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### Combat Losses of Nuclear-Powered Warships: Contamination, Collateral Damage and the Law

*Akira Mayama*

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# Combat Losses of Nuclear-Powered Warships: Contamination, Collateral Damage and the Law

*Akira Mayama\**

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## I. INTRODUCTION

Since the 1955 commissioning of the *USS Nautilus*, the first nuclear-powered warship, many such warships, mainly submarines, have been used in armed conflicts. The first strike by a nuclear-powered warship occurred during the Falkland/Malvinas Islands War of 1982, when the British attack submarine *HMS Conqueror* sank the Argentine cruiser *ARA General Belgrano* in the South Atlantic Ocean.<sup>1</sup> No nuclear-powered warships have been sunk or damaged by an opposing belligerent in armed conflicts, however, more than a few accidents have occurred during combat missions, such as munitions explosions on the flight deck of the *USS Enterprise*, the first nuclear-powered aircraft carrier, during operations off the coast of Vietnam in 1969.<sup>2</sup>

There have been non-combat losses of nuclear-powered warships during sea trials and peacetime patrol missions: the U.S. Navy lost two nuclear submarines, the *USS Thresher* and *USS Scorpion*, in 1963 and 1968, respectively, in the Atlantic Ocean.<sup>3</sup> Several nuclear submarines of the Soviet Union/Russian Federation have been lost in the Atlantic, Arctic and Pacific Oceans, including the *K-8* in Biscay Bay in 1970 and the *K-278 (Komosomolets)* in the Norwegian Sea in 1989.<sup>4</sup> The best-known recent tragedy was the sinking of the *K-141 (Kursk)* in the Barents Sea in 2000.<sup>5</sup> In addition to these ac-

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1. 2 LAWRENCE FREEDMAN, THE OFFICIAL HISTORY OF THE FALKLANDS CAMPAIGN: WAR AND DIPLOMACY 296–98 (2007).

2. NORMAN POLMAR ET AL., CHRONOLOGY OF THE COLD WAR AT SEA 1945–1991, at 131 (1998). Nuclear weapon accidents (referred to as Broken Arrow cases), such as the 1966 Palomares incident in Spain, are not analyzed in this article. Broken Arrow cases involving warships of a belligerent State include one in which an A-4 attack aircraft armed with a nuclear bomb onboard the *USS Ticonderoga* fell off an elevator into deep water eighty miles from a Japanese island while the ship was returning from a combat mission in Vietnamese waters to the Yokosuka Naval Base in Japan in 1965. U.S. DEPARTMENT OF DEFENSE, NARRATIVE SUMMARIES OF ACCIDENTS INVOLVING U.S. NUCLEAR WEAPONS 1950–1980 (1981), <https://nsarchive.files.wordpress.com/2010/04/635.pdf>; David Sanger, *U.S. Confirms It Lost an H-Bomb off Japan in '65*, NEW YORK TIMES (May 9, 1989), [www.nytimes.com/1989/05/09/world/us-confirms-it-lost-an-h-bomb-off-japan-in-65.html](http://www.nytimes.com/1989/05/09/world/us-confirms-it-lost-an-h-bomb-off-japan-in-65.html).

3. POLMAR ET AL., *supra* note 2, at 78, 127. The loss of the *USS Thresher* was the world's first loss of a nuclear-powered vessel.

4. INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA-TECDOC-1242, INVENTORY OF ACCIDENTS AND LOSSES AT SEA INVOLVING RADIOACTIVE MATERIAL 24–25 (2001).

5. *Id.* at 19.

cidents, the Russian Navy has abandoned decommissioned nuclear submarines and their reactors in and around its territorial sea. It has been reported that nuclear contamination is spreading from some of these sinking sites.<sup>6</sup>

It is also conceivable that combat losses of nuclear-powered warships could cause contamination of civilians, civilian objects and the natural environment. If such combat losses occur at sea, both belligerent and neutral States will have to deal with a difficult question: to what extent and by who can harm resulting from such contamination be compensated for by payment of damages.

This article examines legal issues stemming from prospective combat losses of nuclear-powered warships from the perspective of the laws of armed conflict and neutrality at sea. More specifically, it attempts to dissect whether nuclear contamination incidentally caused to civilians, civilian objects and the natural environment during international armed conflict can be properly categorized as collateral damage as envisaged by the laws of armed conflict and neutrality at sea, the lawfulness of which is assessed according to the principle of proportionality.<sup>7</sup>

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6. See U.S. GENERAL ACCOUNTING OFFICE, GAO/RCED-96-4, NUCLEAR SAFETY: CONCERNS WITH NUCLEAR FACILITIES AND OTHER SOURCES OF RADIATION IN THE FORMER SOVIET UNION 10–12 (1995); Alexey V. Yablokov, *Radioactive Waste Disposal in Seas Adjacent to the Territory of the Russian Federation*, 43 MARINE POLLUTION BULLETIN 8 (2001). Neither France nor the UK has suffered the loss of a nuclear-powered warship, although submarines of both countries have been involved in collisions with other submarines. John F. Burns, *French and British Submarines Collide*, NEW YORK TIMES (Feb. 16, 2009), <http://www.nytimes.com/2009/02/17/world/europe/17submarine.html>. No detailed reliable information has been revealed regarding serious incidents or losses during sea trials or operations of Chinese nuclear submarines, such as the 1985 incident involving a Type 092 boat (Xia Class SSBN).

7. This article focuses exclusively on losses that occur during international armed conflicts, not those that may occur during non-international armed conflicts. It has been thought that the law of neutrality is only applicable to inter-State armed conflicts, especially de jure wars. In cases of non-international armed conflicts such as civil wars, the law of neutrality is inapplicable unless the legitimate government or foreign countries explicitly or implicitly recognize an insurgent as a belligerent. However, classification of armed conflict is not always easy. If a cross-Taiwan Strait armed conflict breaks out, both the Chinese and U.S. navies will deploy their nuclear-powered warships. The armed conflict between these two States will no doubt be an international one. However, until the Taiwanese government explicitly abandons its One-China Policy, it seems theoretically difficult for Taiwan to say that its conflict with China is international. One idea for internationalizing this conflict is to invoke Article 1(4) of Additional Protocol I to the Geneva Conventions, *infra* note 13, to which China is a party, by arguing that the people of Taiwan have the right of self-determination. However, to apply Article 1(4), the Taiwanese people must be under

Undoubtedly, it is also necessary to analyze nuclear contamination caused by belligerent actions from the perspective of international environmental law. However, before stepping into the arena of international environmental law and considering such legal interrelationships in times of armed conflict,<sup>8</sup> it is first appropriate to consider to what extent the law of armed conflict and the law of neutrality at sea can provide explicit rules, namely, effective criteria to assess the lawfulness or unlawfulness of nuclear contamination during armed conflict.<sup>9</sup>

## II. COLLATERAL DAMAGE AND THE SIGNIFICANCE OF DETERMINING ITS SCOPE<sup>10</sup>

### *A. Collateral Damage Based on the Principle of Proportionality*

The most basic principle of the law of armed conflict is that of target distinction. Under this principle, attacks, whether occurring in offensive or in defensive operations, must be directed only against lawful targets, namely combatants and military objectives of an opposing belligerent State. Enemy civilians and civilian objects are immune from attack. However, the law of armed conflict does not prohibit attacks that may cause collateral damage to civilians and civilian objects, although attacks which may be expected to cause excessive collateral damage in relation to the military advantage anticipated are deemed unlawful.

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actual colonial domination or foreign occupation. Taiwan has not been under Chinese control in this regard since 1949.

8. See generally PROTECTION OF THE ENVIRONMENT DURING ARMED CONFLICT (Richard J. Grunawalt, John E. King & Ronald S. McClain eds., 1996) (Vol. 69, U.S. Naval War College International Law Studies); SONJA ANN JOZEF BOELAERT-SUOMINEN, INTERNATIONAL ENVIRONMENTAL LAW AND NAVAL WAR: THE EFFECT OF MARINE SAFETY AND POLLUTION CONVENTIONS DURING INTERNATIONAL ARMED CONFLICT (2000) (U.S. Naval War College Newport Paper No. 15). For the latest report submitted to the International Law Commission (67th Session) on this issue, see Marie G. Jacobsson, (Special Rapporteur), *Second Report on the Protection of the Environment in Relation to Armed Conflicts*, U.N. Doc. A/CN.4/685 (May 28, 2015).

9. This article does not discuss other legal issues such as sovereign immunity, civil liability and underwater cultural property. For a detailed analysis of these issues, see Natalino Ronzitti (Rapporteur), *The Legal Regime of Wrecks of Warships and Other State-Owned Ships in International Law*, 74 YEARBOOK OF THE INSTITUTE OF INTERNATIONAL LAW 134 (2012).

10. Collateral damage, as used in this article, encompasses the incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof.

This collateral damage rule is based on the proportionality principle, which “makes large concessions in favor of military necessity.”<sup>11</sup> Still, it is difficult to give a clear answer to the question of how to calculate the balance between the anticipated military advantage and collateral damage.<sup>12</sup> The 1977 Additional Protocol I to the Geneva Conventions of 1949 (API) codified this rule in Articles 51(5)(b) and 57(2)(a)(iii).<sup>13</sup> Although as treaty provisions, these Articles are only applicable to attacks affecting civilians and civilian objects on land due to the geographical limit imposed by Article 49(3), the proportionality principle contained therein is regarded as a fundamental part of the customary law of armed conflict.<sup>14</sup>

It should be noted that the collateral damage rule is the only law of armed conflict provision that allows damage to civilians not taking direct part in hostilities and civilian objects,<sup>15</sup> except for those regulating belligerent reprisals. If damage to civilians and civilian objects is considered collateral damage as envisaged by API or the customary law of armed conflict,

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11. 3 INTERNATIONAL COMMITTEE OF THE RED CROSS, CONFERENCE OF GOVERNMENT EXPERTS ON THE REAFFIRMATION AND DEVELOPMENT OF INTERNATIONAL HUMANITARIAN LAW APPLICABLE IN ARMED CONFLICTS: PROTECTION OF THE CIVILIAN POPULATION AGAINST DANGERS OF HOSTILITIES 85 (1971).

12. MICHAEL BOTHE, KARL JOSEF PARTSCH & WALDEMAR A. SOLF, NEW RULES FOR VICTIMS OF ARMED CONFLICTS: COMMENTARY ON THE TWO 1977 PROTOCOLS ADDITIONAL TO THE GENEVA CONVENTIONS OF 1949, at 361 (1982).

13. Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts arts. 51(5)(b), 57(2)(a)(iii), June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I].

14. The International Committee of the Red Cross study on customary international humanitarian law deems the proportionality principle valid irrespective of the theater of operations. See Rule 14 in 1 CUSTOMARY INTERNATIONAL HUMANITARIAN LAW 46–50 (Jean-Marie Henckaerts & Louise Doswald-Beck eds., 2005) [hereinafter CIHL]. It should be noted, however, that some countries declared at the time of signature or ratification that the rules established by API are not intended to have any effect on and do not regulate the use of nuclear weapons. DOCUMENTS ON THE LAWS OF WAR 502, 506, 510, 512 (Adam Roberts & Richard Guelff eds., 3d ed. 2000). If these declarations or reservations are valid, the API rules would not be applicable to damage inflicted by radiation resulting from the use of nuclear weapons. They would, however, be applicable to nuclear contamination as discussed in this article.

15. Civilians and other protected persons may be directly attacked only if they are taking a direct part in hostilities. Although they retain their civilian or protected status, it is considered that they themselves forfeit their immunity from attack during their direct participation in hostilities. On the other hand, objects such as houses, schools or places of worship that are usually used for civilian purposes may be attacked if they are used for military purposes. Unlike civilians taking direct part in hostilities, these objects no longer maintain their civilian character, and are subject to attack as military objectives.

and if not excessive to the anticipated military advantage, neither an injured belligerent State nor its civilian victims can claim compensation. However, if the damage is excessive, victim States are not prohibited from making claims for such damage. Therefore, it is crucial to determine whether specific harm to civilians, civilian objects or the natural environment is characterized as collateral damage.

*B. Legal Issues Stemming from the Combat Loss of Nuclear-Powered Warships*

There are interesting legal issues relating to incidental damage caused by nuclear contamination from the combat loss of a nuclear-powered warship of a belligerent State. First, while the customary rules related to collateral damage at sea are basically the same as those related to land warfare, given the difference in the legal character of the operational theaters between land and naval warfare, it is necessary to consider the difference of the various maritime areas in which collateral damage may occur. In this regard, the legal status of the exclusive economic zone (EEZ)<sup>16</sup> during armed conflict, especially the EEZ of a neutral coastal State, is particularly relevant.

It could be said that any belligerent operation causing incidental damage to persons and objects on neutral territory, including territorial seas (for instance, damage incidentally caused by attacks on petroleum, oil and lubrication depots in neighboring belligerent land territory), is treated as unlawful whether or not such damage is excessive simply because of the inviolability of the territory of neutral States. On the other hand, because hostilities on the high seas are not unlawful per se, incidental damage to a neutral State national's drift fishing net by the explosion of a belligerent's anti-submarine torpedoes might be argued to be collateral damage, with its lawfulness judged by the proportionality principle.

The lawfulness of causing collateral damage in a neutral EEZ would perhaps depend on the question of whether or not the EEZ's nature is more similar to that of territorial seas than to that of the high seas from the perspective of the laws of armed conflict and neutrality at sea.

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16. The exclusive economic zone is an area beyond and adjacent to a State's territorial sea and extends to a maximum width of 200-nautical miles from the baselines from which the breadth of the territorial sea is measured. Within this zone, the coastal State has sovereignty over the natural resources and jurisdiction over certain specified activities. United Nations Convention on the Law of the Sea arts. 55–57, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter LOSC].

Second, the legal character of nuclear contamination caused by belligerent actions must be discussed. There is no doubt that physical damage such as acute radiation syndrome suffered by enemy civilians as a result of the explosion of a nuclear bomb directed against enemy military objectives should be treated as collateral damage, the lawfulness of which is assessed in accordance with the proportionality principle.<sup>17</sup> However, it is not clear whether or to what extent non-physical damage, such as low-level nuclear contamination, can be regarded as collateral damage within the scope of the laws of armed conflict and neutrality.

Third, it appears that the rule on collateral damage presupposes incidental damage caused by the attacker's means of warfare such as shells, bombs, missiles or torpedoes. Is similar treatment appropriate for damage caused by dangerous forces contained in destroyed military objectives, such as nuclear pollution emanating from a nuclear-powered warship damaged by conventional weapons? In fact, API restricts destruction of certain kinds of works and installations containing dangerous forces on the ground, such as nuclear electrical generating stations, even if they fall within the scope of military objectives. Of course, this particular provision of API is not applicable as a treaty rule to naval warfare. The issue, as discussed in this article, is whether such damage is to be considered as collateral damage under the law of armed conflict.

### III. COLLATERAL DAMAGE RULE AND THEATERS OF NAVAL WARFARE

#### A. *Neutral Land Territory and Territorial Seas*

The most basic principle of the law of armed conflict, the principle of distinction, is applicable to armed conflict at sea. The same can be said of the collateral damage rule based on the principle of proportionality, a corollary of this basic principle. The 1994 *San Remo Manual* confirms this, although it

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17. Radiation syndrome suffered by combatants of a belligerent State cannot be discussed within the scope of collateral damage. The lawfulness or unlawfulness of such suffering is assessed in accordance with another basic principle applicable only to combatants (and others who may be lawfully attacked, for example, those who directly participate in hostilities): the prohibition of means and methods of warfare causing superfluous injury or unnecessary suffering. However, as noted above, some countries made declarations or reservations on signing or ratifying API on the applicability of the newly established treaty rules to the use of nuclear weapons. *See supra* note 14.

uses slightly different wording from the relevant API articles.<sup>18</sup> However, there are considerable differences between land and naval warfare<sup>19</sup> as to where belligerent States may lawfully engage in hostilities against the opposing belligerent. In general, the theater of operations in land warfare is limited to belligerent territory, including internal waters. Incidental damage to civilians and civilian objects of a belligerent territorial State, as well as those of neutrals present in the belligerent State's territory, can be legally evaluated according to the collateral damage rule. Thus, if the damage is not excessive, attacks causing such damage will be considered as lawful.

By contrast, attacks against military objectives located in belligerent territory leading to incidental damage in neighboring neutral States, whether excessive or not, are unlawful. A typical example, as noted previously, is the damage caused to civilian populations in neutral territory as a result of the bombing of petroleum facilities located in a neighboring belligerent State. This is because the law of neutrality dictates that any act of warfare is banned in neutral territory and the neutral duty of acquiescence does not extend to cover such spillover damage to neutral territory.<sup>20</sup> In fact, the neu-

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18. SAN REMO MANUAL ON INTERNATIONAL LAW APPLICABLE TO ARMED CONFLICTS AT SEA ¶ 46(d) (Louise Doswald-Beck ed., 1995) [hereinafter SAN REMO MANUAL] (“With respect to attacks, the following precautions shall be taken: . . . (d) an attack shall not be launched if it may be expected to cause collateral casualties or damage which would be excessive in relation to the concrete and direct military advantage anticipated from the attack as a whole; an attack shall be cancelled or suspended as soon as it becomes apparent that the collateral casualties or damage would be excessive.”). See also UNITED KINGDOM MINISTRY OF DEFENCE, THE MANUAL OF THE LAW OF ARMED CONFLICT ¶ 13.32(d) (2004) [hereinafter UK MANUAL].

19. In this article, the law of armed conflict at sea or naval warfare means the law concerning the conduct of hostilities and other operations against targets at sea and protection of certain personnel and objects at sea. Missile attacks against ships at sea by land or land-based air forces are thus covered by this law.

20. Since the current international law denounces the *de jure* state of war, the validity of the law of neutrality is quite uncertain. Although it is the third State's discretion to choose to be a strict neutral observing the traditional law of neutrality, the rights and duties of a State not involved in an inter-State armed conflict that has not taken a strict neutral position has never been clearly described. In this article, all States other than belligerents are considered as neutrals. The legal analysis of incidental damage caused to the third State not taking a strict neutral position is much more complicated. A good example is nuclear contamination that would result to the coastlines of Japan's southwest islands by combat losses of nuclear-powered warships in the East China Sea during a hypothetical Sino-American war, where Japan would have to provide bases to U.S. forces under the 1960 U.S.-Japan Mutual Defense Treaty. Such a war would be the first in which both belligerents have operational nuclear-powered warships. For an interesting scenario involving

tral duty of acquiescence mainly relates to the capture or seizure of neutral goods and vessels to prevent the carriage of war materials and armaments to a belligerent. A neutral State has not been required to acquiesce to damage to its territory caused by actions of a belligerent State.<sup>21</sup>

*B. Civilians and Civilian Objects in Belligerent Land Territory and Territorial Seas*

As described earlier, incidental damage caused by engagements at sea to civilians and civilian objects located in belligerent land territory are properly considered collateral damage as defined by the law of armed conflict. Therefore, its lawfulness is assessed according to the proportionality principle.

While the proportionality principle constitutes a customary international law rule, it is appropriate to reconfirm that engagement at sea causing incidental damage to civilians and civilian objects on belligerent land territory is the only case of naval warfare to which collateral damage treaty rules apply. API Article 49(3) provides that API's rules on the general protections against the effects of hostilities, namely Articles 48 to 67,

apply to any land, air or sea warfare which may affect the civilian population, individual civilians or civilians on land. They further apply to all attacks from the sea or from the air against objectives on land but do not otherwise affect the rules of international law applicable in armed conflict at sea or in the air.<sup>22</sup>

Although Article 49(3) is silent on sea warfare affecting civilians and civilian objects located in belligerent internal waters, it is safe to say that the term "land" includes internal waters. The same might not be said, however, of civilians and civilian objects in a belligerent's territorial sea,<sup>23</sup> consequently only customary collateral damage rules are applicable to damages they incur.

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the loss of a nuclear-powered warship of a belligerent State in the East China Sea, see James Kraska, *How the United States Lost the Naval War of 2015*, 54 ORBIS 35 (Winter 2010).

21. There is a view that a belligerent State is not responsible for incidental damage to a neutral. See, e.g., Richard L. Weiner, *Limited Armed Conflict Causing Physical Damage to Neutral Countries: Questions of Liability*, 15 CALIFORNIA WESTERN INTERNATIONAL LAW JOURNAL 161, 168 (1985). However, as far as damage to neutral territory is concerned, there appears to be no reason to conclude that a neutral is obliged to acquiesce to such damage.

22. Additional Protocol I, *supra* note 13, art. 49(3).

23. The application of Article 49(3) to internal waters, but not to the territorial sea, turns on the meaning of "land." Although theoretically its meaning might be different from that used in the law of the sea, it is natural to suppose that it has the same meaning in API. Namely, internal waters are, as is land, subject to the full sovereignty of the State.

In any event, many authors interpret Article 49(3)'s badly drafted and complicated provisions as imposing no restrictions on traditional means of economic warfare at sea, including capture of merchant vessels and belligerent blockades that might affect civilian populations on land, despite its first sentence. According to this view, Article 49(3) only applies to rather limited situations, such as naval gunfire against ground targets or destruction of targets at sea causing physical damage to facilities on land,<sup>24</sup> thus making API's collateral damage rules, namely Articles 51(5)(b) and 57(2)(a)(iii), applicable to these categories of collateral damage occurring in the belligerent's land territory.

*C. Belligerent and Neutral Merchant Shipping on the High Seas*

The interrelationship between the law of the sea, including the UN Convention on the Law of the Sea (LOSC),<sup>25</sup> and the laws of armed conflict and neutrality at sea has long been subject to discussion.<sup>26</sup> The general applicability of the LOSC and customary rules of the law of the sea in times of armed conflict is theoretically approved because of the abolition of the *de jure* state of war by the UN Charter.<sup>27</sup> However, it has been widely accepted that engaging in hostilities against enemy forces and conducting other belligerent actions against certain enemy and neutral merchant shipping on the high seas are not in themselves unlawful.<sup>28</sup>

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The State exercises a more limited sovereignty over the territorial sea, with ships of other States having certain navigation rights therein. These rights of entry into the territorial sea do not require coastal State consent, as would be the case for entry into internal waters.

24. See, e.g., Henri Meyrowitz, *Le Protocole Additionnel I aux Conventions de Genève de 1949 et le Droit de la Guerre Maritime*, 89 REVUE GÉNÉRALE DE DROIT INTERNATIONAL PUBLIC 243 (1985). *Contra* ELMAR RAUCH, THE PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS FOR THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS AND THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA: REPERCUSSIONS ON THE LAW OF NAVAL WARFARE 57–66 (1984).

25. LOSC, *supra* note 16.

26. See, e.g., Richard J. Grunawalt, *Belligerent and Neutral Rights in Straits and Archipelagoes*, in THE LAW OF THE SEA: WHAT LIES AHEAD? 137 (Thomas A. Clingan ed., 1986); Vaughan Lowe, *The Impact of the Law of the Sea on Naval Warfare*, 14 SYRACUSE JOURNAL OF INTERNATIONAL LAW AND COMMERCE 657, 682 (1988).

27. See generally Elihu Lauterpacht, *The Legal Irrelevance of the "State of War,"* 62 AMERICAN SOCIETY OF INTERNATIONAL LAW PROCEEDINGS 58 (1968).

28. Even after the prohibition of war and the use of force by the UN Charter, there are only a few precedents in which States explicitly opposed a belligerent's operations on the high seas by invoking the "peacetime" law of the sea. The Soviet objection to the Brit-

Judging from the general recognition of the lawfulness of belligerent operations on the high seas, incidental damage to enemy merchant shipping is treated as collateral damage under the laws of armed conflict and neutrality. Curiously, the traditional law of neutrality at sea has barely addressed collateral damage to neutral shipping. Nonetheless, as neutral ships are located on the high seas where hostilities by belligerents are allowed, it could be said that such damage on the high seas is categorized as collateral damage, the lawfulness of which is assessed following the proportionality principle. For instance, non-excessive splinter damage to belligerent and neutral merchant vessels caused by the explosion of belligerent anti-ship missiles launched against the opposing belligerent's surface combatants on the high seas could be considered collateral damage.<sup>29</sup>

#### D. Neutral Exclusive Economic Zones

The more difficult issue is how to evaluate collateral damage to a neutral State's EEZ, as well as to those portions of its continental shelf that extend beyond the outer limits of its EEZ.<sup>30</sup> The traditional laws of armed conflict

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ish total exclusion zone during the Falkland/Malvinas Islands War was one example. This objection was based on interference with the freedom of navigation and overflight under the High Seas Convention of 1958. Vojtech Mastny, *The Soviet Union and the Falklands War*, 36 NAVAL WAR COLLEGE REVIEW 46, 49 (1983); Sandesh Sivakumaran, *Exclusion Zones in the Law of Armed Conflict at Sea: Evolution in Law and Practice*, 92 INTERNATIONAL LAW STUDIES 152, 180–81 (2016).

29. If an enemy merchant ship is considered a military objective, it becomes a lawful target of attack and the collateral damage rule is not relevant. Prior to World War II, international law prohibited attacks on merchant vessels unless there was provision for the safety of passengers and crew as codified in the 1936 London Protocol, which recognized merchant ships' immunity from attack if that condition was not met. These rules were largely ignored during World War II and again during the Iran-Iraq War. See U.S. NAVAL WAR COLLEGE, U.S. NAVY, U.S. MARINE CORPS & U.S. COAST GUARD, NWP1-14M/MCWP 5-2.1/COMDTPUB P5800.1, THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS ¶¶ 8.2.2, 8.3 (1997) [hereinafter COMMANDER'S HANDBOOK]; UK MANUAL, *supra* note 18, at 359–61; Francis V. Russo, Jr., *Neutrality at Sea in Transition: State Practice in the Gulf War as Emerging International Customary Law*, 19 OCEAN DEVELOPMENT AND INTERNATIONAL LAW 381 (1988).

30. In this context, the only relevant neutral continental shelf is that portion of the shelf that extends beyond the outer limit of the EEZ. That portion of a continental shelf within the EEZ falls within the EEZ regime.

The deep seabed and subsoil thereof beyond a coastal State's EEZ and continental shelf, namely the "Area" as referred to in Article 136 of the LOSC, is the "common heritage of mankind." The waters above the seabed of the Area are the high seas. It is generally

and neutrality at sea were formulated during the era when the ocean was divided into two parts, territorial seas and the high seas; naturally, therefore, lacking rules on naval warfare in the EEZ of a neutral State. Any attempt to codify modern laws of armed conflict and neutrality at sea has only succeeded in the drafting of non-binding documents, such as the *San Remo Manual*.

If this new maritime area extending beyond a coastal State's territorial sea has the same legal character as that of the high seas purely from the perspectives of the laws of armed conflict and neutrality at sea, the issue would be quite simple: collateral damage to a coastal neutral State and neutral shipping in the EEZ would be treated similarly to that occurring on the high seas. However, in cases where a neutral coastal State's rights in the EEZ have some bearing on the laws of armed conflict and neutrality at sea, the permissible scope of belligerent naval operations in neutral EEZs may be reduced. Therefore, damage caused by certain belligerent activities that are not permissible in a neutral EEZ would not be regarded as collateral damage as defined by the law of armed conflict and neutrality at sea, and a neutral coastal State would no longer be obliged to acquiesce in such damage regardless of whether it met the law of armed conflict standard of excessive. For instance, during anti-submarine operations in the neutral EEZ, a destroyer of a belligerent State might launch attacks against an enemy submarine that cause physical damage to the EEZ's living and mineral resources, such as eel spawning areas and smoking chimneys containing rare earth metals on its ocean floor.

In addressing the question of the lawfulness of belligerent activities in a neutral EEZ, again, the analysis of the interrelationship between the law of the sea and the laws of armed conflict and neutrality at sea is of significant importance. It seems sufficient here, however, to briefly refer to the following points.

If it is accepted that the LOSC articles on the EEZ apply to belligerent operations in times of armed conflict, the answer would depend on whether those operations can be said to be included in the freedoms referred to in Article 87 (freedom of the high seas) made applicable to the EEZ by Article 58(1), which addresses the "rights and duties of other States in the exclusive economic zone."<sup>31</sup> This same question arises when the lawfulness of foreign

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thought that conducting hostilities against an enemy in, on and over the high seas is not unlawful. *See, e.g., SAN REMO MANUAL, supra* note 18, ¶ 10. The question here is whether the issue of incidental damage caused to the Area and its resources should be treated differently from that occurring on the high seas.

31. LOSC, *supra* note 16, art. 58(1).

peacetime military exercises or maneuvers in the EEZ are examined. If the answer to this question is affirmative and the coastal State does not have any military or security-related jurisdiction, military activities would be considered as one of the “freedoms” referred to in Article 87<sup>32</sup> and, as provided for in Article 56(2), “the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.”<sup>33</sup> In this case, the collateral damage issue may be resolved in the same way as that of damage occurring on the high seas.

However, because Article 58(3) imposes a corresponding duty on non-coastal user States, it cannot be decisively held that a neutral coastal State and a belligerent State are on equal legal footing in the former’s EEZ in times of armed conflict at sea. Indeed, as Article 58(3) states:

[other] States shall have due regard to the rights and duties of the coastal State and shall comply with the laws and regulations adopted by the coastal State in accordance with the provisions of this Convention and other rules of international law in so far as they are not incompatible with this Part.<sup>34</sup>

Although requiring compatibility with other rules of international law, the wording might be interpreted as giving greater weight to the rights of the coastal State. If so, the permissible scope of belligerent operations in times of armed conflict might be somewhat reduced. This could mean that a neutral coastal State does not need to acquiesce to damage caused to its EEZ by belligerent actions not authorized by Article 58(3), even if not excessive.

If, however, the right to conduct belligerent operations in a neutral EEZ is not one of the Article 58 freedoms, we must go beyond the analysis based on Articles 56 and 58 and examine the applicability of Article 59 (“basis for the resolution of conflicts regarding the attribution of rights and jurisdiction in the exclusive economic zone”), which has also been invoked in relation to foreign peacetime military exercises in the EEZ. Article 59 establishes a conflict resolution mechanism regarding so-called “residual rights” and jurisdiction that the LOSC explicitly attributes neither to coastal States nor to

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32. For an analysis of this issue, see Raul (Pete) Pedrozo, *Coastal State Jurisdiction over Marine Data Collection in the Exclusive Economic Zone*, in *MILITARY ACTIVITIES IN THE EEZ: A U.S.-CHINA DIALOGUE ON SECURITY AND INTERNATIONAL LAW IN THE MARITIME COMMONS* 23, 24–27 (Peter Dutton ed., 2010) (U.S. Naval War College China Maritime Study No. 7).

33. LOSC, *supra* note 16, art. 56(2).

34. *Id.*, art. 58(3).

other States.<sup>35</sup> Without indicating any substantive elements to be considered, it merely provides that a conflict regarding residual rights and jurisdiction “should be resolved on the basis of equity and in the light of all the relevant circumstances, taking into account the respective importance of the interests involved to the parties as well as to the international community as a whole.”<sup>36</sup> The analysis would turn on whether or not it can be said that to conduct belligerent activities during armed conflict is regarded as an “attribut[e] right” of “other States” in accordance with Article 59 criteria.<sup>37</sup>

Another possibility is to treat the LOSC as just a peacetime treaty and in times of armed conflict the traditional laws of armed conflict and neutrality at sea prevail.<sup>38</sup> Although this appears to be one variation of the EEZ-high seas assimilation theory, it differs from the above-addressed theory based on Article 58, which presupposes the continuing validity of the LOSC in wartime and dictates that the legality of belligerent activities should be assessed in accordance with Article 58. On the other hand, under the assimilation theory based on the classic peacetime/wartime dichotomy, the EEZ articles of the LOSC have virtually no importance under the laws of armed conflict and neutrality, and collateral damage caused by belligerent activities in the neutral EEZ would be treated similarly as those on the high seas.

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35. See Pedrozo, *supra* note 32, at 23–26.

36. LOSC, *supra* note 16, art. 59.

37. The specific Article 59 criteria are uncertain. Treves found that Article 59 only implied an obligation to the parties to negotiate in good faith. Tullio Treves, *Military Installations, Structures and Devices on the Seabed*, 74 AMERICAN JOURNAL OF INTERNATIONAL LAW 808, 844 (1980). Pedrozo examined Article 59 from the perspective of the coastal State, finding that security interests were not a residual right. Pedrozo, *supra* note 32, at 24.

38. Richard R. Baxter, *The Legal Consequences of the Unlawful Use of Force under the Charter*, 62 AMERICAN SOCIETY OF INTERNATIONAL LAW PROCEEDINGS 68, 73 (1968); Patrick M. Norton, *Between the Ideology and the Reality, the Shadow of the Law of Neutrality*, 17 HARVARD INTERNATIONAL LAW JOURNAL 249, 305 (1976). The Swedish delegation declared on several occasions during the LOSC negotiations that the Convention does not affect the law of neutrality. Third United Nations Conference on the Law of the Sea, 136th plen. mtg., ¶ 64, U.N. Doc. A/CONF.62/SR.136 (Aug. 26, 1980); 163rd plen. mtg., ¶ 9, A/CONF.62/SR.163 (Mar. 31, 1982); 187th plen. mtg., ¶ 224, A/CONF.62/SR.187 (Dec. 7, 1982).

## IV. COLLATERAL DAMAGE AND NUCLEAR CONTAMINATION

## A. Nuclear Contamination Not Causing Physical Damage

Two situations causing nuclear contamination are conceivable: one resulting from the use of nuclear weapons, the other from the destruction of military targets containing nuclear material. The law of armed conflict has focused mainly on the former. One of the remaining questions is whether the ordinary collateral damage rule also applies in the latter situation and therefore to its lawfulness. Before discussing this question, however, this section briefly analyzes contamination caused by the use of nuclear weapons.

The issue of the lawfulness of the use of nuclear weapons is beyond the scope of this article; hence, the analysis below considers collateral damage issues arising from their use and simply presupposes that there are some situations where the use of nuclear weapons is not unlawful.<sup>39</sup> However, if nuclear weapons as a means of warfare are unlawful weapons as such, the use of nuclear weapons even against enemy combatants and military objectives is unlawful, and to examine collateral damage to civilians and civilian objects is therefore unnecessary.

If nuclear contamination as a result of the use of nuclear weapons leads to the incidental death, injury or disease of civilians,<sup>40</sup> these are undoubtedly treated as collateral damage as envisaged by the law of armed conflict. Acute radiation syndrome caused to civilian fishermen or merchant ship crew by nuclear fallout emanating from the explosion of nuclear torpedoes directed against belligerent surface combatants on the high seas is an example of the potential collateral damage.<sup>41</sup>

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39. For declarations and reservations concerning the use of nuclear weapons made by some States when signing or ratifying API, see *supra* note 14.

40. Civilian casualties by nuclear attacks against two Japanese cities in 1945 cannot be treated as collateral damage because it is clear that civilians were intentionally targeted. See Gabriella Blum, *The Law of War and the "Lesser Evil,"* 35 YALE JOURNAL OF INTERNATIONAL LAW 1, 22 (2010) ("In Hiroshima and Nagasaki, hundreds of thousands of innocent civilians were targeted.").

41. Several Japanese fishing boats, including the *Lucky Dragon No.5* (the *Daigo Fukuryū-Maru*), were heavily contaminated by the hydrogen bomb testing on the Bikini Atoll in 1954 and some crewmembers were killed and seriously injured by acute radiation syndrome. *Japanese Fishermen Encountered an Atomic-Bomb Test in the Bikini*, YOMIURI SHIMBUN (Mar. 16, 1954); RALPH EUGENE LAPP, *THE VOYAGE OF THE LUCKY DRAGON* (1958). If a nuclear weapon was used against enemy warships at sea in wartime, physical damage to belligerent and neutral fishing vessels on the high seas could be categorized as collateral damage.

Nuclear contamination may cause non-physical damage in addition to physical damage. Article 52(2) of API defining military objectives uses the term “neutralization” in addition to “destruction” and “capture.”<sup>42</sup> It provides that “military objectives are limited to those objects . . . whose total or partial destruction, capture or *neutralization* . . . offers a definite military advantage.”<sup>43</sup> The term neutralization could mean the non-physical disabling of a military objective.<sup>44</sup> Cutting the electric power supply to an early warning radar system or dispersing landmines around a nuclear weapons factory may be deemed as neutralization. On the contrary, interestingly, API Articles 51(5)(b) and 57(2)(a)(iii) define collateral damage as “incidental loss of civilian life, injury to civilians, [and] damage to civilian objects.”<sup>45</sup> Although this definition uses the terms “loss,” “injury” and “damage,” it avoids using the term “neutralization.”<sup>46</sup>

Interpreting the relevant collateral damage rules of API literally, these provisions exclude neutralization or non-physical disabling of civilian objects from the scope of collateral damage, requiring that the damage be physical.<sup>47</sup> A potential example of non-physical damage to civilians and civilian objects may occur when cyber means are used against military objectives such as belligerent electricity transmission systems that result in the loss of power in civilian population areas.<sup>48</sup>

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42. Additional Protocol I, *supra* note 13, art. 52(2).

43. *Id.* (emphasis added).

44. Knut Dörmann, *Applicability of the Additional Protocols to Computer Network Attacks* 4, ICRC (Nov. 19, 2004), [https://www.icrc.org/eng/assets/files/other/applicabilityofihlto\\_cna.pdf](https://www.icrc.org/eng/assets/files/other/applicabilityofihlto_cna.pdf). The International Committee of the Red Cross’s API *Commentary* does not refer to this issue. COMMENTARY ON THE ADDITIONAL PROTOCOLS OF 8 JUNE 1977 TO THE GENEVA CONVENTIONS OF 1949, at 635–36 (Yves Sandoz, Christophe Swinarski & Bruno Zimmermann eds., 1987). Threshold or intensity issues have also been discussed in the *jus ad bellum* context. See Michael N. Schmitt, “*Below the Threshold*” *Cyber Operations: The Countermeasures Response Option and International Law*, 54 VIRGINIA JOURNAL OF INTERNATIONAL LAW 697 (2014).

45. Additional Protocol I, *supra* note 13, arts. 51(5)(b), 57(2)(a)(iii).

46. *Id.*

47. As described earlier, Article 49(3) of API geographically limits the applicability of these collateral damage treaty rules; therefore, they are not applicable as treaty rules to collateral damage caused to merchant vessels at sea. Furthermore, some State parties have been denying the applicability of the API treaty rules to the use of nuclear weapons. See DOCUMENTS ON THE LAWS OF WAR, *supra* note 14, at 504, 506, 510, 512. However, it is probably safe to say that the concept and scope of collateral damage embodied in API’s provisions constitute customary law. CIHL, *supra* note 14, at 46–50.

48. An electric power blackout itself has not been considered as collateral damage unless it directly caused physical damage. Historically, there are many cases where power

If this interpretation requiring physical damage is correct, mere low-level nuclear contamination that has neither a neutralizing nor disabling effect on civilian objects is not damage in the sense of the law of armed conflict. In the same vein, low-level nuclear contamination of civilians who have not developed any related illness may not be treated as collateral damage.<sup>49</sup> Therefore, such below-the-threshold “damage” that has no neutralizing or disabling effect would not be considered collateral damage, and a victim belligerent State cannot claim compensation from its enemy State.<sup>50</sup>

The remaining problem is, therefore, how to set the threshold, that is, what is the lowest level of nuclear contamination that would physically injure the civilian population or natural living resources? Two incidents in the

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plants were destroyed by aerial bombing, but resulting power shortages have not generally been treated as collateral damage for which lawfulness is assessed according to the proportionality principle. Christopher Greenwood, *Customary International Law and the First Geneva Protocol of 1977 in the Gulf Conflict*, in *THE GULF WAR 1990–91 IN INTERNATIONAL AND ENGLISH LAW* 63, 79 (Peter Rowe ed., 1993); Henry Shue & David Wippman, *Limiting Attacks on Dual-Use Facilities Performing Indispensable Civilian Functions*, 35 *CORNELL INTERNATIONAL LAW JOURNAL* 559, 565–69 (2002); *TALLINN MANUAL ON THE INTERNATIONAL LAW APPLICABLE TO CYBER WARFARE* 159–64 (Michael N. Schmitt ed., 2013).

49. In 2011, a huge earthquake and the subsequent tsunami destroyed the northeast coastal area of Japan. The tsunami crippled a nuclear power plant in Fukushima and its operator, Tokyo Electric Power Company (TEPCO), could not prevent a nuclear meltdown. In 2012, several crewmembers of the *USS Ronald Reagan* who had participated in a massive U.S. disaster relief campaign in the area (Operation Tomodachi (Friendship)) filed suit in a U.S. federal district court against TEPCO. They claimed a host of medical conditions related to radiation exposure and asserted that TEPCO knowingly gave false information concerning the condition of the Fukushima plant and “coaxed” the ship closer to it. The key issue is whether any illness these crewmembers developed is a result of radiation exposure during the operation. The case went forward pending appeals in the U.S. 9th Circuit Court of Appeals. Mathew M. Burke, *16 Ships that Aided in Operation Tomodachi Still Contaminated with Radiation*, *STARS AND STRIPES* (Mar. 13, 2016), <http://www.stripes.com/news/16-us-ships-that-aided-in-operation-tomodachi-still-contaminated-with-radiation-1.399094>; *Operation Tomodachi: Shadow of Nuclear Radiation*, *ASAHI SHIMBUN* (Japan), Oct. 1, 2015 (evening ver.), at 9.

50. A similar argument was made in relation to space activities. To avoid any legal responsibility, the Soviet Union appeared to take the position that nuclear contamination caused by the reentry of its nuclear-powered satellite *Cosmos 954* in 1978 did not fall within the scope of damage defined by Article 1(a) of the 1972 Convention on International Liability for Damage Caused by Space Objects because scattered radioactive debris did not cause any physical damage to Canadian populations or objects. Joseph A. Burke, *Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages after the Cosmos 954 Incident*, 8 *FORDHAM INTERNATIONAL LAW JOURNAL* 255, 273–80 (1984).

last thirty years illustrate the effect of nuclear contamination. The first is the disastrous Chernobyl nuclear power plant accident in 1986 that resulted in the closure of vast areas around the plant site. The second is the Fukushima nuclear plant meltdown following the earthquake and tsunami. Since 2011, the Japanese government has prohibited people from living in the adjacent nuclear contaminated areas.<sup>51</sup>

Although no one has defined with confidence the level of negligible radioactive exposure, when nuclear contamination occurs in belligerent territory during armed conflict it is necessary to examine the threshold issue to decide the applicability of the collateral damage rule. It is all the more difficult to set the threshold if very long-term radiation effects to civilian populations, in addition to the more immediate acute radiation syndrome, are taken into account.

As far as belligerent land, sea and aerial territories are concerned, causing below-the-threshold nuclear contamination would not be unlawful if we simply follow the literal interpretation of the collateral damage rules of the law of armed conflict. However, it is appropriate to remember again that this is valid only for the damage occurring in a belligerent State. The law of neutrality does not require a neutral State to acquiesce in even below-the-threshold damage to their territory and population. Moreover, as previously discussed, the lawfulness of below-the-threshold incidental damage to the neutral EEZ depends on its status during armed conflict.

### *B. Nuclear Contamination of the Natural Environment*

Although it is rather difficult to define the natural environment for the purpose of the law of armed conflict, certain objects within the natural environment can be military objectives. For instance, Article 2(4) of the Incendiary Weapons Protocol to the Convention on Certain Conventional Weapons prohibits actions 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.”<sup>52</sup>

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51. *Nuclear Reactor Incidents: Chernobyl and Fukushima*, ASAHI SHIMBUN (Japan), Mar. 16, 2016 (evening ver.), at 9.

52. Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons, Oct. 10, 1980, 1342 U.N.T.S. 171. This provision provides that the natural environment is not immune from attack if it covers military objectives or is itself a military objective. Judging from its wording, it presupposes that although the natural environment concealing military

API Article 52(1) defines civilian objects negatively as “all objects which are not military objectives.”<sup>53</sup> This means that there is no intermediate or third category. Accordingly, it is arguable that the entire natural environment of a belligerent State—other than that which constitutes military objectives—is a civilian object.

It is easy to envisage that certain areas of forests, ponds, beaches and other terrain may be treated as civilian objects following API’s negative definition methodology. However, curiously, the natural environment not constituting a military objective is not necessarily treated as a civilian object. For instance, although Article 52(1) provides that “[c]ivilian objects shall not be the object of attack,” Articles 35(3) and 55 merely prohibit actions causing “widespread, long-term and severe damage” to the natural environment.<sup>54</sup> By not making clear the unlawfulness of environmental damage not meeting these criteria, API appears to deny general protection to the natural environment.<sup>55</sup> In addition, Article 55(1) is somewhat anthropocentric because it provides that “[t]his protection includes a prohibition of the use of methods or means of warfare which are intended or expected to cause such damage

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objectives is not in itself a military objective, such environment is subject to attack because of its function. However, by definition, such natural environment should be categorized as a military objective.

53. Article 52(2) defines military objectives as “limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.”

54. Article 35 is applicable even to hostilities at sea that have no direct effects on the civilian population on land. This is because, unlike Article 55, Article 35 is provided for in Part III (Methods and Means of Warfare, Combatant and Prisoner-of-War Status) of the Protocol, which is outside the scope of the geographical limitation found in Article 49(3).

The provisions of this Section apply to any land, air or sea warfare which may affect the civilian population, individual civilians or civilian objects on land. They further apply to all attacks from the sea or from the air against objectives on land but do not otherwise affect the rules of international law applicable in armed conflict at sea or in the air.

55. Article 1(1) of the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD Convention) prohibits a State Party from using “environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party.” Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, May 18, 1977, 31 U.S.T. 333, 1108 U.N.T.S. 151. By prohibiting hostile use of certain modification techniques, the ENMOD Convention indirectly protects the natural environment; however, it does not provide general protection to the natural environment due to Article 1(1)’s threshold of widespread, long-lasting or severe effects. *See also* COMMANDER’S HANDBOOK, *supra* note 29, ¶ 8.4.

to the natural environment and *thereby* to prejudice the health or survival of the population.”<sup>56</sup>

Although as a treaty relating to individual criminal responsibility the 1998 Statute of the International Criminal Court<sup>57</sup> does not directly regulate the conduct of States, Article 8(2)(b)(iv), concerning war crimes arising from the launching of attacks which cause excessive collateral damage, has no anthropocentric element.<sup>58</sup> Instead, it introduces the proportionality principle to the assessment of environmental collateral damage. The provision, however, still maintains the “widespread, long-term and severe” damage criteria.

Because the portion of the belligerent’s natural environment that is not a military objective may not enjoy general protection as a civilian object, its nuclear contamination may not be treated as a violation of the law of armed conflict, unless it results in widespread, long-term or severe environmental damage.<sup>59</sup> This lack of general protection is one of the striking defects of the current law of armed conflict.

## V. NUCLEAR CONTAMINATION FROM DESTROYED NUCLEAR-POWERED WARSHIPS

### *A. Release of Dangerous Forces Contained in Destroyed Targets*

There are several instances in which nuclear contamination caused by belligerent actions could be considered as collateral damage, the lawfulness of which could be judged according to the proportionality principle. However, as discussed above, the collateral damage rule usually presupposes physical effects caused by an attacker’s bombs or missiles upon civilians or civilian

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56. See Julian Wyatt, *Law-Making at the Intersection of Environmental, Humanitarian and Criminal Law: The Issue of Damage to the Environment in International Armed Conflict*, 92 INTERNATIONAL REVIEW OF THE RED CROSS 593, 607 (2010) (emphasis added).

57. Rome Statute of the International Criminal Court, July 17, 1998, 2187 U.N.T.S. 90.

58. For a detailed analysis of Article 8(2)(b)(iv) from the “ecocentric” point of view, see Jessica C. Lawrence & Kevin Jon Heller, *The First Ecocentric Environmental War Crime: The Limits of Article 8(2)(b)(iv) of the Rome Statute*, 20 GEORGETOWN INTERNATIONAL ENVIRONMENTAL LAW REVIEW 61 (2007).

59. Here again, this is valid only for the damage to a belligerent State’s natural environment. A neutral State does not need to acquiesce in any environmental damage to its territory.

objects surrounding targeted military objectives.<sup>60</sup> On the other hand, nuclear contamination from damaged nuclear-powered warships does not result directly from the attacker's means, but from nuclear material released from targeted military objectives.

Conversely, Article 56(1) of API provides that "[w]orks or installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations, shall not be made the object of attack, even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population."<sup>61</sup> Additional Protocol II contains identical language in Article 15.<sup>62</sup>

Although API Article 56(2) provides that the special protection against attack for those works and installations identified in paragraph 1 is lost in specific situations,<sup>63</sup> this Article is unique because it gives protection to specific types of military objectives. The reason is obvious: these works and installations contain dangerous forces and their release would significantly

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60. This article does not examine legal issues of incidental injury to civilians located in military objectives, for example, civilians being evacuated in belligerent military vehicles not displaying the civil defense protective emblem or present in a militarily important railway station. If injuries to civilians inside military objectives are treated as collateral damage as envisaged by the law of armed conflict, the lawfulness of attacks against such targets containing civilians would be assessed in accordance with the proportionality principle. This is virtually equal to legalization of human shield tactics. If the death of, or injuries to, civilians in military objectives are not considered as collateral damage, it could be said that the attack against them is lawful irrespective of the number of casualties because they are there at their own risk. To deal with this issue, it may be appropriate to divide military objectives into two categories: those open to civilians, such as bridges and roads, and those closed to unauthorized civilians, such as military vehicles and bases. Incidental damage to civilians in the former open military objectives could be treated as collateral damage assessed in accordance with the principle of proportionality.

61. For a critical analysis of Article 56, see W. Hays Parks, *Air War and the Law of War*, 32 AIR FORCE LAW REVIEW 1, 202–18 (1990).

62. Protocol Additional to the Geneva Conventions of August 12, 1949, and Relating to the Protection of Victims of Non-international Armed Conflicts art 15, June 8, 1977, 1125 U.N.T.S. 609.

63. See Additional Protocol I, *supra* note 13, art. 56(2)(a)–(b), which provides the following specific situations:

for a dam or a dyke only if it is used for other than its normal function and in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support [and] for a nuclear electrical generating station only if it provides electric power in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support.

harm the surrounding civilian population in the ordinary course of events.<sup>64</sup> For the three designated military objectives, it is very clear that a belligerent attacking them is legally responsible for the severe damage that would result.

However, as a treaty provision, this special protection is given only to the three specified works and installations, and this protection cannot be interpreted to be given to other similar facilities, such as nuclear fuel factories. Further, Article 49(3) limits the geographical scope of the application of API's provisions, including Article 56, to land warfare, as discussed earlier.<sup>65</sup>

### B. Destruction of Nuclear-Powered Warships

From the humanitarian and environmental points of view, it might be desirable to extend Article 56-type protection to all similar works and installations on land and at sea.<sup>66</sup> If this extension of special protection were to occur, launching an attack against military objectives such as large fuel and munition depots located in civilian populated areas would be prohibited. However, then the surrounding civilian populations would practically function as human shields and a considerable degree of imbalance emerges—the depots could continue to be used to support military operations, while the opposing belligerent is virtually prohibited from attacking them.

Unless the locating of such military objectives in and around civilian populations can be effectively prohibited, it is inconceivable and undesirable to expand Article 56-type protection to all similar fixed works and installations. Even API does not attempt such a prohibition, merely providing in Article 58 that “[t]he Parties to the conflict *shall, to the maximum extent feasible* . . . endeavour to remove the civilian population . . . from the vicinity of mil-

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64. In the wake of the 2011 Fukushima incident, it was revealed that in the 1980s the Japanese government asked the Japan Institute of International Affairs to prepare a report on the anticipated nuclear contamination that would result from attacks on Japanese nuclear facilities in wartime. *Attacks against Nuclear Reactors: Top-Secret Scenario*, ASAHI SHIMBUN (Tokyo), July 31, 2011, at 1. The classified report was submitted to the government in 1984. NIHON KOKUSAI-MONDAI KENKYU-JYO (JAPAN INSTITUTE OF INTERNATIONAL AFFAIRS), GENSHIRO-SHISETSU NI TAISURU KOGEDI NO EIKYOU NI KANSURU ICHI-KOSATSU (A REFLECTION UPON THE EFFECT OF ATTACKS AGAINST NUCLEAR FACILITIES) (1984) (on file with author).

65. See *supra* Part II.A.

66. In the API drafting process, some States proposed a provision totally banning attacks against any works and installations containing dangerous forces. BOTHE, PARTSCH & SOLF, *supra* note 12, at 350–53; COMMENTARY ON THE ADDITIONAL PROTOCOLS OF 8 JUNE 1977 TO THE GENEVA CONVENTIONS OF 1949, *supra* note 44, at 666–68; Parks, *supra* note 61, at 210.

itary objectives,” [and] “avoid locating military objectives within or near densely populated areas.”<sup>67</sup> Furthermore, unlike the Hague Cultural Property Convention and its protocols, API does not introduce a separation regime to give special protection to certain kinds of civilian objects.<sup>68</sup>

In the same vein, if an ordinary collateral damage rule based on the proportionality principle is applied, an attack destroying a nuclear-powered submarine might be prohibited in certain situations due to excessive collateral nuclear contamination. However, such submarines are an important part of several navies<sup>69</sup> and their use as a means of warfare is not unlawful. It is, therefore, impossible to prohibit the launch of attacks against such a highly effective weapon platform by extending Article 56-type protection without prohibiting their use in naval warfare. To solve this dilemma, there might be no other way than to argue that the military advantage gained from the destruction of enemy nuclear-powered warships should always be considered to be greater than collateral nuclear contamination, however devastating it may be. However, such argument would make the customary law principle of proportionality almost meaningless.

Further, to extend the concept of collateral damage to include damage by dangerous forces released from destroyed targets is problematic. However, if such extension is not allowed, another serious problem arises: neither a user-belligerent State nor an attacking belligerent State appears to be responsible for nuclear contamination emanating from damaged or sunken nuclear-powered warships.

## VI. CONCLUSION

As far as damage incidentally caused to personnel and objects in neutral territory and to a neutral State’s natural environment, the laws of armed conflict and neutrality do not obligate an injured neutral State to acquiesce to such damage, even if it does not rise to the level of excessiveness. The same can be said of certain damage to natural resources in the neutral EEZ.

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67. Additional Protocol I, *supra* note 13, art. 58(a)–(b) (emphasis added).

68. *See* Convention for the Protection of Cultural Property in the Event of Armed Conflict, May 14, 1954, 249 U.N.T.S. 240 (noting that Article 8(1)(a) provides that in order for a cultural property refuge to be granted special protection it must be “situated at an adequate distance . . . from any important military objective”).

69. As of the time of this writing, China, France, India, Russia, the United Kingdom and the United States operate nuclear-powered submarines. Three navies, France, Russia and the United States, have nuclear-powered surface warships as well.

On the other hand, damage to belligerent and neutral State civilians and civilian objects in a belligerent's territory and EEZ and on the high seas, that is damage to those located in areas where hostilities and other belligerent acts can be lawfully undertaken, is considered collateral damage that is assessed by the proportionality principle. Damage to belligerent State civilians and civilian objects in a neutral EEZ is (perhaps) treated similarly.

Just as with other damage, including physical damage, a neutral State is not required to acquiesce to below-the-threshold damage in its territory or to its natural environment. However, when below-the-threshold damage occurs in the belligerent's territory and EEZ and on the high seas, it may be argued that such "damage" does not even fall within the concept of damage from the perspectives of the laws of armed conflict and neutrality. Contrary to similar below-the-threshold damage to a neutral State, an injured belligerent State would not be entitled to ask for compensation.

In this way, unlike the law of armed conflict applicable on land, the determination of lawful and unlawful collateral damage mainly depends on the classification of the area where it occurs. If the methods and means of warfare employed cause unlawful collateral damage, an attacking belligerent State incurs international responsibility. It is relatively easy to identify the responsible belligerent State, and, in certain cases, members of its armed forces are criminally responsible for war crimes when causing unlawful excessive collateral damage.

In contrast, however, in the case of nuclear contamination resulting from the destruction of a nuclear-powered warship, it is legally difficult to decide who is responsible. As the earlier analysis has indicated, this is simply because neither their use nor the attack upon such vessels outside neutral territorial seas are unlawful from the law of armed conflict's perspective, unlike attacks on certain protected works and installations on the ground, even where they are military objectives. When nuclear contamination from a destroyed nuclear-powered warship causes unlawful collateral damage, whether to civilians, civilian objects or the natural environment of either a belligerent or a neutral State, the injured State will face this difficult situation: no belligerent State is responsible for nuclear contamination from the perspective of the laws of armed conflict and neutrality.<sup>70</sup> This means that the laws of armed conflict and neutrality leave an injured State without a

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70. An injured State can still invoke the responsibility of a belligerent State if its use of force is against *jus ad bellum* norms such as is described in Article 2(4) of the UN Charter.

remedy for the contamination that will surely result from the destruction of a nuclear-powered warship.