

Israel – Hamas 2023 Symposium – White Phosphorus and International Law

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October 25, 2023

by [Kevin S. Coble](#), [John C. Tramazzo](#) | Oct 25, 2023



Human Rights Watch (HRW) has [reported](#) that the Israel Defense Forces (IDF) fired white phosphorus artillery rounds into southern Lebanon and Gaza City on October 10 and 11, respectively. Amnesty International’s Crisis Evidence Lab also released [images](#) of IDF troops in the town of Sderot alongside M109 155mm Howitzers and pallets of “M825 and M825A1 artillery shells, which are also labeled D528, the U.S. Department of Defense Identification Code for white phosphorus-based rounds.” Israel denies ([here](#) and [here](#)) that it has used white phosphorous in the ongoing conflict with Hamas, but various media outlets have published videos depicting what appears to be white phosphorous air-burst munitions in the sky over the port in Gaza City and in two rural locations along Israel’s border with Lebanon.

The HRW Middle East and North Africa director condemned Israel’s apparent use of white phosphorous on legal grounds and [claimed](#) that “[t]he use of white phosphorus in Gaza . . . violates the international humanitarian law prohibition on putting civilians at unnecessary risk.” The full HRW [report](#) concludes that white phosphorous “can be used as an incendiary weapon” and that its use “in densely populated areas of Gaza violates the requirement under

international humanitarian law to take all feasible precautions to avoid civilian injury and loss of life.” Amnesty International also opined that the IDF’s use of white phosphorus in densely populated civilian areas in Gaza may be considered “unlawful indiscriminate attacks.”

In this post, we describe white phosphorus and discuss why and how militaries use it. We then consider whether white phosphorous munitions are illegal *per se* or violate treaties addressing the use of incendiary and chemical weapons. Finally, we turn to the *law of armed conflict rules* applicable to the use of all munitions, including white phosphorus weapons. Our conclusion is that, as always, the application of the law of armed conflict is contextual. Whether the use of white phosphorous violates the law depends on the circumstances and manner of its use, which, in the present case, remain unclear.

White Phosphorus on the Battlefield

White phosphorous, or tetraphosphorus, does not occur naturally. It is a toxic, colorless, white, or yellow waxy solid manufactured from phosphate rocks. When it reacts with oxygen, white phosphorus burns at extremely high temperatures and produces thick clouds of white smoke. White phosphorous munitions spread burning phosphorous at extreme temperatures. It continues to burn until completely “depleted” or no longer exposed to oxygen.

Militaries employ various types of white phosphorous munitions, primarily for marking and illuminating targets and to create smokescreens to protect maneuvering friendly forces. When used to create smoke or to illuminate targets at night, the risk to personnel is minimal. White phosphorous may also be used as an anti-personnel weapon under some circumstances and can be delivered by artillery (land and naval). Because of its favorable smoke-to-weight ratio, it can even be delivered by mortar or hand grenade. As Ian MacLeod and Anthony Rogers have explained,

The armed forces have a legitimate requirement for substances that can be used to illuminate a battlefield at night or to provide cover during daylight, to mark a target, to assist in range-finding or to set fire to material targets such as ammunition or fuel stores. [White phosphorus] is suitable for many of these tasks because it ignites easily when exposed to oxygen and produces dense white smoke. Ideal for laying a quick smoke screen, it can also be used as a component of incendiary weapons, or of tracer, or to indicate a target or illuminate enemy positions.

The use of white phosphorous is not new. For instance, the American and British armies employed it throughout the Second World War for the purposes described above. The British Special Air Services used white phosphorous grenades in the Falklands to flush enemies out of their fighting positions. In 2004, the United States military used white phosphorous during the second battle of Fallujah to “smoke out” concealed fighters and attack them. More recently, U.S. forces used it in battles with the Islamic State to screen and obscure friendly forces and to mark and illuminate enemy targets.

In late 2008 and early 2009, Israel fired white phosphorus munitions into Gaza for the purposes of marking, signaling, and screening. The Israeli Ministry of Foreign Affairs (MFA) stressed that “no exploding munitions containing white phosphorous were used in built-up areas of the Gaza Strip or for anti-personnel purposes.” The MFA also explained that the white phosphorous munitions “may, on occasion, produce incidental incendiary effects, but this does not make them incendiary weapons for purposes of international law” (para. 407).

The Law

There is no *per se* prohibition on the use of white phosphorous. For instance, a March 2009 HRW report notes that “[w]hen used properly in open areas, white phosphorous munitions are not illegal.” A 2017 article in the New York Times likewise noted that “it is not illegal under international law for militaries to possess and use white phosphorus.” The military manuals of several States indicate that it may be used lawfully, even as an anti-personnel weapon, in certain circumstances (e.g., United States (§ 6.14.2.1), Canada (para. 521.3.), France (p. 20-21), Germany (paras. 453-458), and Australia (paras. 4.30-31)). The question, then, is whether the use of white phosphorous munitions is restricted by weapons treaty law or the law of armed conflict rules governing the conduct of hostilities.

Treaty Law

White phosphorus munitions are often characterized as “incendiary weapons” or “chemical weapons.” In this regard, many commentators point to the Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons (Protocol III) to the 1980 Convention on Certain Conventional Weapons and/or the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (CWC) when analyzing the use of white phosphorus munitions in armed conflict. Both treaties apply in international and non-international armed conflicts (Protocol III, amendment to art. 1; CWC, art. 1(1)).

White phosphorus munitions are not considered an “incendiary weapon,” as that term appears in Protocol III. Article 1 of Protocol III 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.” In fact, Article 1(b)(i) excludes from the definition munitions “which may have incidental incendiary effects, such as illuminants, tracers, smoke or signalling [*sic*] systems.”

According to the U.S. Department of Defense *Law of War Manual*, “white phosphorous is a munition ... [that] is intended primarily for marking or illuminating a target or masking friendly force movement by creating smoke” (§ 6.14.1.3). Because white phosphorus munitions are primarily designed for marking, screening, illuminating, and signaling, their burning effects are *incidental*. As a result, Protocol III does not apply.

But even if white phosphorous munitions did qualify as “incendiary weapons,” Protocol III would not *ban* their use. Rather, it *regulates* the use of incendiary weapons by parties to the instrument for the purpose of protecting civilians.

Article 2 of the instrument sets forth the restrictions:

1. It is prohibited in all circumstances to make the civilian population as such, individual civilians or civilian objects the object of attack by incendiary weapons.
2. It is prohibited in all circumstances to make any military objective located within a concentration of civilians the object of attack by air-delivered incendiary weapons.
3. It is further prohibited to make any military objective located within a concentration of civilians the object of attack by means of incendiary weapons other than air-delivered incendiary weapons, except when such military objective is clearly separated from the concentration of civilians and all feasible precautions are taken 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.
4. It is prohibited to make forests or other kinds of plant cover the object of attack by incendiary weapons except when such natural elements are used to cover, conceal or camouflage combatants or other military objectives, or are themselves military objectives.

In sum, Article 2 of Protocol III regulates the circumstances under which the weapons can be used, to mitigate collateral effects on civilians.

Note that Israel is not a party to Protocol III and is therefore not formally bound by its terms. And the detailed rules in Articles 2(2) to 2(4) do not reflect customary international law (International Committee of the Red Cross (ICRC) *Customary International Humanitarian Law* study, rule 84). However, in practice, Israel generally applies Protocol III’s principles. Additionally, in a 2013 response to a petition to Israel’s High Court of Justice regarding the use of white phosphorus in Gaza, the IDF stated that it would no longer use white phosphorus in populated areas except in two narrow situations that it revealed only to the justices. In the court’s ruling, Justice Edna Arbel said that the conditions would “render use of white phosphorous an extreme exception in highly particular circumstances.”

The United States *is* a party to Protocol III, but it has issued a reservation regarding both Article 2(2) and 2(3). Specifically, the United States,

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.

It is also sometimes asserted that white phosphorous is a chemical weapon, the use of which is banned by the CWC. Article 2 of the CWC defines “chemical weapons” as:

- (a) Toxic chemicals and their precursors, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes;
- (b) Munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;
- (c) Any equipment specifically designed for use directly in connection with the employment of munitions and devices specified in subparagraph (b).

As with Protocol III, white phosphorous falls outside of the CWC’s purview because it is not “specifically designed to cause death or other harm” by means of a “toxic chemical.” A “toxic chemical” is defined as “[a]ny chemical which *through its chemical action on life processes* can cause death, temporary incapacitation or permanent harm to humans or animals” (emphasis added). Therefore, the CWC only prohibits chemical weapons that rely on the toxic properties of their base agents when they interact with human physiology—that is, “life processes.” Even though white phosphorous produces incredible temperatures through a chemical process, it does not, by “chemical action on life processes” cause death or temporary incapacitation. In addition, white phosphorus munitions are specifically designed for illumination, marking, signaling, and screening; not for causing death or other harm. As a result, white phosphorus munitions do not fall within the CWC’s definition of a chemical weapon. Of note, the CWC annexes incorporate a list of known toxic chemicals and their precursors. Tetraphosphorus is not listed.

In conclusion, neither Protocol III nor the CWC bans white phosphorus munitions. White phosphorus does not meet the definition of an “incendiary weapon” under Protocol III. And, even if it did, Israel is not a party to the Protocol nor are the treaty’s restrictions customary in character. Similarly, white phosphorus does not fall within the CWC’s definition of a “chemical weapon.”

Conduct of Hostilities Rules

Although not subject to the aforementioned treaties, the use of white phosphorous is always governed by the law of armed conflict’s conduct of hostilities rules. As Peter Herby, then the head of the ICRC’s Arms Unit observed in 2009:

The use of weapons containing white phosphorous is, like the use of any other weapon, regulated by the basic rules of international humanitarian law. These require parties to a conflict to discriminate between military objectives on the one hand and civilians and civilian objects on the other. The law also requires that they take all feasible precautions to prevent harm to civilians and civilian objects that can result from military operations. Attacks which cause “disproportionate” damage to civilians and to civilian objects are prohibited.

His comments make clear, correctly in our view, that each use of white phosphorus must be evaluated under law of armed conflict rules, specifically, distinction (discrimination), proportionality, unnecessary suffering, and feasible precautions.

Indiscriminate attacks are, in part, those “which are not directed at a specific military objective.” (ICRC, *Customary International Humanitarian Law* study, [rule 12](#)). An armed force may not fire white phosphorus munitions at civilians or civilian objects, nor use the munitions without aiming them (e.g., by firing them into an area in which there are separated civilian objects and military objectives without aiming at the latter).

The rule of proportionality prohibits an attack expected to cause harm to civilians or civilian objects that would be excessive in relation to the concrete and direct military advantage anticipated (ICRC, *Customary International Humanitarian Law* study, [rule 14](#)). Thus, the military advantage an attacker hopes to gain by using white phosphorous munitions (e.g., illumination of an enemy target at night; screening troop movements, etc.) must be assessed against the collateral damage to civilians and civilian objects likely to be caused by the burning phosphorus embers.

The principle of unnecessary suffering (or humanity) focuses on the effects a weapon system has on combatants (ICRC, *Customary International Humanitarian Law* study, [rule 70](#)). While the principle of unnecessary suffering is widely accepted, the exact meaning and regulatory implementation varies between States (see Professor Sean Watts’s previous *Articles of War* [post](#) for an in-depth discussion). While some States apply the standard set forth in [Article 35\(2\)](#) of Additional Protocol I to the 1949 Geneva Conventions (AP I), Israel and the United States (neither is a [party](#) to AP I) apply the standard set forth in Article 23(e) of the Regulations annexed to the 1907 Hague Convention IV (Hague IV), which states “it is especially forbidden . . . [t]o employ arms . . . *calculated to cause unnecessary suffering*” (emphasis added) (see DoD *Law of War Manual*, [§ 6.6.1](#), and Israel’s [Statement](#) on Lethal Autonomous Weapons Systems (LAWS) Weapon Legal Review).

As discussed, white phosphorus munitions are primarily designed and used for illumination, marking, signaling, and screening. They are not unlawful *per se* because they are designed to achieve a specific military advantage (DoD *Law of War Manual*, [§ 6.14.1.3](#); The Operation in Gaza 27 December 2008 – 18 January 2009 – Factual and Legal Aspects, [para. 405](#)).

Even used as an anti-personnel weapon, white phosphorus munitions are lawful so long as the suffering imposed by their use is necessary to accomplish a legitimate military purpose (DoD *Law of War Manual*, § 6.14.2.1).

Finally, combatants are required to take “feasible precautions” to avoid or minimize “incidental loss of civilian life, injury to civilians and damage to civilian objects” (ICRC, *Customary International Humanitarian Law* study, [rule 15](#)). Feasible precautions include, for example, the use of different munitions (if available), warnings to civilians, deciding to use the munitions only in rural areas, and weaponeering, such as changing the direction and altitude of the air-burst to decrease the potential for collateral damage.

The application of the law of armed conflict to the use of white phosphorus munitions must be done on a case-by-case basis. Like the use of any munition in combat, whether the use of white phosphorous munitions is lawful depends on the attendant circumstances.

Concluding Thoughts

The use of white phosphorus munitions, even in an urban environment, would not violate international law *per se*. Instead, because there is no weapons control treaty that prohibits their use altogether, any use of the munitions would have to be evaluated against the law of armed conflict’s conduct of hostilities rules. In this case, Israel has denied reports that the IDF used white phosphorus munitions in Gaza. However, even if they had been used, the lawfulness of their use would depend on the facts and surrounding circumstances, as is the case with all attacks.

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Communiqué de presse de l'Ambassade d'Israël en France

Le 13 octobre 2023

Objet : Informations mensongères relayées sur les réseaux sociaux et dans la presse au sujet de l'utilisation du phosphore blanc par l'Armée de Défense d'Israël (Tsahal) à Gaza.

L'Ambassade d'Israël en France est sidérée de lire que des informations mensongères sur la guerre en cours entre le groupe terroriste islamiste Hamas et Israël sont exploitées et relayées sur les réseaux sociaux notamment, par des élus de la République.

L'État d'Israël dément toute utilisation du phosphore blanc.

Les vidéos de bombardements à Gaza postées sur les réseaux sociaux reprennent en majorité des images de la guerre en Ukraine.

La conduite de l'Armée de Défense d'Israël est claire : anéantir le Hamas, en opérant principalement via des frappes chirurgicales.

Pour rappel, Tsahal a donné l'ordre aux Gazaouis de quitter Gaza Nord pour se rendre dans le Sud, à l'abri des prochaines frappes, comme l'armée le fait à chaque fois afin d'épargner au maximum les civils palestiniens.

Le Hamas a, quant à lui, donné l'ordre aux populations civiles de Gaza de rester dans le nord et ce, afin d'en faire un bouclier humain, gonfler les chiffres des pertes humaines palestiniennes et continuer à manipuler les images et l'opinion publique internationale.

Conformément au droit international, ce type d'arme n'est pas utilisée par Tsahal contre le groupe terroriste Hamas.

Nous condamnons avec la plus grande fermeté la presse et les élus qui font état, sans aucune autre preuve que des vidéos détournées d'une autre guerre, de l'utilisation du phosphore blanc par Tsahal.

Enfin, les images qui nous sont communiquées du massacre orchestré par le Hamas contre des civils israéliens sont extrêmement choquantes.

S'il est totalement impossible pour certains de croire qu'un mouvement terroriste qui se qualifie de "résistance armée palestinienne" puisse avoir commis de telles atrocités, nous vous demandons de ne pas véhiculer de fausses informations en affirmant, sans preuve aucune et par simple bêtise, que l'armée israélienne fait usage de la réalité augmentée pour faire croire au massacre de quarante bébés.

Véhiculer de fausses informations en tant de guerre, poster des vidéos détournées de leurs contextes ou reposter de faux témoignages, conduisent inéluctablement à **exacerber les réactions des utilisateurs, ainsi qu'à l'incitation à la haine, voire à une rapide escalade de la violence.**



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Exhibit P-40, Budget Line Item Justification: PB 2020 Navy										Date: March 2019		
Appropriation / Budget Activity / Budget Sub Activity: 1508N: Procurement of Ammo, Navy & MC / BA 02: Proc Ammo, MC / BSA 1: Marine Corps Ammunition							P-1 Line Item Number / Title: 1650 / Artillery Munitions					
ID Code (A=Service Ready, B=Not Service Ready): A				Program Elements for Code B Items: N/A				Other Related Program Elements: N/A				
Line Item MDAP/MAIS Code: N/A												
Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Procurement Quantity (<i>Units in Each</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost (<i>\$ in Millions</i>)	0.000	105.741	113.582	0.000	220.923	220.923	200.830	202.451	177.828	194.562	Continuing	Continuing
Less PY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) (<i>\$ in Millions</i>)	0.000	105.741	113.582	0.000	220.923	220.923	200.830	202.451	177.828	194.562	Continuing	Continuing
Plus CY Advance Procurement (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority (<i>\$ in Millions</i>)	0.000	105.741	113.582	0.000	220.923	220.923	200.830	202.451	177.828	194.562	Continuing	Continuing
<i>(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)</i>												
Initial Spares (<i>\$ in Millions</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Flyaway Unit Cost (<i>\$ in Dollars</i>)	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost (<i>\$ in Dollars</i>)	-	-	-	-	-	-	-	-	-	-	-	-

Description:
FY 2020 funding totals include \$0.0M for Base and \$220.923M for Overseas Contingency Operations (OCO); of which \$188.876M is realigned as part of the OCO for Base Requirements. FY 2020 OCO for Base Requirements is OCO funding for base budget requirements in support of the National Defense Strategy. The Budget requests these funds in OCO to comply with the base budget defense caps included in the Budget Control Act of 2011.

Beginning in FY18 this budget represents a consolidation of ammunition line items by functional capability.

The family of artillery munitions includes all 155mm artillery ammunition components. The 155mm artillery components are fired from M777 howitzers, and include: primer, propellant, projectile, and fuze. High explosive artillery ammunition is used against personnel, trucks, electronic surveillance and target acquisition devices, supply points, command and control and communications installations, and mechanized and armored forces. Precision-guided artillery provides accurate, first round fire-for-effect capability, and can achieve reduced collateral damage. Illumination cartridges are used to illuminate the battlefield with light either in visual or near Infrared Spectrum. Smoke cartridges are used to provide obscuration on the battlefield and to mark locations. Included are artillery fuzes such as; point detonating, multi-option, electronic time and precision guided.

Funds prior to FY18 are contained in line items 1473 and 1625.

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Exhibit P-40, Budget Line Item Justification: PB 2020 Navy								Date: March 2019		
Appropriation / Budget Activity / Budget Sub Activity: 1508N: Procurement of Ammo, Navy & MC / BA 02: Proc Ammo, MC / BSA 1: Marine Corps Ammunition						P-1 Line Item Number / Title: 1650 / Artillery Munitions				
ID Code (A=Service Ready, B=Not Service Ready): A			Program Elements for Code B Items: N/A			Other Related Program Elements: N/A				
Line Item MDAP/MAIS Code: N/A										
Exhibits Schedule					Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/MAIS Code	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)	Quantity / Total Cost (Each) / (\$ M)
P-40a	Artillery, All Types	P-5a, P-21			- / 0.000	- / 86.373	- / 99.986	- / 0.000	- / 144.342	- / 144.342
P-5	1 / Fuze, All Types	P-5a, P-21			- / 0.000	- / 19.368	- / 13.595	- / 0.000	- / 76.581	- / 76.581
P-40	Total Gross/Weapon System Cost				- / 0.000	- / 105.741	- / 113.582	- / 0.000	- / 220.923	- / 220.923
<p>*Title represents 1) the Number / Title for Items; 2) the Number / Title [DODIC] for Ammunition; and/or 3) the Number / Title (Modification Type) for Modifications. Title represents the P-40a Title when only the P-40a Summary/Total is shown.</p> <p>Note: Totals in this Exhibit P-40 set may not be exact or sum exactly due to rounding.</p>										
<p>Justification: FY 2020 OCO for baseline funding will support the procurement of 155mm High Explosive (HE) M795 with IMX-101 (DODIC DA54). The DA54 is the prime round for the Light Weight 155mm Cannon/Howitzer/ Gun/Artillery piece. The funding will also support the procurement of the prime 155mm HE Training Projectile M1122E1 (DA68), 155mm White Phosphorus (WP) Smoke Projectile M825 (D528) and 155mm Propelling Charge (MACS) M232A2 (DODIC DA67).</p> <p>FY 2020 funds are also required to support the procurement of artillery fuzes including the Point Detonation (PD) M739A1 (DODIC N340) and the Precision Guidance Kit (PGK) (DODIC NA29). The NA29 technology provides a first-of-its-kind "near-precision" capability. PGK contains a Global Positioning System (GPS) guidance kit with fuzing functions and an integrated GPS receiver to correct the inherent errors associated with ballistic firing solutions. The PGK capability is essential to providing commanders the ability to engage assigned targets while minimizing collateral damage and reducing the number of artillery projectiles required to attack targets.</p> <p>The FY 2019 to FY 2020 budget increase is attributed to increased product buys to meet user demands, increased price of items procured as we transition to insensitive munitions such as DA54, and the procurement of like in kind artillery munitions.</p> <p>OCO: FY 2020 Direct War OCO funding request of \$32.047M supports procurement of reset munitions 155mm propellant charge M232A2 (DA67), 155mm point detonating fuze M739A1 (N340), and 155mm Precision Guided Kit Fuze (NA29) expended in theater in support of Operation Inherent Resolve (OIR).</p>										

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Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Navy																Date: March 2019				
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1								P-1 Line Item Number / Title: 1650 / Artillery Munitions								Aggregated Items Title: Artillery, All Types ⁽¹⁾				
Item Number / Title [DODIC]	ID CD	MDAP/MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)
1) D528 Projectile, 155mm Smoke White Phosphorus M825																				
1.1) D528 Hardware ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	1,976.76	4,739	9.368	1,976.76	4,739	9.368
1.2) D528 Production Engineering	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.522	-	-	0.522
1.3) D528 Acceptance Testing	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.110	-	-	0.110
Subtotal: 1) D528 Projectile, 155mm Smoke White Phosphorus M825			-	-	0.000	-	-	-	-	-	-	-	-	0.000	-	-	10.000	-	-	10.000
2) D528 M825 WP SMK																				
2.1) D528 M825 Projectile Recap ^(†)	A		-	-	-	-	-	-	357.85	5,589	2.000	-	-	-	-	-	-	-	-	-
Subtotal: 2) D528 M825 WP SMK			-	-	0.000	-	-	-	-	-	2.000	-	-	-	-	-	-	-	-	-
3) D529 155mm HE M795 w/TNT																				
3.1) D529 M795 LAP ^(†)	A		-	-	-	148.39	71,669	10.635	-	-	-	-	-	-	-	-	-	-	-	-
3.2) D529 M795 Metal Parts ^(†)	A		-	-	-	380.69	73,102	27.829	-	-	-	-	-	-	-	-	-	-	-	-
3.3) D529 TNT Supplemental Charge ^(†)	A		-	-	-	12.36	73,102	0.903	-	-	-	-	-	-	-	-	-	-	-	-
3.4) D529 TNT TYPE I FLAKE (TRINITROTOLUENE) ^(†)	A		-	-	-	4.77	1,935,063	9.230	-	-	-	-	-	-	-	-	-	-	-	-
3.5) D529 Wooden Pallets ^(†)	A		-	-	-	95.77	9,317	0.892	-	-	-	-	-	-	-	-	-	-	-	-
3.6) D529 Production Engineering	A		-	-	-	-	-	1.409	-	-	-	-	-	-	-	-	-	-	-	-
3.7) D529 Acceptance Testing	A		-	-	-	-	-	0.625	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal: 3) D529 155mm HE M795 w/ TNT			-	-	0.000	-	-	51.523	-	-	-	-	-	-	-	-	-	-	-	-
4) DA51 155mm HE Training Projectile M1122																				
4.1) DA51 Load, Assemble & Pack (LAP) ^(†)	A		-	-	-	322.85	79,637	25.711	323.80	29,035	9.402	-	-	-	-	-	-	-	-	-
4.2) DA51 Wooden Pallet ^(†)	A		-	-	-	115.85	10,353	1.199	120.00	3,775	0.453	-	-	-	-	-	-	-	-	-
4.3) DA51 Supplemental Charge, PBXNg ^(†)	A		-	-	-	18.62	81,230	1.513	18.99	29,616	0.562	-	-	-	-	-	-	-	-	-

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Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Navy																Date: March 2019					
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1						P-1 Line Item Number / Title: 1650 / Artillery Munitions						Aggregated Items Title: Artillery, All Types ⁽¹⁾									
Item Number / Title [DODIC]	ID CD	MDAP/MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total			
			Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	
4.4) DA51 TNT Type I Flake ^(†)	A		-	-	-	4.77	238,911	1.140	4.87	87,105	0.424	-	-	-	-	-	-	-	-	-	
4.5) DA51 Plug, Lifting, Meltable for IM ^(†)	A		-	-	-	7.90	81,230	0.642	8.06	29,616	0.239	-	-	-	-	-	-	-	-	-	
4.6) DA51 Production Engineering	A		-	-	-	-	-	0.281	-	-	0.450	-	-	-	-	-	-	-	-	-	
4.7) DA51 ACCEPTANCE TESTING	A		-	-	-	-	-	0.550	-	-	0.350	-	-	-	-	-	-	-	-	-	
4.8) DA51 Government Furnished Material	A		-	-	-	-	-	-1.139	-	-	-	-	-	-	-	-	-	-	-	-	
Subtotal: 4) DA51 155mm HE Training Projectile M1122			-	-	0.000	-	-	29.897	-	-	11.880	-	-	-	-	-	-	-	-	-	
5) DA54 155mm HE M795 W/IMX																					
5.1) DA54 Load, Assemble, Pack (LAP) ^(†)	A		-	-	-	-	-	-	231.11	68,003	15.716	-	-	0.000	235.73	86,986	20.505	235.73	86,986	20.505	
5.2) DA54 MELTABLE FUZE PLUG ^(†)	A		-	-	-	-	-	-	8.06	69,363	0.559	-	-	0.000	10.40	88,725	0.923	10.40	88,725	0.923	
5.3) DA54 Explosive Fill IMX 104 ^(†)	A		-	-	-	-	-	-	22.34	68,003	1.519	-	-	0.000	22.78	86,986	1.982	22.78	86,986	1.982	
5.4) DA54 Supplementary Charge, PBXN9 ^(†)	A		-	-	-	-	-	-	18.99	69,363	1.318	-	-	0.000	19.37	88,725	1.719	19.37	88,725	1.719	
5.5) DA54 Wooden Pallets ^(†)	A		-	-	-	-	-	-	120.00	8,839	1.060	-	-	0.000	122.39	11,307	1.384	122.39	11,307	1.384	
5.6) DA54 Explosive Fill IMX-101 ^(†)	A		-	-	-	-	-	-	14.99	2,244,124	33.639	-	-	0.000	16.48	2,870,538	47.306	16.48	2,870,538	47.306	
5.7) DA54 M795 IM Metal Part ^(†)	A		-	-	-	-	-	-	436.92	69,363	30.306	-	-	0.000	437.85	88,725	38.848	437.85	88,725	38.848	
5.8) DA54 Production Engineering			-	-	-	-	-	-	-	-	1.676	-	-	0.000	-	-	2.122	-	-	2.122	
5.9) DA54 Acceptance Testing			-	-	-	-	-	-	-	-	0.313	-	-	0.000	-	-	0.459	-	-	0.459	
Subtotal: 5) DA54 155mm HE M795 W/IMX			-	-	0.000	-	-	-	-	-	86.106	-	-	0.000	-	-	115.248	-	-	115.248	
6) DA58 155mm Extended Range, M982 Excalibur 1B																					
6.1) DA58 Complete Round ^(†)	A		-	-	-	65,678.32	69	4.532	-	-	-	-	-	-	-	-	-	-	-	-	

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Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Navy															Date: March 2019					
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1							P-1 Line Item Number / Title: 1650 / Artillery Munitions								Aggregated Items Title: Artillery, All Types ⁽¹⁾					
Item Number / Title [DODIC]	ID CD	MDAP/MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)
6.2) DA58 Container Excalibur ^(†)	A		-	-	-	2,100.00	69	0.145	-	-	-	-	-	-	-	-	-	-	-	-
6.3) DA58 Production Engineering	A		-	-	-	-	-	0.276	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal: 6) DA58 155mm Extended Range, M982 Excalibur 1B			-	-	0.000	-	-	4.953	-	-	-	-	-	-	-	-	-	-	-	-
8) DA68, 155mm HE IM Training M1122A1																				
8.1) DA68 Load, Assemble, Pack (LAP) ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	150.00	20,162	3.024	150.00	20,162	3.024
8.2) DA68 Metal Parts - M1122A1 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	338.13	20,565	6.954	338.13	20,565	6.954
8.3) DA68 Supplemental Charge, PBXN9 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	19.37	20,565	0.398	19.37	20,565	0.398
8.4) DA68 Plug, Lifting, Melttable For IM ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	10.40	20,565	0.214	10.40	20,565	0.214
8.5) DA68 Explosive Fill IMX-104 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	22.78	80,648	1.837	22.78	80,648	1.837
8.6) DA68 Wooden Pallet, IMX ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	122.39	2,621	0.321	122.39	2,621	0.321
8.7) DA68 Production Engineering	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.261	-	-	0.261
8.8) DA68 Acceptance Testing	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.053	-	-	0.053
Subtotal: 8) DA68, 155mm HE IM Training M1122A1			-	-	0.000	-	-	-	-	-	-	-	-	0.000	-	-	13.062	-	-	13.062
9) DA67, Chg Prop 155mm (MACS) M232A2																				
9.1) DA67 Load, Assemble, Pack (LAP) ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	53.25	28,114	1.497	53.25	28,114	1.497
9.2) DA67, Propellant, M31A2 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	20.31	135,509	2.752	20.31	135,509	2.752
9.3) DA67 Container, M232A1 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	62.15	5,903	0.367	62.15	5,903	0.367
9.4) DA67 Combustable Cases M232A1 ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	44.67	28,957	1.293	44.67	28,957	1.293
9.5) DA67 Ignition Propellant, MACS ^(†)	A		-	-	-	-	-	-	-	-	-	-	-	0.000	11.30	1,828	0.021	11.30	1,828	0.021

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Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Navy															Date: March 2019					
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1							P-1 Line Item Number / Title: 1650 / Artillery Munitions							Aggregated Items Title: Artillery, All Types ⁽¹⁾						
Item Number / Title [DODIC]	ID CD	MDAP/MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)
9.6) DA67 Production Engineering	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.060	-	-	0.060
9.7) DA67 Acceptance Testing	A		-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	0.042	-	-	0.042
Subtotal: 9) DA67, Chg Prop 155mm (MACS) M232A2			-	-	0.000	-	-	-	-	-	-	-	-	0.000	-	-	6.032	-	-	6.032
Total			-	-	0.000	-	-	86.373	-	-	99.986	-	-	0.000	-	-	144.342	-	-	144.342

Note: Subtotals or Totals in this Exhibit P-40a may not be exact or sum exactly, due to rounding.

(†) indicates the presence of a P-5a

Footnotes:

⁽¹⁾ Pricing is provided by the Army Single Manager for Conventional Ammunition (SMCA) and incorporates other service buys.

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy									Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1				P-1 Line Item Number / Title: 1650 / Artillery Munitions					Aggregated Items: Artillery, All Types ⁽¹⁾			
Item Number / Title [DODIC]	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty <i>(Each)</i>	Unit Cost <i>(\$)</i>	Specs Avail Now?	Date Revision Available	RFP Issue Date
1) D528 Projectile, 155mm Smoke White Phosphorus M825												
1.1) D528 Hardware ^(†)	✓	2020	PINE BLUFF ARSENAL / PINE BLUFF, AR	PO	PICATINNY ARSENAL, NJ	Jan 2020	Jul 2022	4,739	1,976.76	N	Jan 2020	
2) D528 M825 WP SMK												
2.1) D528 M825 Projectile Recap		2019	PINE BLUFF ARSENAL / PINE BLUFF, AR	PO	ROCK ISLAND ARSENAL, IL	Oct 2018	Oct 2020	5,589	357.85	Y		
3) D529 155mm HE M795 w/TNT												
3.1) D529 M795 LAP ^(†)		2018	AMERICAN ORDANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	May 2018	May 2020	65,467	148.39	Y		
3.1) D529 M795 LAP ^(†)	✓	2018	AMERICAN ORDANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	May 2018	May 2020	6,202	148.39	Y		
3.2) D529 M795 Metal Parts ^(†)		2018	MEDICO INDUSTRIES / WILKES-BARRE, PA	C / IDDQ	PICATINNY ARSENAL, NJ	Aug 2018	Feb 2020	66,776	380.69	Y		
3.2) D529 M795 Metal Parts ^(†)	✓	2018	MEDICO INDUSTRIES / WILKES-BARRE, PA	C / IDDQ	PICATINNY ARSENAL, NJ	Aug 2018	Feb 2020	6,326	380.69	Y		
3.3) D529 TNT Supplemental Charge		2018	CHEMRING ORDNANCE, INC. / PERRY,FL	C / FFP	ROCK ISLAND ARSENAL, IL	Jan 2018	Jul 2019	66,776	12.36	Y		
3.3) D529 TNT Supplemental Charge	✓	2018	CHEMRING ORDNANCE, INC. / PERRY,FL	C / FFP	ROCK ISLAND ARSENAL, IL	Jan 2018	Jul 2019	6,326	12.36	Y		
3.4) D529 TNT TYPE I FLAKE (TRINITROTOLUENE)		2018	AMERICAN ORDANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	Sep 2018	Sep 2019	1,767,609	4.77	Y		
3.4) D529 TNT TYPE I FLAKE (TRINITROTOLUENE)	✓	2018	AMERICAN ORDANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	Sep 2018	Sep 2019	167,454	4.77	Y		
3.5) D529 Wooden Pallets		2018	KNOX CNTY ASSOC RETARDED CITIZENS / VINCENNES, IN	C / FFP	ROCK ISLAND ARSENAL, IL	Oct 2018	Apr 2020	8,511	95.77	Y		
3.5) D529 Wooden Pallets	✓	2018	KNOX CNTY ASSOC RETARDED CITIZENS / VINCENNES, IN	C / FFP	ROCK ISLAND ARSENAL, IL	Oct 2018	Apr 2020	806	95.77	Y		
4) DA51 155mm HE Training Projectile M1122												
4.1) DA51 Load, Assemble & Pack (LAP) ^(†)		2018	CRANE ARMY AMMUNITION ACTIVITY / CRANE, IN	PO	PICATINNY ARSENAL, NJ	Jan 2018	Aug 2020	79,637	322.85	Y		
4.1) DA51 Load, Assemble & Pack (LAP) ^(†)		2019	CRANE ARMY AMMUNITION ACTIVITY / CRANE, IN	PO	PICATINNY ARSENAL, NJ	Jan 2019	Jan 2021	29,035	323.80	Y		
4.2) DA51 Wooden Pallet		2018	KNOX CNTY ASSOC RETARDED CITIZENS / VINCENNES, IN	C / FFP	ROCK ISLAND ARSENAL, IL	Jun 2018	Jun 2019	10,353	115.85	Y		
4.2) DA51 Wooden Pallet		2019	KNOX CNTY ASSOC RETARDED CITIZENS / VINCENNES, IN	C / FFP	ROCK ISLAND ARSENAL, IL	Jan 2019	Jan 2020	3,775	120.00	Y		
4.3) DA51 Supplemental Charge, PBXN9		2018	CHEMRING ORDNANCE, INC. / PERRY,FL	C / IDIQ	ROCK ISLAND ARSENAL, IL	Jan 2018	Jan 2019	81,230	18.62	Y		

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy										Date: March 2019		
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1				P-1 Line Item Number / Title: 1650 / Artillery Munitions						Aggregated Items: Artillery, All Types ⁽¹⁾		
Item Number / Title [DODIC]	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty (Each)	Unit Cost (\$)	Specs Avail Now?	Date Revision Available	RFP Issue Date
4.3) DA51 Supplemental Charge, PBXN9		2019	TO BE SELECTED / UNKNOWN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Mar 2019	Sep 2020	29,616	18.99	Y		
4.4) DA51 TNT Type I Flake		2018	GOVERNMENT FURNISHED MATERIAL / TBD	C / FFP	ROCK ISLAND ARSENAL, IL	Mar 2018	Mar 2018	238,911	4.77	Y		
4.4) DA51 TNT Type I Flake		2019	TO BE SELECTED / UNKNOWN	C / FFP	ROCK ISLAND ARSENAL, IL	Mar 2019	Sep 2020	87,105	4.87	Y		
4.5) DA51 Plug, Lifting, Meltable for IM		2018	POLYMER TECHNOLOGIES, INC / CLIFTON,NJ	C / FFP	PICATINNY ARSENAL, NJ	Oct 2018	Nov 2019	81,230	7.90	Y		
4.5) DA51 Plug, Lifting, Meltable for IM		2019	RTI TECHNOLOGIES / COLUMBIA, CT.	C / FFP	PICATINNY ARSENAL, NJ	Aug 2019	Feb 2020	29,616	8.06	Y		
5) DA54 155mm HE M795 W/IMX												
5.1) DA54 Load, Assemble, Pack (LAP) ^(†)		2019	AMERICAN ORDNANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	Mar 2019	Mar 2022	43,039	231.11	Y		
5.1) DA54 Load, Assemble, Pack (LAP) ^(†)	✓	2019	AMERICAN ORDNANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	Mar 2019	Mar 2022	24,964	231.11	Y		
5.1) DA54 Load, Assemble, Pack (LAP) ^(†)	✓	2020	AMERICAN ORDNANCE / MIDDLETOWN, IA	C / FFP	ROCK ISLAND ARSENAL, IL	May 2020	May 2023	86,986	235.73	Y		
5.2) DA54 MELTABLE FUZE PLUG		2019	TO BE SELECTED / UNKNOWN	C / FFP	PICATINNY ARSENAL, NJ	Mar 2019	Sep 2020	43,900	8.06	Y		
5.2) DA54 MELTABLE FUZE PLUG	✓	2019	TO BE SELECTED / UNKNOWN	C / FFP	PICATINNY ARSENAL, NJ	Mar 2019	Sep 2020	25,463	8.06	Y		
5.2) DA54 MELTABLE FUZE PLUG	✓	2020	TO BE SELECTED / UNKNOWN	C / FFP	PICATINNY ARSENAL, NJ	Feb 2020	Aug 2021	88,725	10.40	Y		
5.3) DA54 Explosive Fill IMX 104		2019	BAE ORDNANCE SYSTEMS / KINDSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Jun 2019	Dec 2020	43,039	22.34	Y		
5.3) DA54 Explosive Fill IMX 104	✓	2019	BAE ORDNANCE SYSTEMS / KINDSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Jun 2019	Dec 2020	24,964	22.34	Y		
5.3) DA54 Explosive Fill IMX 104	✓	2020	BAE ORDNANCE SYSTEMS / KINDSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2020	Aug 2021	86,986	22.78	Y		
5.4) DA54 Supplementary Charge, PBXN9		2019	TO BE SELECTED / UNKNOWN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2019	Aug 2020	43,900	18.99	Y		
5.4) DA54 Supplementary Charge, PBXN9	✓	2019	TO BE SELECTED / UNKNOWN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2019	Aug 2020	25,463	18.99	Y		
5.4) DA54 Supplementary Charge, PBXN9	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2020	Aug 2021	88,725	19.37	Y		
5.5) DA54 Wooden Pallets		2019	TO BE SELECTED / UNKNOWN	SS / FFP	ROCK ISLAND ARSENAL, IL	Aug 2019	Aug 2020	5,594	120.00	Y		
5.5) DA54 Wooden Pallets	✓	2019	TO BE SELECTED / UNKNOWN	SS / FFP	ROCK ISLAND ARSENAL, IL	Aug 2019	Aug 2020	3,245	120.00	Y		

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy								Date: March 2019				
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1			P-1 Line Item Number / Title: 1650 / Artillery Munitions					Aggregated Items: Artillery, All Types ⁽¹⁾				
Item Number / Title [DODIC]	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty <i>(Each)</i>	Unit Cost (\$)	Specs Avail Now?	Date Revision Available	RFP Issue Date
5.5) DA54 Wooden Pallets	✓	2020	TO BE SELECTED / UNKNOWN	SS / FFP	ROCK ISLAND ARSENAL, IL	Feb 2020	Feb 2021	11,307	122.39	Y		
5.6) DA54 Explosive Fill IMX-101 ^(t)		2019	BAE ORDNANCE SYSTEMS / KINGSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Jun 2019	Oct 2021	1,420,312	14.99	Y		
5.6) DA54 Explosive Fill IMX-101 ^(t)	✓	2019	BAE ORDNANCE SYSTEMS / KINGSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Jun 2019	Oct 2021	823,812	14.99	Y		
5.6) DA54 Explosive Fill IMX-101 ^(t)	✓	2020	BAE ORDNANCE SYSTEMS / KINGSPORT, TN	C / IDDQ	ROCK ISLAND ARSENAL, IL	Feb 2020	Jun 2022	2,870,538	16.48	Y		
5.7) DA54 M795 IM Metal Part		2019	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Aug 2019	Apr 2021	43,900	436.92	Y		
5.7) DA54 M795 IM Metal Part	✓	2019	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Aug 2019	Apr 2021	25,463	436.92	Y		
5.7) DA54 M795 IM Metal Part	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Feb 2020	Aug 2021	88,725	437.85	Y		
6) DA58 155mm Extended Range, M982 Excalibur 1B												
6.1) DA58 Complete Round	✓	2018	Raytheon Missile Systems / Tucson, AZ	C / FFP	PICATINNY ARSENAL, NJ	Jan 2018	Jan 2019	69	65,678.32	Y		
6.2) DA58 Container Excalibur	✓	2018	Raytheon Missile Systems / Tucson, AZ	C / FFP	PICATINNY ARSENAL, NJ	Jan 2018	Aug 2019	69	2,100.00	Y		
8) DA68, 155mm HE IM Training M1122A1												
8.1) DA68 Load, Assemble, Pack (LAP)	✓	2020	TO BE SELECTED / UNKNOWN	C / IDDQ	PICATINNY ARSENAL, NJ	May 2020	Sep 2022	20,162	150.00	Y		
8.2) DA68 Metal Parts - M1122A1	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Feb 2020	Aug 2021	20,565	338.13	Y		
8.3) DA68 Supplemental Charge, PBXN9	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2020	Aug 2021	20,565	19.37	Y		
8.4) DA68 Plug, Lifting, Meltable For IM	✓	2020	TO BE SELECTED / UNKNOWN	C / FFP	PICATINNY ARSENAL, NJ	Feb 2020	Aug 2021	20,565	10.40	Y		
8.5) DA68 Explosive Fill IMX-104	✓	2020	BAE ORDNANCE SYSTEMS / KINGSPORT, TN	C / IDIQ	ROCK ISLAND ARSENAL, IL	Feb 2020	Aug 2022	80,648	22.78	Y		
8.6) DA68 Wooden Pallet, IMX	✓	2020	TO BE SELECTED / UNKNOWN	SS / FFP	ROCK ISLAND ARSENAL, IL	Feb 2020	Aug 2021	2,621	122.39	Y		
9) DA67, Chg Prop 155mm (MACS) M232A2												
9.1) DA67 Load, Assemble, Pack (LAP)	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Mar 2020	Mar 2022	28,114	53.25	Y		
9.2) DA67, Propellant, M31A2	✓	2020	TO BE SELECTED / unknown	C / IDIQ	PICATINNY ARSENAL, NJ	Mar 2020	Nov 2021	135,509	20.31	Y		
9.3) DA67 Container, M232A1	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Mar 2020	Mar 2021	5,903	62.15	Y		

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy									Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1				P-1 Line Item Number / Title: 1650 / Artillery Munitions					Aggregated Items: Artillery, All Types ⁽¹⁾			
Item Number / Title [DODIC]	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty <i>(Each)</i>	Unit Cost <i>(\$)</i>	Specs Avail Now?	Date Revision Available	RFP Issue Date
9.4) DA67 Combustable Cases M232A1	✓	2020	TO BE SELECTED / UNKNOWN	C / IDIQ	PICATINNY ARSENAL, NJ	Mar 2020	Mar 2021	28,957	44.67	Y		
9.5) DA67 Ignition Propellant, MACS	✓	2020	TO BE SELECTED / UNKNOWN	C / FFP	PICATINNY ARSENAL, NJ	Mar 2020	Mar 2021	1,828	11.30	Y		

(†) indicates the presence of a P-21

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Exhibit P-21, Production Schedule: PB 2020 Navy																				Date: March 2019													
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions										Aggregated Items: Artillery, All Types ⁽¹⁾													
Items <small>(Units in Millions, * = < 500)</small>							Fiscal Year 2018										Fiscal Year 2019										BALANCE						
OCO#	MFR#	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2017	BAL DUE AS OF 1 OCT				Calendar Year 2018										Calendar Year 2019													
							OC T	NO V	DE C	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OC T	NO V	DE C	JAN	FEB	MAR	APR	MAY		JUN	JUL	AUG	SEP		
1) D528 Projectile, 155mm Smoke White Phosphorus M825																																	
1.1) D528 Hardware																																	
✓		27	2020	NAVY		.005																											.005
3) D529 155mm HE M795 w/TNT																																	
3.1) D529 M795 LAP																																	
		28	2018	NAVY		.065								A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.065
✓		28	2018	NAVY		.006								A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.006
3.2) D529 M795 Metal Parts																																	
		29	2018	NAVY		.067											A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.067
✓		29	2018	NAVY		.006											A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.006
4) DA51 155mm HE Training Projectile M1122																																	
4.1) DA51 Load, Assemble & Pack (LAP)																																	
		30	2018	NAVY		.080					A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.080
		30	2019	NAVY		.029																A -	-	-	-	-	-	-	-	-	-	-	.029
5) DA54 155mm HE M795 W/IMX																																	
5.1) DA54 Load, Assemble, Pack (LAP)																																	
		31	2019	NAVY		.043																	A -	-	-	-	-	-	-	-	-	-	.043
✓		31	2019	NAVY		.025																	A -	-	-	-	-	-	-	-	-	-	.025
✓		31	2020	NAVY		.087																											.087
5.6) DA54 Explosive Fill IMX-101																																	
		32	2019	NAVY		1.420																			A -	-	-	-	-	-	-	-	1.420
✓		32	2019	NAVY		.824																			A -	-	-	-	-	-	-	-	.824
✓		32	2020	NAVY		2.871																											2.871
							OC T	NO V	DE C	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OC T	NO V	DE C	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			

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Exhibit P-21, Production Schedule: PB 2020 Navy																					Date: March 2019																		
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions											Aggregated Items: Artillery, All Types ⁽¹⁾																		
Items <small>(Units in Millions, * = < 500)</small>							Fiscal Year 2020										Fiscal Year 2021													BALANCE									
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2019	BAL DUE AS OF 1 OCT	Calendar Year 2020																			Calendar Year 2021													
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		SEP								
1) D528 Projectile, 155mm Smoke White Phosphorus M825																																							
1.1) D528 Hardware																																							
✓	27	2020	NAVY		.005	.000				A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.005							
3) D529 155mm HE M795 w/TNT																																							
3.1) D529 M795 LAP																																							
	28	2018	NAVY		.065	.000	.065	-	-	-	-	-	-	-	.014	.016	.016	.012	.008													.000							
✓	28	2018	NAVY		.006	.000	.006	-	-	-	-	-	-	-	.006																	.000							
3.2) D529 M795 Metal Parts																																							
	29	2018	NAVY		.067	.000	.067	-	-	-	-	.018	.018	.014	.017																	.000							
✓	29	2018	NAVY		.006	.000	.006	-	-	-	-	.003	.002	.002																		.000							
4) DA51 155mm HE Training Projectile M1122																																							
4.1) DA51 Load, Assemble & Pack (LAP)																																							
	30	2018	NAVY		.080	.000	.080	-	-	-	-	-	-	-	-	-	.013	.013	.013	.013	.013	.010	.005									.000							
	30	2019	NAVY		.029	.000	.029	-	-	-	-	-	-	-	-	-	-	-	-	-	.003	.008	.010	.008								.000							
5) DA54 155mm HE M795 W/IMX																																							
5.1) DA54 Load, Assemble, Pack (LAP)																																							
	31	2019	NAVY		.043	.000	.043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.043							
✓	31	2019	NAVY		.025	.000	.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.025							
✓	31	2020	NAVY		.087	.000	.087								A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.087							
5.6) DA54 Explosive Fill IMX-101																																							
	32	2019	NAVY		1.420	.000	1.420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.420							
✓	32	2019	NAVY		.824	.000	.824	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.824							
✓	32	2020	NAVY		2.871	.000	2.871					A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.871							
								OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP								

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Exhibit P-21, Production Schedule: PB 2020 Navy																				Date: March 2019													
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions										Aggregated Items: Artillery, All Types ⁽¹⁾													
Items <small>(Units in Millions, * = < 500)</small>							Fiscal Year 2022										Fiscal Year 2023										BALANCE						
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2021	BAL DUE AS OF 1 OCT	Calendar Year 2022																Calendar Year 2023										
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY		JUN	JUL	AUG	SEP		
1) D528 Projectile, 155mm Smoke White Phosphorus M825																																	
1.1) D528 Hardware																																	
✓	27	2020	NAVY		.005	.000	.005	-	-	-	-	-	-	-	-	-	.005																.000
3) D529 155mm HE M795 w/TNT																																	
3.1) D529 M795 LAP																																	
	28	2018	NAVY		.065	.065	.000																										.000
✓	28	2018	NAVY		.006	.006	.000																										.000
3.2) D529 M795 Metal Parts																																	
	29	2018	NAVY		.067	.067	.000																										.000
✓	29	2018	NAVY		.006	.006	.000																										.000
4) DA51 155mm HE Training Projectile M1122																																	
4.1) DA51 Load, Assemble & Pack (LAP)																																	
	30	2018	NAVY		.080	.080	.000																										.000
	30	2019	NAVY		.029	.029	.000																										.000
5) DA54 155mm HE M795 W/IMX																																	
5.1) DA54 Load, Assemble, Pack (LAP)																																	
	31	2019	NAVY		.043	.000	.043	-	-	-	-	-	.005	.005	.005	.005	.005	.005	.010	.003													.000
✓	31	2019	NAVY		.025	.000	.025	-	-	-	-	-	.005	.005	.005	.005	.005																.000
✓	31	2020	NAVY		.087	.000	.087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.010	.010	.010	.013	.013	.031
5.6) DA54 Explosive Fill IMX-101																																	
	32	2019	NAVY		1.420	.000	1.420	.250	.250	.250	.250	.250	.170																				.000
✓	32	2019	NAVY		.824	.000	.824	.250	.250	.324																							.000
✓	32	2020	NAVY		2.871	.000	2.871	-	-	-	-	-	-	.250	.250	.250	.250	.250	.250	.500	.500	.371											.000
								OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		

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Exhibit P-21, Production Schedule: PB 2020 Navy																							Date: March 2019														
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions													Aggregated Items: Artillery, All Types ⁽¹⁾														
Items <small>(Units in Millions, * = < 500)</small>							Fiscal Year 2024											Fiscal Year 2025													BALANCE						
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2023	BAL DUE AS OF 1 OCT	Calendar Year 2024																	Calendar Year 2025													
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP							
1) D528 Projectile, 155mm Smoke White Phosphorus M825																																					
1.1) D528 Hardware																																					
✓	27	2020	NAVY		.005	.005	.000																		.000												
3) D529 155mm HE M795 w/TNT																																					
3.1) D529 M795 LAP																																					
	28	2018	NAVY		.065	.065	.000																		.000												
✓	28	2018	NAVY		.006	.006	.000																		.000												
3.2) D529 M795 Metal Parts																																					
	29	2018	NAVY		.067	.067	.000																		.000												
✓	29	2018	NAVY		.006	.006	.000																		.000												
4) DA51 155mm HE Training Projectile M1122																																					
4.1) DA51 Load, Assemble & Pack (LAP)																																					
	30	2018	NAVY		.080	.080	.000																		.000												
	30	2019	NAVY		.029	.029	.000																		.000												
5) DA54 155mm HE M795 W/IMX																																					
5.1) DA54 Load, Assemble, Pack (LAP)																																					
	31	2019	NAVY		.043	.043	.000																		.000												
✓	31	2019	NAVY		.025	.025	.000																		.000												
✓	31	2020	NAVY		.087	.056	.031	.013	.013	.005													.000														
5.6) DA54 Explosive Fill IMX-101																																					
	32	2019	NAVY		1.420	1.420	.000																		.000												
✓	32	2019	NAVY		.824	.824	.000																		.000												
✓	32	2020	NAVY		2.871	2.871	.000	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP						

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Exhibit P-21, Production Schedule: PB 2020 Navy									Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1					P-1 Line Item Number / Title: 1650 / Artillery Munitions				Aggregated Items: Artillery, All Types ⁽¹⁾			
MFR Ref #	Manufacturer Name - Location	Production Rates (Each / Year)			Procurement Leadtime (Months)							
		MSR For 2020	1-8-5 For 2020	MAX For 2020	Initial				Reorder			
					ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1	ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1
1	PINE BLUFF ARSENAL - PINE BLUFF, AR	9,000	12,000	15,000	6	4	30	34	6	4	30	34
2	AMERICAN ORDANCE - MIDDLETOWN, IA	8,100	16,000	20,000	11	11	24	35	6	6	24	30
3	MEDICO INDUSTRIES - WILKES-BARRE, PA	10,000	35,000	40,000	11	11	12	23	6	6	12	18
4	CRANE ARMY AMMUNITION ACTIVITY - CRANE, IN	5,000	13,000	30,000	6	6	24	30	6	6	24	30
5	AMERICAN ORDNANCE - MIDDLETOWN, IA	81,000	130,000	200,000	8	8	36	44	8	8	36	44
6	BAE ORDNANCE SYSTEMS - KINGSPORT, TN			TBD	0	0	0	0	0	0	0	0

"A" in the Delivery Schedule indicates the Contract Award Date.

Note: Due to space limitations, quantities in the Exhibit P-21 delivery calendar are truncated and rounded based on the maximum quantity in the calendar as follows. If the maximum quantity is less than or equal to than 9,999, all quantities are shown as each. If the maximum quantity is between 10,000 and 999,999 all quantities are shown in thousands. If the maximum quantity is between 1,000,000 and 999,999,999 all quantities are shown in millions (rounded to the nearest thousand). If the maximum quantity is equal or greater than 1,000,000,000 all quantities are shown in billions (rounded to the nearest million).

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Exhibit P-5, Cost Analysis: PB 2020 Navy												Date: March 2019						
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1						P-1 Line Item Number / Title: 1650 / Artillery Munitions						Item Number / Title [DODIC]: 1 / Fuze, All Types						
ID Code (A=Service Ready, B=Not Service Ready) :										MDAP/MAIS Code:								
Resource Summary				Prior Years		FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total				
Procurement Quantity (Units in Each)				-		-		-		-		-		-				
Gross/Weapon System Cost (\$ in Millions)				0.000		19.368		13.595		0.000		76.581		76.581				
Less PY Advance Procurement (\$ in Millions)				-		-		-		-		-		-				
Net Procurement (P-1) (\$ in Millions)				0.000		19.368		13.595		0.000		76.581		76.581				
Plus CY Advance Procurement (\$ in Millions)				-		-		-		-		-		-				
Total Obligation Authority (\$ in Millions)				0.000		19.368		13.595		0.000		76.581		76.581				
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)																		
Initial Spares (\$ in Millions)				-		-		-		-		-		-				
Gross/Weapon System Unit Cost (\$ in Dollars)				-		-		-		-		-		-				
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)
Hardware - N340 Fuze Point Detonating M739A1 Cost																		
Recurring Cost																		
1.1.1) N340 Complete Fuze ^(†)	-	-	0.000	71.93	4,576	0.329	-	-	0.000	-	-	0.000	74.84	198,567	14.861	74.84	198,567	14.861
1.1.2) N340 Productiong Engineering	-	-	0.000	-	-	0.162	-	-	0.000	-	-	0.000	-	-	0.999	-	-	0.999
1.1.3) N340 Acceptance Testing	-	-	0.000	-	-	0.011	-	-	0.000	-	-	0.000	-	-	0.800	-	-	0.800
Subtotal: Recurring Cost	-	-	0.000	-	-	0.502	-	-	0.000	-	-	0.000	-	-	16.660	-	-	16.660
Subtotal: Hardware - N340 Fuze Point Detonating M739A1 Cost	-	-	0.000	-	-	0.502	-	-	0.000	-	-	0.000	-	-	16.660	-	-	16.660
Hardware - NA29 Precisiong Guided Kit (NPGK) Cost																		
Recurring Cost																		
2.1.1) NA29 Complete Fuze ^(†)	-	-	0.000	6,821.92	2,418	16.496	6,934.14	1,593	11.046	-	-	0.000	7,286.95	7,631	55.607	7,286.95	7,631	55.607
2.1.2) NA29 Production Engineering	-	-	0.000	-	-	1.010	-	-	1.247	-	-	0.000	-	-	1.287	-	-	1.287
2.1.3) NA29 PGK NET SUPPORT	-	-	0.000	-	-	0.500	-	-	0.205	-	-	0.000	-	-	1.698	-	-	1.698
Subtotal: Recurring Cost	-	-	0.000	-	-	18.006	-	-	12.498	-	-	0.000	-	-	58.592	-	-	58.592
Non Recurring Cost																		

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Exhibit P-5, Cost Analysis: PB 2020 Navy															Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1							P-1 Line Item Number / Title: 1650 / Artillery Munitions							Item Number / Title [DODIC]: 1 / Fuze, All Types				
ID Code (A=Service Ready, B=Not Service Ready) :										MDAP/MAIS Code:								
Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.																		
Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)	Unit Cost (\$)	Qty (Each)	Total Cost (\$ M)
2.2.1) NA29 DOTC GPS Obsolesc.	-	-	0.000	-	-	0.186	-	-	0.671	-	-	0.000	-	-	1.329	-	-	1.329
2.2.2) NA29 Melody II Qual	-	-	0.000	-	-	0.235	-	-	0.132	-	-	0.000	-	-	0.000	-	-	0.000
2.2.3) NA29 CINCO Buy	-	-	0.000	-	-	0.101	-	-	0.060	-	-	0.000	-	-	0.000	-	-	0.000
2.2.4) NA29 MELODY ASIC II Chip	-	-	0.000	-	-	0.338	-	-	0.234	-	-	0.000	-	-	0.000	-	-	0.000
<i>Subtotal: Non Recurring Cost</i>	-	-	<i>0.000</i>	-	-	<i>0.860</i>	-	-	<i>1.097</i>	-	-	<i>0.000</i>	-	-	<i>1.329</i>	-	-	<i>1.329</i>
<i>Subtotal: Hardware - NA29 Precision Guided Kit (NPGK) Cost</i>	-	-	<i>0.000</i>	-	-	<i>18.866</i>	-	-	<i>13.595</i>	-	-	<i>0.000</i>	-	-	<i>59.921</i>	-	-	<i>59.921</i>
Gross/Weapon System Cost	-	-	0.000	-	-	19.368	-	-	13.595	-	-	0.000	-	-	76.581	-	-	76.581
Remarks: Pricing is provided by the Army Single Manager for Conventional Ammunition (SMCA) and incorporates other service buys. (t) indicates the presence of a P-5a																		

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Exhibit P-5a, Procurement History and Planning: PB 2020 Navy									Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1				P-1 Line Item Number / Title: 1650 / Artillery Munitions					Item Number / Title [DODIC]: 1 / Fuze, All Types			
Cost Elements	O C O	FY	Contractor and Location	Method/Type or Funding Vehicle	Location of PCO	Award Date	Date of First Delivery	Qty (Each)	Unit Cost (\$)	Specs Avail Now?	Date Revision Available	RFP Issue Date
1.1.1) N340 Complete Fuze ^(†)		2018	ACTION MANUFACTURING INC / Bristol, PA	C / IDIQ	PICATINNY ARSENAL, NJ	Nov 2018	Nov 2021	4,576	71.93	Y		
1.1.1) N340 Complete Fuze ^(†)	✓	2020	ACTION MANUFACTURING INC / Bristol, PA	C / IDIQ	PICATINNY ARSENAL, NJ	Aug 2020	Aug 2023	198,567	74.84	Y		
2.1.1) NA29 Complete Fuze ^(†)		2018	NORTHROP GRUMMAN INNOVATION SYSTEMS / PLYMOUTH, MN	SS / FFP	PICATINNY ARSENAL, NJ	Mar 2018	Mar 2020	2,304	6,821.92	Y		
2.1.1) NA29 Complete Fuze ^(†)	✓	2018	NORTHROP GRUMMAN INNOVATION SYSTEMS / PLYMOUTH, MN	SS / FFP	PICATINNY ARSENAL, NJ	Mar 2018	Mar 2020	114	6,821.92	Y		
2.1.1) NA29 Complete Fuze ^(†)		2019	NORTHROP GRUMMAN INNOVATION SYSTEMS / PLYMOUTH, MN	SS / FFP	PICATINNY ARSENAL, NJ	Mar 2019	Mar 2021	1,593	6,934.14	Y		
2.1.1) NA29 Complete Fuze ^(†)	✓	2020	NORTHROP GRUMMAN INNOVATION SYSTEMS / PLYMOUTH, MN	SS / FFP	PICATINNY ARSENAL, NJ	Mar 2020	Mar 2022	7,631	7,286.95	Y		
^(†) indicates the presence of a P-21												

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Exhibit P-21, Production Schedule: PB 2020 Navy																				Date: March 2019																
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions										Item Number / Title [DODIC]: 1 / Fuze, All Types																
Cost Elements <i>(Units in Thousands)</i>							Fiscal Year 2018										Fiscal Year 2019														B A L A N C E					
O C C O	M F R #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2017	BAL DUE AS OF 1 OCT	Calendar Year 2018										Calendar Year 2019																			
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P						
1.1.1) N340 Complete Fuze																																				
	1	2018	NAVY	4.576	.000	4.576															A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.576
✓	1	2020	NAVY	198.567	.000	198.567																										198.567				
2.1.1) NA29 Complete Fuze																																				
	2	2018	NAVY	2.304	.000	2.304						A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.304					
✓	2	2018	NAVY	.114	.000	.114						A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.114						
	2	2019	NAVY	1.593	.000	1.593																		A -	-	-	-	-	-	-	-	-	-	-	1.593	
✓	2	2020	NAVY	7.631	.000	7.631																										7.631				
							O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P						

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Exhibit P-21, Production Schedule: PB 2020 Navy																							Date: March 2019										
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions													Item Number / Title [DODIC]: 1 / Fuze, All Types										
Cost Elements <i>(Units in Thousands)</i>							Fiscal Year 2020												Fiscal Year 2021												BALANCE		
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2019	BAL DUE AS OF 1 OCT	Calendar Year 2020												Calendar Year 2021														
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			
1.1.1) N340 Complete Fuze																																	
	1	2018	NAVY	4.576	.000	4.576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.576			
✓	1	2020	NAVY	198.567	.000	198.567											A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	198.567
2.1.1) NA29 Complete Fuze																																	
	2	2018	NAVY	2.304	.000	2.304	-	-	-	-	-	.152	.152	.152	.190	.190	.190	.190	.210	.210	.210	.225	.233									.000	
✓	2	2018	NAVY	.114	.000	.114	-	-	-	-	-	.038	.038	.038											.126	.126	.126	.126	.126	.126	.139	.698	
	2	2019	NAVY	1.593	.000	1.593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.126	.126	.126	.126	.126	.126	.139	.698		
✓	2	2020	NAVY	7.631	.000	7.631						A -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.631			
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			

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Exhibit P-21, Production Schedule: PB 2020 Navy																							Date: March 2019											
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions													Item Number / Title [DODIC]: 1 / Fuze, All Types											
Cost Elements <i>(Units in Thousands)</i>							Fiscal Year 2022												Fiscal Year 2023													BALANCE		
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2021	BAL DUE AS OF 1 OCT	Calendar Year 2022												Calendar Year 2023															
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP				
1.1.1) N340 Complete Fuze																																		
	1	2018	NAVY	4.576	.000	4.576	-	4.576																										.000
✓	1	2020	NAVY	198.567	.000	198.567	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.000	35.000	128.567		
2.1.1) NA29 Complete Fuze																																		
	2	2018	NAVY	2.304	2.304	.000																											.000	
✓	2	2018	NAVY	.114	.114	.000																											.000	
	2	2019	NAVY	1.593	.895	.698	.139	.139	.139	.139	.142																						.000	
✓	2	2020	NAVY	7.631	.000	7.631	-	-	-	-	-	.672	.662	.662	.662	.662	.662	.662	.662	.662	.662	.662	.339											.000
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP				

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Exhibit P-21, Production Schedule: PB 2020 Navy																				Date: March 2019												
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1										P-1 Line Item Number / Title: 1650 / Artillery Munitions										Item Number / Title [DODIC]: 1 / Fuze, All Types												
Cost Elements <i>(Units in Thousands)</i>							Fiscal Year 2024										Fiscal Year 2025													BALANCE		
OCO	MFR #	FY	SERVICE	PROC QTY	ACCEPT PRIOR TO 1 OCT 2023	BAL DUE AS OF 1 OCT	Calendar Year 2024										Calendar Year 2025															
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		SEP	
1.1.1) N340 Complete Fuze																																
	1	2018	NAVY		4.576	4.576	.000																									.000
✓	1	2020	NAVY		198.567	70.000	128.567	35.000	35.000	32.900	25.667																					.000
2.1.1) NA29 Complete Fuze																																
	2	2018	NAVY		2.304	2.304	.000																									.000
✓	2	2018	NAVY		.114	.114	.000																									.000
	2	2019	NAVY		1.593	1.593	.000																									.000
✓	2	2020	NAVY		7.631	7.631	.000	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	

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Exhibit P-21, Production Schedule: PB 2020 Navy								Date: March 2019			
Appropriation / Budget Activity / Budget Sub Activity: 1508N / 02 / 1					P-1 Line Item Number / Title: 1650 / Artillery Munitions				Item Number / Title [DODIC]: 1 / Fuze, All Types		

MFR Ref #	Manufacturer Name - Location	Production Rates (Each / Year)			Procurement Leadtime (Months)							
		MSR For 2020	1-8-5 For 2020	MAX For 2020	Initial				Reorder			
					ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1	ALT Prior to Oct 1	ALT After Oct 1	Manufacturing PLT	Total After Oct 1
1	ACTION MANUFACTURING INC - Bristol, PA	20,000	35,000	500,000	10	10	36	46	10	10	36	46
2	NORTHROP GRUMMAN INNOVATION SYSTEMS - PLYMOUTH, MN	3,330	11,000	22,000	13	9	27	36	3	6	24	30

"A" in the Delivery Schedule indicates the Contract Award Date.

Note: Due to space limitations, quantities in the Exhibit P-21 delivery calendar are truncated and rounded based on the maximum quantity in the calendar as follows. If the maximum quantity is less than or equal to than 9,999, all quantities are shown as each. If the maximum quantity is between 10,000 and 999,999 all quantities are shown in thousands. If the maximum quantity is between 1,000,000 and 999,999,999 all quantities are shown in millions (rounded to the nearest thousand).If the maximum quantity is equal or greater than 1,000,000,000 all quantities are shown in billions (rounded to the nearest million).