explosive rounds. This type of use is controversial, even when applied to enemy combatants, because of the nature of the injuries caused. Regardless of how they are used, weapons containing white phosphorus raise humanitarian concerns. Not only do they produce cruel injuries, but they also often have a broad area effect, which means they cannot be used in a way that discriminates between soldiers and civilians in populated areas.

White phosphorus was first used in World War I and was subsequently used extensively in World War II and the Vietnam War. Over the past two decades, white phosphorus has been used by the Taliban and NATO forces in Afghanistan (2003-2011), Israel in Gaza and Lebanon (2008 and 2006, respectively), Ethiopia in Somalia (2007), the United States and

⁹ For more information, see Human Rights Watch and the Harvard Law School International Human Rights Clinic, *Q&A on Incendiary Weapons and CCW Protocol III*; Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Need to Re-Visit Protocol III on Incendiary Weapons*.

the United Kingdom in Iraq (2004), and Russia in Chechnya (1994-1995).¹⁰ Continued use and/or stockpiling of incendiary munitions in countries such as Afghanistan and Libya present ongoing threats to civilians.

Razia's Story

The story of eight-year-old Razia exemplifies the civilian suffering caused by white phosphorus, regardless of who uses it. A white phosphorus shell ripped through the Afghan girl's home in the Tagab Valley of Kapisa in June 2009.¹¹ The Associated Press reported that the attack left Razia's skin burned to a scaly red, her hair would never grow back, and most of her left ear was burned off.¹² When she reached the operating room, white powder covered her skin, the oxygen mask on her face started to melt, and flames appeared when US military doctors attempted to scrape away the dead tissue.¹³ A related Associated Press video about Razia's treatment in the hospital vividly illustrates the horrific nature of her burns, which, if she lives, will cause long-term disfigurement as well as short-term agony.¹⁴ A US military spokeswoman with NATO's security force said that officials could not be certain whether it was their own round or an enemy round that hit Razia's house, noting that "[e]ither scenario is possible, and equally regrettable" and that the harm to Razia "could have been [NATO's] fault."¹⁵

¹⁰ See Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Human Suffering Caused by Incendiary Munitions*; Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Need to Re-Visit Protocol III on Incendiary Weapons*.

¹¹ See Jason Straziuso and Evan Vucci, "Burned Afghan Girl Learns to Smile Again," Associated Press, June 23, 2009, http://www.msnbc.msn.com/id/31509214/ns/world_news-south_and_central_asia/t/burned-afghan-girl-learns-smile-again/#.T1WWRvGPWQw (accessed March 11, 2012).

¹² Ibid.

¹³ Ibid.

¹⁴ Evan Vucci, "Video Essay: Doctors Save Burned Afghan Girl," June 23, 2009, http://www.youtube.com/watch?v=AYhrGxuof6o&feature=player_embedded (accessed March 11, 2012).

¹⁵ See Jason Straziuso and Evan Vucci, "Burned Afghan Girl Learns to Smile Again"; "U.S.: Afghan Militants Using White Phosphorous," Associated Press, May 11, 2009, http://www.msnbc.msn.com/id/30672076/ns/world_news-south_and_central_asia/t/us-afghan-militants-using-white-phosphorous/#.T1WY4PGPWQw (accessed March 11, 2012).

*C. Shortcomings of Protocol III*¹⁶

As written, Protocol III fails adequately to protect civilians. The protocol's definition of "incendiary weapon" is too narrow because it does not clearly cover multipurpose munitions. Article 1 of Protocol III provides a loophole for such munitions in two ways: it encompasses only munitions "primarily designed" to set fires or cause burn injuries, and it creates exceptions for munitions with incendiary effects that are "incidental." This definition allows multipurpose and widely used incendiary munitions, such as those containing white phosphorus, to escape regulation because their classification is based on the discretion of the manufacturer or the user instead of on their incendiary effects.

Furthermore, Article 2 of Protocol III's restrictions on the use of incendiary weapons, however defined, are insufficiently rigorous. They include exceptions that too often permit attacks that could endanger and cause cruel injuries to civilians. While the article prohibits attacks in populated areas with air-dropped incendiary weapons, it permits the same kinds of attacks with ground-launched models under certain circumstances. These inconsistent provisions fail to recognize that incendiary weapons, whether air or ground delivered, can have the same harmful impacts, especially when used in populated areas.

III. State Positions on Protocol III

Over the past year and a half, at least 20 CCW states parties have provided their views on the use and regulation of incendiary weapons, in interventions at CCW sessions and in letters to Human Rights Watch.¹⁷ A wide variety of states from six continents have articulated positions. They include countries large and small, developed and developing, currently involved in conflict and not. All but four of these states have expressed concern about and/or a willingness to examine the protocol.¹⁸

¹⁶ See Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Human Suffering Caused by Incendiary Munitions*; Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Need to Re-Visit Protocol III on Incendiary Weapons*.

¹⁷ Human Rights Watch sent letters to each of the 114 CCW states parties attaching a November 2010 memorandum to CCW delegates: Human Rights Watch and the Harvard Law School International Human Rights Clinic, *The Need to Re-Visit Protocol III on Incendiary Weapons*. Ten states responded. Others made comments during CCW meetings.

¹⁸ The states open to examining the protocol are: Australia, Austria, Belarus, Belgium, Canada, Djibouti, Estonia, Germany, the Holy See, Honduras, Ireland, Mexico, New Zealand, Qatar, Saudi Arabia, and Switzerland. Israel, Japan, and the United States expressed implicit or explicit opposition to revisiting the protocol. Italy objected to discussing white phosphorus under Protocol III, but it appeared willing to consider it under different auspices.

In their letters and statements, most of these countries have outlined positions regarding the civilian impact of incendiary weapons and what should be done about it within the CCW forum. Some have called for the formation of a Group of Governmental Experts, and some have explicitly supported amending the provisions of Protocol III. The International Committee of the Red Cross (ICRC) has also issued strong statements regarding the need to revisit Protocol III.¹⁹

A. Humanitarian Concerns

Many states that have made their positions publicly known have highlighted the humanitarian harm caused by incendiary munitions. Estonia wrote that “the humanitarian concerns caused by the use of incendiary weapons must be alleviated and that civilians must be protected.”²⁰ Djibouti stated its “concern toward reducing the deep and traumatizing wounds inflicted upon civilian populations by incendiary weapons.”²¹

Several states have focused on white phosphorus. Belgium, for example, shared “the concern about the humanitarian problem caused by the misuse of white phosphorus munitions from their normal use of ... illuminating.”²² Switzerland emphasized the considerable number of victims that incendiary weapons have caused²³ and expressed concern about the “grave effects” these weapons produce.²⁴ It also highlighted the

¹⁹ Statement of Jakob Kellenberger, President of the International Committee of the Red Cross, Fourth Review Conference of States Parties to the CCW, Geneva, November 15, 2011, <http://www.icrc.org/eng/resources/documents/statement/ccw-statement-2011-11-15.htm> (accessed April 4, 2012). See also Statement of Louis Maresca, Legal Adviser, Arms Unit, Legal Division, International Committee of the Red Cross, Fourth Review Conference of States Parties to the CCW, Geneva, November 16, 2011, [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/C77CB1DD06229E70C1257967003BC545/\\$file/MCI_CRC_ProtocolIII.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/C77CB1DD06229E70C1257967003BC545/$file/MCI_CRC_ProtocolIII.pdf) (accessed April 4, 2012). For further discussion of the ICRC’s position, see Part III(E) below.

²⁰ Letter from Urmas Paet, Ministry of Foreign Affairs of the Republic of Estonia, to Human Rights Watch, April 25, 2011.

²¹ Statement of Isse Abdillahi, Deputy Director in Charge of Disarmament Affairs, Djibouti Ministry of Foreign Affairs, Tenth Meeting of States Parties to the CCW, Geneva, November 2010.

²² Letter from Steven Vanackere, Minister of Foreign Affairs and Institutional Reforms of Belgium, to Human Rights Watch, May 3, 2011 (unofficial translation).

²³ Statement of HE Alexandre Fasel, Permanent Representative of Switzerland to the Conference on Disarmament, Fourth Review Conference of States Parties to the CCW, Geneva, November 16, 2011, [http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/B85AA07EFD972BCAC125796700508F48/\\$file/MCI_Switzerland.pdf](http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/B85AA07EFD972BCAC125796700508F48/$file/MCI_Switzerland.pdf) (accessed April 4, 2012).

²⁴ Letter from Valentin Zellweger, March 22, 2012.

loophole that the protocol creates for white phosphorus and noted that “the problem of incendiary weapons raised under Protocol III is still not resolved.”²⁵

In discussions on the Fourth Review Conference’s Final Document, some states linked white phosphorus to Protocol III. Mexico argued that the Final Document’s language on white phosphorus should appear under the heading of Protocol III. Although as written the protocol may not apply directly to white phosphorus, Mexico noted that states have expressed their concerns about white phosphorus munitions in the context of the incendiary weapons protocol.²⁶ Australia and Switzerland supported Mexico’s position on this point.²⁷ Italy, by contrast, expressed doubts about whether the language about white phosphorus should appear under the heading of Protocol III because “white phosphorus is not really an incendiary weapon.”²⁸ Italy said it supported including the proposed language somewhere in the Final Document, however, and noted the “harmful effects on civilians” of white phosphorus.²⁹

Although these comments indicate that there is not yet a consensus on classifying white phosphorus munitions, they do reflect concern that the CCW needs to deal with these munitions’ incendiary effect and potential to inflict civilian harm.

B. Proposal for an Experts Meeting

During the Fourth Review Conference, at least two states called for a meeting of experts to discuss Protocol III and the use of incendiary weapons. Australia stated that it “would welcome a genuine exchange between experts in the coming year on the scope and applicability of Protocol III on other weapons that can have the same effect as incendiary weapons.”³⁰ By referring to these other weapons, Australia implied that white phosphorus

²⁵ Statement of HE Alexandre Fasel, November 16, 2011.

²⁶ Statement of Mexico, Fourth Review Conference of States Parties to the CCW, Geneva, November 22, 2011, notes by Human Rights Watch.

²⁷ Statements of Australia and Switzerland, Fourth Review Conference of States Parties to the CCW, Geneva, November 22, 2011, notes by Human Rights Watch.

²⁸ Statement of Italy, Fourth Review Conference of States Parties to the CCW, Geneva, November 17, 2011, notes by Women’s League for International Peace and Freedom. See also Statement of Italy, Fourth Review Conference of the States Parties to the CCW, Geneva, November 22, 2011, notes by Human Rights Watch.

²⁹ Statement of Italy, November 22, 2011.

³⁰ Statement of HE Peter Woolcott, Permanent Representative of Australia to the United Nations in Geneva and Ambassador for Disarmament, Fourth Review Conference of States Parties to the CCW, Geneva, November 16, 2011,

should be central to the discussion. Australia further noted the “inconsistency in Protocol III that allows two munitions used for the same purpose and having the same effect to be subject to differing levels of restrictions under international humanitarian law.”³¹ The latter statement can be read as a criticizing either the possible exclusion of white phosphorus from the definition in Article 1 or the different standards for ground- and air-launched weapons under Article 2.

Germany echoed Australia’s recommendation for an experts meeting. It found it “appropriate to begin to study and examine the possible misuse of white phosphorous as a weapon, for instance by devoting one day of an experts' meeting to presentations on the subject and in light of this possibly the development of recommendations for the further treatment of this topic.”³²

These statements are consistent with the call of Human Rights Watch and the IHRC for a Group of Governmental Experts to initiate discussions of Protocol III that cover white phosphorus munitions.

Although it did not specifically mention an experts meeting, Switzerland said it favored a mandate “to deal with all the humanitarian problems caused by white phosphorus.”³³ It also recognized the need for Protocol III to change with the times. Switzerland stated that the CCW, as well as the Geneva Conventions, are “dynamic instrument[s]... [that] should be able to respond to developments in the nature and conduct of armed conflict, to continuously address humanitarian concerns, and should be reviewed, amended and improved if this is deemed necessary.”³⁴ Switzerland thus did not narrow its focus to white phosphorus but described CCW as a living instrument that must adapt to the ever evolving means and methods of warfare.

[http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/A042E1F9A0DE9DB5C12579660059B081/\\$file/MCI_Australia_NewProposals.pdf](http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/A042E1F9A0DE9DB5C12579660059B081/$file/MCI_Australia_NewProposals.pdf) (accessed April 9, 2012).

³¹ Ibid.

³² Statement of HE Hellmut Hoffmann, German Ambassador for Global Disarmament Affairs, Fourth Review Conference of States Parties to the CCW, Geneva, November 15, 2011.

³³ Statement of HE Alexandre Fasel, November 16, 2011.

³⁴ Letter from Valentin Zellweger, March 22, 2011.

C. Support for Amendment

In order to reduce the humanitarian harm of incendiary weapons, some states have gone beyond calling for an experts meeting and already articulated the need to amend Protocol III. In its letter to Human Rights Watch, Qatar said it “supports the principle of amending the Protocol III on Incendiary Weapons.... [and] will also work positively to achieve the objective of this amendment, which will provide a better protection to civilians from the harmful effects of these weapons.”³⁵ Likewise, Honduras deemed it appropriate to “pronounce in favor of the amendment of Protocol III on the prohibitions or restrictions to the use of incendiary weapons.”³⁶

Other states have drawn attention to the need to adopt stronger provisions in Protocol III at CCW meetings. At the 2011 Review Conference, the Holy See stated “it would be useful to revisit this issue in order to improve and strengthen provisions for the protection of civilians from the harmful effects of these weapons.”³⁷ At the 2010 Meeting of States Parties, Djibouti focused on the definitional loopholes and argued for “the necessity of revisiting, redefining, and clarifying the clauses contained in Protocol III on Incendiary Weapons, in order to reach greater clarity in the designation of white phosphorus explosives.”³⁸

These positions reflect a growing interest across several continents in augmenting the civilian protections under Protocol III.

D. Openness to Discussion

In letters to Human Rights Watch and statements at CCW meetings, the large majority of states that expressed a position on Protocol III were open to holding further discussions at a future CCW forum. Austria declared that it would take proposals “into due

³⁵ Letter from Ambassador Abdulla Falah Al Dosari, Permanent Mission of the State of Qatar before the United Nations in Geneva, to Human Rights Watch, October 24, 2011. See also Statement of Qatar, Fourth Review Conference of States Parties to the CCW, Geneva, November 15, 2011, notes by Human Rights Watch.

³⁶ Letter from Col. Juan Angel Blanco Bejarano, Director of Humanitarian Law, Joint Chiefs of Staff of the Honduran Armed Forces, to the Chairman of the Joint Chiefs of Staff of the Honduran Armed Forces, May 24, 2011 (transmitted to Human Rights Watch in Letter from Permanent Mission of Honduras before the United Nations in Geneva, July 5, 2011) (unofficial translation).

³⁷ Statement of the Holy See, Fourth Review Conference of States Parties to the CCW, Geneva, November 14, 2011, notes by Human Rights Watch.

³⁸ Statement of Isse Abdillahi, November 2010.

consideration.”³⁹ Belarus stated it was “ready to listen and discuss the humanitarian concerns in this area.”⁴⁰ Canada noted its “long standing policy of addressing the humanitarian impact of weapons on civilians”⁴¹ and pledged it would “examine all relevant proposals.”⁴² Estonia explained that it was “open to adopting further measures within the CCW and to review and improve the mechanisms of Protocol III ... in order to minimize the impact of armed conflicts on both the civilian population as well as combatants.”⁴³ It qualified its statement by saying that it would only take such steps after states parties had addressed the proposed CCW protocol on cluster munitions, but states rejected that protocol and concluded negotiations on it in November 2011. Finally, Saudi Arabia declared that it “will consider the issue if there is a consensus during the coming conference.”⁴⁴

Several states explicitly or implicitly said they were willing to talk about white phosphorus in particular. Belgium wrote about the possibility of “consider[ing] this issue [of white phosphorus] within the general framework offered by” the CCW.⁴⁵ Ireland wrote that it was “open to proposals to consider particular weapons in the CCW context, including white phosphorus, within the overall mandate of the CCW to address weapons which may be deemed to be excessively injurious or to have indiscriminate effects...”⁴⁶ Similarly, New Zealand stated that it would “consider the issues raised regarding white phosphorus in particular” and “looks forward to discussions on the issue.”⁴⁷ Although states have yet to delve into the details of a discussion mandate, their willingness to start a dialogue on

³⁹ Letter from Alexander Kmentt, Head of Department for Disarmament, Arms Control and Non-Proliferation, Austrian Federal Ministry for European and International Affairs, to Human Rights Watch, May 18, 2011.

⁴⁰ Statement of Belarus, Fourth Review Conference of States Parties to the CCW, Geneva, November 14, 2011, notes by Human Rights Watch.

⁴¹ Letter from the Honourable Lawrence Cannon, Minister of Foreign Affairs of Canada, to Human Rights Watch, March 22, 2011.

⁴² Ibid.

⁴³ Letter from Urmas Paet, April 25, 2011.

⁴⁴ Letter from Saud Al-Faisal, Minister of Foreign Affairs of Saudi Arabia, to Human Rights Watch, October 4, 2011.

⁴⁵ Letter from Steven Vanackere, May 3, 2011.

⁴⁶ Letter from Aidan Cronin, Private Secretary on behalf of the Minister of Foreign Affairs, Office of the Minister for Foreign Affairs of Ireland, to Human Rights Watch, February 5, 2011.

⁴⁷ Letter from Hon. Georgina te Heuheu QSO, Minister for Disarmament and Arms Control of New Zealand, to Human Rights Watch, April 5, 2011.

Protocol III shows that the time to revisit the protocol and strengthen its protections for civilians is now.

E. International Committee of the Red Cross

At the Fourth Review Conference, the ICRC, the arbiter of international humanitarian law, expressed grave concerns and noted, “Recent reports of the use of weapons with incendiary effects in densely populated areas, and the humanitarian impact of such use, highlight the relevance of this issue and the dangers that exist for the civilian population.”⁴⁸ As a result, there is a need to examine “the adequacy of protections provided under Protocol III of the CCW.”⁴⁹ On white phosphorus in particular, the ICRC emphasized not only the “horrific burns” of this substance, but also the difficulty in treating the burns and the risks flammable remnants pose for medical personnel.⁵⁰

The ICRC specifically proposed holding an experts meeting in some forum. Given that some states believe that weapons containing white phosphorus escape the restrictions of Protocol III, the ICRC said it found “a value in examining a range of military, technical, legal and humanitarian aspects of weapons with significant incendiary effects either through work on this issue in the CCW's Group of Governmental Experts or within other informal settings.”⁵¹ In sum, the ICRC concluded that “the protections afforded to civilians and civilian objects by Protocol III warrant a review.”⁵²

F. Reluctant and Opposing States

In spite of the growing willingness to open discussions on Protocol III, some states have hesitated to support that step. Japan and Israel noted there was no consensus at the Review Conference on the issue of incendiary weapons. Japan pointed out that although states have expressed concern regarding the use of white phosphorus, “this concern was just raised by some of the parties and not all of us.”⁵³ Israel also said there was no

⁴⁸ Statement of Louis Maresca, November 16, 2011.

⁴⁹ Ibid.

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Ibid.

⁵³ Statement of Japan, Fourth Review Conference of States Parties to the CCW, Geneva, November 17, 2011, notes by Women's International League for Peace and Freedom.

agreement on the issue,⁵⁴ and it stated, “With regard to the suggestions to revisit protocols and issues previously dealt with by the CCW, we remain to be convinced that the current circumstances are conducive for the achievement of consensus in this regard.”⁵⁵ Although it is not a state party to Protocol III, Israel has previously explained that it does not consider white phosphorus used as a smokescreen to be covered by the protocol.⁵⁶

Besides taking note of Japan’s point,⁵⁷ the United States made clear that it does not support revisiting Protocol III. It stated, “As far as discussions related to Protocol III or the use of white phosphorus, we do not believe it is necessary or appropriate to reopen existing protocols that already have significant humanitarian value.”⁵⁸ This statement echoes previous ones the United States has made in other contexts.⁵⁹ The US Department of Defense has further explained that it does not consider white phosphorus to be an incendiary weapon under the definition of Protocol III and has argued that it can legally use white phosphorus munitions even for antipersonnel purposes.⁶⁰

At the Fourth Review Conference, the United States also participated in a brief discussion of the reservation it made to Protocol III upon consenting to be bound in 2009. This reservation, widely objected to by other states parties, states:

⁵⁴ Statement of Israel, Fourth Review Conference of States Parties to the CCW, November 24, 2011, notes by Human Rights Watch.

⁵⁵ Statement by Tamar Rahamimoff-Honig, Israeli Representative to the Conference on Disarmament, Fourth Review Conference of States Parties to the CCW, November 16, 2011, [http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/6C78EFA1FD108DCBC1257967003C89E1/\\$file/MCI_ISRAEL.pdf](http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/6C78EFA1FD108DCBC1257967003C89E1/$file/MCI_ISRAEL.pdf) (accessed April 9, 2012).

⁵⁶ Israel Ministry of Foreign Affairs, “The Operation in Gaza: Factual and Legal Aspects,” July 2009, <http://www.mfa.gov.il/NR/rdonlyres/E89E699D-A435-491B-B2Do-017675DAFEF7/o/GazaOperationwLinks.pdf> (accessed March 11, 2012), p. 147. This report added that Israel also used small numbers of exploding munitions containing white phosphorus in Gaza for marking and signaling. It said that Israel observed the rules of Protocol III when using these weapons even though Israel is not a party to Protocol III. *Ibid.*, p. 146.

⁵⁷ Statement of the United States, Fourth Review Conference of States Parties to the CCW, Geneva, November 17, 2011, notes by Women’s International League for Peace and Freedom.

⁵⁸ Statement of Phillip Spector, Head of US Delegation, Fourth Review Conference of States Parties to the CCW, Geneva, November 15, 2011, [http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/09734904BFoCB2B9C125796700529405/\\$file/MCI_UnitedStatesofAmerica.pdf](http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/09734904BFoCB2B9C125796700529405/$file/MCI_UnitedStatesofAmerica.pdf) (accessed April 9, 2012).

⁵⁹ Jeff Abramson, “Cluster Negotiations Again Extended,” *Arms Control Today*, January-February 2011, http://www.armscontrol.org/act/2011_01-02/Cluster (accessed March 11, 2012).

⁶⁰ US Department of Defense Answers to Questions from Senator Leahy, enclosure 2, p. 5 (facsimile to Human Rights Watch, June 12, 2009).

The United States of America, with reference to Article 2, paragraphs 2 and 3, reserves the right to use incendiary weapons against military objectives located in concentrations of civilians where it is judged that such use would cause fewer casualties and/or less collateral damage than alternative weapons, but in so doing will take all feasible precautions with a view to limiting the incendiary effects to the military objective and to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects.⁶¹

The United States declared that it “took this reservation to reduce the risk to civilians.”⁶² In discussions of the Review Conference’s Final Document, however, other states parties proposed including language about the need for reservations to be consistent with the purpose of a protocol under the Protocol III heading, which was a thinly disguised critique of the US reservation.⁶³ Although the United States successfully had the sentence moved to a more general part of the Final Document, where it became a generic statement not tied to any particular protocol, a version of the language did appear in the final text.⁶⁴

This language about reservations was inspired by the opposition to the US reservation. Seventeen of the 107 states parties to Protocol III have filed objections to the reservation, arguing it goes against the object and purpose of Protocol III: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the United Kingdom.⁶⁵ Belgium, for example,

⁶¹ Reservation of the United States on Consent to Be Bound by Protocol III, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (with Protocols I, II and III), January 21, 2009, http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2&chapter=26&lang=en#EndDec (accessed March 17, 2012).

⁶² Statement of the United States, November 17, 2011.

⁶³ The proposed language read, “The Conference further notes ... the need to ensure that reservations to this Protocol are in accordance with the objectives and purpose of the Convention.” CCW Fourth Review Conference Draft Final Document, CCW/CONF.IV/CRP.1, Geneva, November 14, 2011, p. 9.

⁶⁴ The final language in the preamble to the review of the convention reads, “The Conference ... recalls the basic principle that reservations to the Convention or its Protocols must be in accordance with the object and purpose of the Convention or its Protocols, respectively.” CCW Fourth Review Conference Final Document, p. 6.

⁶⁵ Denmark and the United Kingdom welcomed a narrow definition of the reservation that would not defeat the purpose of the protocol. This interpretation would allow the use of incendiary weapons to destroy counter-proliferation targets, such as biological weapons facilities requiring high heat to eliminate biotoxins. Objections of Denmark and the United Kingdom, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate

wrote that this reservation could “negate the specific object and scope of those provisions, thus leaving the Protocol devoid of any useful effect.”⁶⁶ Sweden underlined that the “duty to take feasible precautions does not remove the obligation to ensure that specific treaty obligations are fulfilled.”⁶⁷ Furthermore, France considered that “despite the assurances given by the United States of America, it cannot guarantee the protection of civilians, which is the *raison d’être* of the Protocol.”⁶⁸

The controversy provoked by the United States reservation underscores that it is the position of many states that incendiary weapons should be strictly regulated to fulfill the ultimate goal of Protocol III, the protection of civilians and the minimization of humanitarian harm caused by incendiary weapons.

IV. Use, Stockpiling, and Production of Incendiary Weapons

As states have begun to articulate their positions on Protocol III, use, stockpiling, and production of incendiary weapons has continued. Over the past year, both high-tech US military forces and non-state armed insurgents have used white phosphorus in Afghanistan, while in Libya weapons depots containing incendiary weapons were abandoned by Gaddafi’s forces and left unsecured. At the same time, Human Rights Watch has documented that almost 30 countries have produced incendiary weapons. The pattern of use, stockpiling, and production indicates that the weapons will almost certainly cause ongoing civilian harm unless international law is strengthened.

Effects (with Protocols I, II and III), February 4, 2010, http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2&chapter=26&lang=en#EndDec (accessed April 12, 2012).

⁶⁶ Objection of Belgium, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (with Protocols I, II and III), February 2, 2010, http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2&chapter=26&lang=en#EndDec (accessed April 10, 2012).

⁶⁷ Objection of Sweden, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (with Protocols I, II and III), February 2, 2010, <http://disarmament.un.org/treaties/a/ccwc/sweden/rat/un> (accessed March 30, 2012).

⁶⁸ Objection of France, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (with Protocols I, II and III), February 2, 2010, <http://disarmament.un.org/treaties/a/ccwc/france/rat/un> (accessed March 30, 2012).

A. White Phosphorus Use and Stockpiling in Afghanistan

In a February 2011 statement, ISAF acknowledged that it has used white phosphorus munitions in Afghanistan. ISAF maintained that its use of the munitions has been lawful because they have been employed primarily for non-incendiary purposes such as illumination, screening missions, and target marking.⁶⁹ The coalition further noted that if it uses white phosphorus for incendiary purposes, “ISAF adheres to CCW Protocol III, which places a greater emphasis on minimizing harm to civilians” than general international humanitarian law.⁷⁰ Notably, ISAF’s statement treats white phosphorus munitions used in this manner as if they were incendiary weapons, despite disagreement in the international community whether white phosphorus munitions fit the current definition of incendiary weapons and whether they should be dealt with under Protocol III.⁷¹

Media sources have elaborated on the use of white phosphorus munitions in Afghanistan. *The New York Times* has documented the use of white phosphorus by US and ISAF forces as recently as October 2011.⁷² *The New York Times* explained that white phosphorus rounds with point-detonating fuzes were “intended to set fire to any Taliban rockets at the firing positions, causing them to explode and preventing them from being fired on the American outposts.”⁷³ The artillery platoon sergeant quoted in the article noted the effectiveness of the munitions in accomplishing this task.⁷⁴ Additionally, US soldiers

⁶⁹ See Statement by Lt. Nicole R Schwegman, Press Officer, ISAF Public Affairs, February 7, 2011; Charlotte Aagaard, “Leaked Documents Show NATO Use of White Phosphorous against Afghan Insurgents,” *Dagbladet Information* (Denmark), April 18, 2011, <http://www.information.dk/265810> (accessed March 11, 2012).

⁷⁰ ISAF statement by Lt. Nicole R Schwegman.

⁷¹ The US Department of Defense, for example, has stated that because white phosphorus is “primarily designed and used for illumination and screening purposes, it is not an ‘incendiary weapon’ as defined in Protocol III.” The Department of Defense has also said that even if white phosphorus were covered by the protocol it could “lawfully be used for anti-personnel purposes.” US Department of Defense Answers to Questions from Senator Leahy, enclosure 2, p. 5.

⁷² See C.J. Chivers, “10 Years into Afghan War, a Thunderous Duel,” *The New York Times*, October 7, 2011, http://www.nytimes.com/2011/10/08/world/asia/attacks-rock-us-outposts-near-afghanistan-pakistan-border.html?_r=3&ref=world (accessed March 11, 2012); C.J. Chivers, “Mao’s Rockets and the Eastern Afghan Border War, Part I,” *The New York Times At War Blog*, October 26, 2011, <http://atwar.blogs.nytimes.com/2011/10/26/maos-rockets-and-the-eastern-afghan-border-war-part-i/?ref=whitephosphorus> (accessed March 11, 2012); C.J. Chivers, “Tensions Flare as G.I.’s Take Fire out of Pakistan,” *The New York Times*, October 16, 2011, http://www.nytimes.com/2011/10/17/world/asia/cross-border-fire-frustrates-american-troops-in-afghanistan.html?pagewanted=2&_r=1&ref=whitephosphorus (accessed March 11, 2012).

⁷³ See C.J. Chivers, “10 Years into Afghan War, a Thunderous Duel.”

⁷⁴ *Ibid.*

stated that it was common practice to return fire from Afghan insurgents with “barrages of high-explosives and white phosphorus artillery rounds.”⁷⁵ The Danish daily newspaper *Dagbladet Information* reported in April 2011 that it had obtained leaked documents detailing more than 1,100 reported instances from 2005 to 2009 in which ISAF forces had used white phosphorus grenades, rockets, and bombs.⁷⁶ The same article reported that the ISAF use of white phosphorus munitions often occurred in residential areas.⁷⁷

Afghan insurgent forces and members of the Taliban have also used and stockpiled white phosphorus munitions.⁷⁸ In 2010 ISAF documented multiple insurgent weapons caches in Kabul province that included white phosphorus munitions.⁷⁹ Previously, on May 11, 2009, the US military declassified a report of 44 instances from 2003 to 2009 in which insurgents used or stockpiled white phosphorus munitions, including 12 attacks where militants used white phosphorus in mortars or rockets, and seven cases of use in improvised explosive devices.⁸⁰ The US military has reported that the white phosphorus munitions possessed by non-state armed groups in Afghanistan were manufactured in a variety of countries, including China, Iran, Russia, and the United Kingdom.⁸¹ It also stated in 2009 that Afghan militants found white phosphorus rounds in old weapons stores left over from decades of

⁷⁵ See C.J. Chivers, “Tensions Flare as G.I.’s Take Fire out of Pakistan.”

⁷⁶ See Charlotte Aagaard, “Leaked Documents Show NATO Use of White Phosphorous against Afghan Insurgents,” *Dagbladet Information*.

⁷⁷ Ibid.; see also “White Phosphorous Used in Afghan war,” *Press TV*, May 14, 2011, <http://www.presstv.ir/detail/179875.html> (accessed March 11, 2012).

⁷⁸ See John J. Kruzal, “U.S. Denies Using White Phosphorous in Afghanistan, Gates Pledges More Investigation,” American Forces Press Service, May 11, 2009, <http://www.defense.gov/news/newsarticle.aspx?id=54294> (accessed March 11, 2012).

⁷⁹ See ISAF Joint Command-Afghanistan, “Large Explosive Caches Discovered in Sarobi,” December 16, 2010, <http://www.isaf.nato.int/article/isaf-releases/large-explosive-caches-discovered-in-sarobi.html> (accessed March 11, 2012); ISAF Joint Command-Afghanistan, “Large Weapons Cache Found, Destroyed,” November 4, 2010, <http://www.isaf.nato.int/article/isaf-releases/large-weapons-cache-found-destroyed.html> (accessed March 11, 2012).

⁸⁰ See Statement by Combined Joint Task Force-101, United States Central Command, “Reported Insurgent White Phosphorus Attacks and Caches,” May 11, 2009 <http://www.centcom.mil/press-releases/reported-insurgent-white-phosphorus-attacks-and-caches> (accessed March 11, 2012); “U.S.: Afghan Militants Using White Phosphorous,” Associated Press. The other reported incidents included 19 discoveries of insurgent caches or unexploded ordnance and 6 unexplained events.

⁸¹ See Statement by Combined Joint Task Force-101, United States Central Command, “Reported Insurgent White Phosphorus Attacks and Caches.”

war and received newer rounds from “neighbors,” a reference to militant networks in Pakistan.⁸²

The United States has voiced its concerns about the use of white phosphorus as a weapon by insurgents and its harmful effects on civilians. In response to instances of the use and stockpiling of white phosphorus by non-state armed groups in Afghanistan, spokeswoman Maj. Jenny Willis stated that the militants’ use of white phosphorus as a weapon could cause “unnecessary suffering” and that “this pattern of irresponsible and indiscriminate use of white phosphorus by insurgents is reprehensible and should be noted by the international human rights community.”⁸³

Incendiary weapons are dangerous in the hands of non-state armed groups that often disregard or even intentionally violate international humanitarian law. The evidence of white phosphorus caches in Afghanistan demonstrates the low barrier for armed groups to obtain such weapons.

B. Stockpiling of Napalm and White Phosphorus in Libya

Abandoned ordnance in Libya, including incendiary weapons, has posed an ongoing threat to civilians. In 2011, Human Rights Watch researchers found leaking drums of napalm powder abandoned at a military depot in Benghazi alongside casings and igniters for napalm bombs. It also saw 81mm mortar rounds containing white phosphorus that were fuzed and primed for combat use.⁸⁴ In March 2012, Human Rights Watch saw additional white phosphorus rounds at ammunition storage facilities bombed by NATO near Misrata and Zintan. Human Rights Watch has called on the transitional Libyan authority and others to safeguard these munitions depots, many of which have been inadequately secured since February 2011.⁸⁵ Abandoned ordnance in general endangers civilians, particularly children.⁸⁶ For example, on March 4, 2011, “an arms depot near Benghazi accidentally

⁸² See “U.S.: Afghan Militants Using White Phosphorous,” Associated Press.

⁸³ Ibid.

⁸⁴ Human Rights Watch, *Libya: Abandoned Weapons, Landmines, Unexploded Ordnance*, photographic slide show, April 5, 2011, <http://www.hrw.org/features/libya-abandoned-weapons-landmines-unexploded-ordnance>.

⁸⁵ “Libya: Abandoned Weapons, Landmines Endanger Civilians: Civilians and Aid Workers Need Protection,” Human Rights Watch news release, April 5, 2011, <http://www.hrw.org/news/2011/04/05/libya-abandoned-weapons-landmines-endanger-civilians-o>.

⁸⁶ Ibid.

exploded ... as untrained people were removing munitions, killing at least 27.”⁸⁷ As long as stores of napalm and white phosphorus are left unsecured, the munitions also remain largely unaccounted for and could fall into the hands of those who do not respect international humanitarian law. Even if secured, the incendiary weapons present a major clearance problem. Deminers told Human Rights Watch they fear that white phosphorus munitions, which have a low melting point, will ignite over the summer, in turn detonating the large numbers of nearby weapons.⁸⁸

C. Production of Incendiary Weapons

Underlying the problem of use and stockpiling of incendiary weapons is their production. Using respected international reference materials, Human Rights Watch has compiled a list of 29 states that have produced 182 types of incendiary weapons including air-dropped bombs and ground-launched rockets, mortars, and artillery projectiles of varying sizes. The list of producers includes states from Africa, Asia-Pacific, Europe, the Middle East, and North and South America. It also includes several states that have expressed concerns about incendiary weapons and a willingness to reexamine the adequacy of Protocol III. For the complete list, see the appendix to this paper.

V. Conclusion

States should take both short-term and long-term steps to alleviate the concerns articulated by states and to minimize the dangers posed by ongoing use, stockpiling, and production of incendiary weapons. In the immediate future, following the lead of the Review Conference’s Final Document statement about further discussions, CCW states parties should adopt at the November 2012 Meeting of States Parties a mandate to establish a Group of Governmental Experts on Protocol III. That discussion mandate should then lead to a mandate to negotiate amendments to the flawed protocol.

A complete ban would provide the strongest protections for civilians. If that is not possible at this point, states parties should at least:

- 1) Adopt an effects-based definition of incendiary weapons that encompasses multipurpose munitions, based on their substantial incendiary effects and not the purpose for which they are primarily designed, and

⁸⁷ Ibid.

⁸⁸ Human Rights Watch interview with Paul Grimsley, Chief of Ammunition Management, UN Mine Action Service, Tripoli, Libya, March 27, 2012.

2) Prohibit the use of all incendiary weapons within concentrations of civilians under all circumstances, regardless of the means of launching the weapons. Air-dropped attacks are already prohibited, but surface-launched ones should also be absolutely proscribed.

States could also establish a presumption that the use of incendiary weapons outside of civilian concentrations is disproportionate and thus illegal except where states can show that expected military advantage substantially outweighs risk to civilians. States should further consider a prohibition on the use of incendiary weapons as antipersonnel weapons, even if they are targeted at military personnel.

Thirty years ago, the use of napalm during the Vietnam War was the trigger to negotiate and adopt Protocol III. Today, white phosphorus may serve as the impetus to revisit the standards of this protocol. Nevertheless, the end goal of this process should not be simply to classify white phosphorus as an incendiary weapon. Instead states should adopt a broader definition of incendiary weapons and more coherent restrictions on their use in order effectively to regulate new incendiary technology and related targeting methods that could threaten civilians in the future.

Appendix I: Production of Incendiary Weapons

A total of 29 countries have produced 182 different types of incendiary weapons, according to respected international reference materials.

Country	Category	Type Name	Country	Category	Type Name
Argentina	Mortar bomb	60mm FMK3, Mod 0; 81mm M80; 120mm H	Greece	Artillery projectile	105mm M60; 155mm M110/M110A2
	Artillery projectile	105mm M60	India	Mortar bomb	81mm (U/K)
Australia	Artillery projectile	105mm M60		Mortar bomb	60mm M49A2; 81mm M375; 120mm (U/K)
Austria	Mortar bomb	60mm Mk.2; 81mm Mk.4; 120mm Mk.2		Artillery projectile	105mm M60; 155mm M110
	Cannon ammunition	105mm M57	Iraq	Air-dropped bomb	KAAKAA-100; KAAKAA-250
Belgium	Mortar bomb	81mm M513A1; 120mm M532A1	Israel	Mortar bomb	60mm M50A1; 60mm M63; 60mm M84; 81mm M65; 81mm M98; 82mm (U/K); 120mm (U/K); 120mm M84; 120mm M95; 120mm M110; 160mm M18
	Artillery projectile	105mm NR144; 155mm NR149		Artillery projectile	105mm M60A2; M110A2
	Unguided rocket	70mm FZ63	Italy	Mortar bomb	120mm (U/K)
	Cannon ammunition	90mm M602/M603; 105mm M416		Artillery projectile	105mm M60; 155mm IM150; 155mm P8A1
Bosnia & Herzegovina	Artillery projectile	105mm M60		Unguided rocket	51mm Firos-6
Brazil	Artillery projectile	105mm MD1		Cannon ammunition	90mm M313
	Unguided rocket	70mm AVC-70FB; 480mm ASTROS-II; 300mm ASTROS-II	South Korea	Artillery projectile	105mm M60/KM60A2; 155mm M110/KM110A2
	Air-dropped bomb	AV-BI-200; AV-BI-250; AV-BI-300; AV-BI-375; AV-BI-400	Netherlands	Artillery projectile	105mm M60; 155mm M110
Chile	Air-dropped bomb	ALAMANT	Pakistan	Mortar bomb	60mm (U/K); 81mm (U/K); 120mm M44A1
China	Mortar bomb	82mm Type 53; 120mm Type 55		Artillery projectile	105mm M60; 122mm (U/K); 105mm M60
	Artillery projectile	122mm Type 54; 122mm (U/K); 130mm DTs-1; 152mm Type 66; 155mm M92	Romania	Artillery projectile	76.2mm D350
	Unguided rocket	107mm Type 63	Russia	Artillery projectile	152mm D540
	Air-dropped bomb	Type 1.250-kg; 250-kg low drag		Air-dropped bomb	FOZAB-500; FOZAB-500; OFZAB-500; RBK-250 ZAB-2.5M; RBK-500 ZAB-2.5M; ZAB 100-105; ZAB 250-200; ZAB 250; ZB-500GD; ZB-500ShM
Czech Republic	Mortar bomb	60mm MK.98	Serbia	Mortar bomb	60mm M73; 60mm M90; 81mm M74; 82mm M74; 120mm M64P1
Egypt	Artillery projectile	122mm (U/K)		Artillery projectile	105mm M60
France	Mortar bomb	60mm Mk.51; 81mm M96; 120mm M1e.44		Air-dropped bomb	PLAB-150; PLAB-200; PLAB-350
	Artillery projectile	105mm M60; 105mm G1; 155mm M110; 155mm M825A1; 155mm F1A/F2A	Singapore	Mortar bomb	81mm (U/K); 120mm (U/K)
	Cannon ammunition	90mm OFUM F2; 105mm OFUM F3; 105mm OFUM F2; 105mm OFUM PH; 105mm 105 F1		Artillery projectile	155mm (U/K); 155mm M110; 155mm M825A1
	Air-dropped bomb	BL-99			

Country	Category	Type Name
South Africa	Artillery projectile	155mm (U/K)
Spain	Mortar bomb	60mm AE; 60mm Model N; 81mm NA; 120mm AE
	Artillery projectile	105mm M60/ME60A1; 155mm M110/ME110A2
	Air-dropped bomb	BIN-100; BIN-250; BIN-375
Thailand	Mortar bomb	120mm M404
Turkey	Mortar bomb	107mm M328A1; 120mm M226
	Artillery projectile	155mm M110
United Kingdom	Mortar bomb	81mm L42A3

Country	Category	Type Name
United States	Mortar bomb	60mm M302; 60mm M302A1/M302A2, 60mm M722; 81mm M57/M57A1; 81mm M370; 81mm M375/M375A1/M375A2/M375A3; 107mm M328/M328A1; 120mm M68; 120mm M929/M929A1
	Artillery projectile	105mm M60; 155mm M110; 155mm M825A1
	Unguided rocket	70mm M259
	Canon ammunition	57mm M308/M308A1; 76mm M361/M361A1; 90mm M313/M313C; 105mm M416
	Air-dropped bombs	M-116; Mk77 Mod 0; Mk77 Mod 1; Mk77 Mod 4; Mk78; Mk79; Mk112; BLU-1; BLU-10; BLU-11; BLU-23/B; BLU-27; BLU-32; BLU-35; BLU-53; BLU-74

Sources: Jane's Information Group, *Ammunition Handbook 2007-2008* and *Air Launched Weapons* (Issue 44).
Note: use of the (U/K) symbol indicates the name of the type is not known.