

Protection of Civilian Nuclear Installations in Time of Armed Conflict

by Vanda Lamm*

The history of wars fought by mankind has witnessed a host of cases in which installations containing dangerous forces, e.g., dams and dykes became the object of military operations, and such installations were damaged particularly during the wars of the 20th century. In 1938, for instance, the Chinese authorities exploded dams of the Yellow River to prevent the advance of Japanese troops. With the same end in view, the Dutch flooded extensive agricultural areas with seawater. During the Second World War the dams in the Eder and the Möhne in Germany became targets of the enemy in 1943. Needless to emphasise that such attacks caused enormous damage at the time. Later similar attacks were undertaken during the wars in Korea and Vietnam.¹ The cited examples go to show that installations containing dangerous forces were often damaged in armed conflicts, not only by the enemy, but were destroyed for defensive purposes as well.

All those events led the International Committee of the Red Cross (ICRC) to introduce in the “Draft Rules for the Limitation of the Dangers Incurred by the Civilian Population in Time of War”,² which it had prepared by 1956, an article (then Article 17) on the special protection of installations containing dangerous forces. According to the Draft, States were to seek in peacetime special agreements on granting general immunity, for the duration of armed conflicts, to installations like dams and dykes of hydroelectric stations serving exclusively peaceful purposes. In addition, States were to conclude separate agreements in time of war to provide special protection for installations which were and would remain wholly unrelated to military operations.³ The list of installations containing dangerous forces was later extended to include nuclear electrical generating stations.

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1. Cf. Commentary to the Additional Protocols to the Geneva Conventions, Ed. Yves Sandoz, Christophe Swinarski, Bruno Zimernann (1987), *International Committee of the Red Cross*, Martinus Nijhoff Publishers, Geneva, p. 667.
2. For the Draft, see Herczegh, Géza (1981), “*A humanitarius nemzetközi jog fejlődése és mai problémái*” (Development and Current Problems of International Humanitarian Law), *Közgazdasági és Jogi Könyvkiadó*, Budapest, p. 143-145. In 1949 the Four Geneva “Red Cross” Conventions replaced a number of conventions that dealt with rules concerning the wounded and sick in armies in the field and prisoners of war, and extended the protection of civilians in time of war. In 1977, two Additional Protocols to the 1949 Conventions were adopted.
3. Cf. Bothe M., K.J. Partsch and W.A. Solf (1982), *New Rules for the Victims of Armed Conflicts*, Martinus Nijhoff Publishers, The Hague (Boston) London, p. 350-351.

The Draft of the Red Cross was not received favourably at the 1971 and 1972 Conferences of Governmental Experts, primarily because several representatives found it inapplicable in practice as it envisioned agreements to be concluded in time of armed conflict.⁴ Thus, in 1968 the ICRC prepared a new Draft proposing that, in case of armed conflict, dams, dykes and nuclear power stations should be protected in all circumstances and that the belligerents should refrain from locating any kind of military objective in the vicinity of such installations.⁵

After a long discussion the Working Group dealing with this question accepted by consensus Article 56 of the Protocol Additional to the Geneva Conventions of 12 August 1949 (Protocol I). The Treaty was adopted by the Diplomatic Conference from 1974 to 1977, on the reaffirmation and development of international humanitarian law applicable in armed conflicts. Article 56 of Protocol I reads as follows:

- “1. Works 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. Other military objectives located at or in the vicinity of these works or installations shall not be made the object of attack if such attack may cause the release of dangerous forces from the works or installations and consequent severe losses among the civilian population.
2. The special protection against attack provided by paragraph 1 shall cease:
 - (a) 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;
 - (b) 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;
 - (c) for other military objectives located at or in the vicinity of these works or installations only if they are used in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support.
3. In all cases, the civilian population and individual civilians shall remain entitled to all the protection accorded them by international law, including the protection of the precautionary measures provided for in Article 57. If the protection ceases and any of the works, installations or military objectives mentioned in paragraph 1 is attacked, all practical precautions shall be taken to avoid the release of the dangerous forces.
4. It is prohibited to make any of the works, installations or military objectives mentioned in paragraph 1 the object of reprisals.
5. The Parties to the conflict shall endeavour to avoid locating any military objectives in the vicinity of the works or installations mentioned in paragraph 1. Nevertheless, installations

4. Ibid. p. 351.

5. Commentary....., op. cit., p. 667-668.

erected for the sole purpose of defending the protected works or installations from attack are permissible and shall not themselves be made the object of attack, provided that they are not used in hostilities except for defensive actions necessary to respond to attacks against the protected works or installations and that their armament is limited to weapons capable only repelling hostile action against the protected works or installations.

6. The High Contracting Parties and the Parties to the conflict are urged to conclude further agreements among themselves to provide additional protection for objects containing dangerous forces.
7. In order to facilitate the identification of the objects protected by this Article, the Parties to the conflict may mark them with a special sign consisting of a group of three bright orange circles placed on the same axis, as specified in Article 16 of Annex I to this Protocol. The absence of such marking in no way relieves any Party to the conflict of its obligations under this Article.”⁶

The inclusion of Article 56 in Protocol I clearly represents a significant achievement in the development of international humanitarian law. Nonetheless, this article has been, perhaps to the point of exaggeration, criticised as complicated and confusing which explains why, among other reasons, the United States has not ratified Protocol I.⁷

I. The protected installations and the concept of protection

1. The basic idea of Article 56 is that installations should not be the object of attack when an act of violence, whether offensive or defensive in nature, could release forces resulting in grave losses to the civilian population.

Paragraph 1 of Article 56 enumerates three categories of protected installations, notably dams, dykes and nuclear electrical generating stations. In connection with Article 56 the first question raised by writers concerns the failure of that article to mention other installations similarly containing dangerous forces, such as certain chemical works or oil installations.⁸ It is to be noted that the need to widen the range of protected installations had already emerged in the course of the negotiations on the Protocol, with importance attached especially to the protection of oil refineries and storage facilities.⁹ Although the relevant proposals were later withdrawn, one of the reasons may have been that Article 56 of Protocol I contains a separate provision on environmental damage and that attacks against petroleum storage facilities and refineries or chemical works breach the prohibition of damage to the environment.¹⁰

6. For the interpretation of Article 56 see Commentary..., op. cit., p. 666-675; and Bothe, Partsch and Solf, op. cit., p. 350-357.

7. Cf. Carnahan, Burrus M. (1992), “Protecting Nuclear Facilities from Military Attack: Prospects after the Gulf War”, *American Journal of International Law*, p. 533.

8. Rogers, A.P.V. (1996), *Law on the Battlefield*, Manchester University Press, Manchester and New York, p. 117.

9. Cf. Commentary ..., op. cit., p. 668.

10. For the elaboration of the provisions of Protocol I on the protection of the environment, see Herczegh, Géza, (1984), “*La protection de l’environnement naturel et le droit humanitaire*”, *Études et essais sur le droit international humanitaire et sur les principes de la Croix-Rouge en l’honneur de Jean*

The Protocol refers to nuclear electrical generating stations as the third group of protected installations. This means that Protocol I *only aims to protect the nuclear facilities used for peaceful purposes* and that even its related provisions apply to a single sub-group of civilian nuclear installations.

2. Thus Protocol I in no way covers nuclear weapons, albeit, as will be discussed later, the use of such weapons may have environmental consequences. The Draft of the ICRC specifically stated that it did not intend to deal with the problem of nuclear weapons. As is pointed out by Rogers, that statement was necessary because the nuclear powers were not willing to enter into negotiations unless those weapons remained unaffected by the instrument to be elaborated.¹¹ The International Court of Justice has, also in its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons* stated that nuclear weapons specifically had not been discussed at the Conferences of Geneva in 1949 and 1974-1977. However, the Court emphasised that “In view of the vast majority of States as well as writers there can be no doubt as to the applicability of humanitarian law to nuclear weapons.”¹²

3. As mentioned earlier, Protocol I deals only with the protection of nuclear electrical generating stations. This means that *protection does not extend to research reactors, which constitute another large group of nuclear installations used for peaceful purposes*. This is one of the great deficiencies of the Protocol, and there are several reasons *why it is necessary to list the research reactors among the installations containing dangerous forces*.

- Extension of protection to research reactors is supported primarily by the fact that in 56 States of the world there exists today a total of 283 research reactors with a combined capacity exceeding 3 000 MW.¹³
- Another reason lies in the fact that research reactors operate at widely different capacities. There are research reactors in the United States which operate with a capacity of 3 or 4 MW, but also ones with a capacity of 250, 100 and 60 MW.¹⁴
- A considerable number of research reactors operate within the framework of universities and research institutes, which are generally much nearer to inhabited areas than nuclear power plants.

The quantity and capacity of nuclear research reactors as well as their proximity to populated centres *make it likely that attacks against them will cause severe losses among the civilian population*.

Pictet, Ed. Christophe Swinarski, *Comité international de la Croix-Rouge*, Martinus Nijhoff Publishers. p. 725-731.

11. This explains why several States, at the time of signing and ratifying the Protocol, made declaratory statements stressing that the rules laid down in Protocol I did not affect nuclear weapons and did not regulate or prohibit their use. *Cf.* Rogers, *op. cit.*, p. 118.

12. ICJ Reports, 1996. p. 259.

13. *Cf.* www.world-nuclear.org/info. *Cf.* Ritchie, Ian G., “Growing Dimensions, Spent Fuel Management at Research Reactors”, www.iaea.org/worldatom/Periodical/Bulletin/Bull401/article7.html.

14. In the United States the capacity of the Idaho National Engineering Lab. is 250 MW, that of the Oak Ridge National Laboratory is 100 MW, and that of the Brookhaven National Laboratory is 60 MW. *Cf.* Matos J.E., “LEU Conversion Status of US Research Reactors” (Paper presented at the 1996 International Meeting on Reduced Enrichment for Research and Test Reactors, October 7-10, 1996. Seoul, Korea), p. 8.

However, in connection with the inclusion of research reactors among the installations containing dangerous forces, the question arises what to do with research reactors producing fissionable materials for nuclear weapons.¹⁵

The question of immunity of these reactors is of topical interest because several research reactors have become the objects of attack due to the suspicion that nuclear materials were used for military purposes.

The first such action took place on 7 June 1981, when Israel bombed the French-made OSIRAK research reactor of 40 MW capacity located at the research centre Tuwaitha near Baghdad.¹⁶ In the course of the first Gulf War of 1981 the United States Air Force attacked this same nuclear installation. In both cases the military action was said to have been warranted by Iraq's breach of its obligations under the Non-Proliferation Treaty and intention to use the reactor's materials for the production of nuclear weapons, and further justified as a measure to prevent the spread of nuclear weapons.¹⁷ It should be added that, according to published information, the American attacks on Iraqi nuclear installations during the first Gulf War did not create a risk of radioactive contamination.¹⁸

Without dwelling on this issue I should point to an essential difference between the Israeli and American attacks. At the time, Israel's action was condemned by several States of the international community on the basis of Article 2, paragraph 4, of the United Nations Charter, whereas the American attacks took place on an authorisation by the Security Council. The extent to which the attack on the basis of Security Council Resolution 678 on Iraq was justified is a separate question. In that Resolution the Security Council invited the Member States of the World Organisation to use all possible means to have Iraq withdraw from Kuwait and "to restore peace and security in the region". Obviously, the first sentence of the Security Council Resolution can in no way justify the attacks on the nuclear installation Tuwaitha, because the expulsion of Iraq's forces from Kuwaiti territory can hardly be brought into a direct relationship with the attacks on the facilities under IAEA safeguards.¹⁹ Rather, it is that part of the Resolution dealing with the restoration of peace and security in the region which can be invoked as a justification for the American action.²⁰ This appears to be borne out by the fact that neither the coalition nor the closed session of the Security Council were inquisitive about the American action, which leads Henri Meyrowitz to conclude "... *que le consensus qui existe indéniablement quant à la licéité et à la justesse du désarmement nucléaire de l'Irak couvrait aussi les bombardements ayant visé les installations nucléaires.*"²¹

15. Carnahan, op. cit., p. 533.

16. At the time of the attack OSIRAK was not yet in operation, but the enriched uranium in the reactor was already under IAEA safeguards, and the Agency's inspectors did not find any irregularity a few months before the Israeli attack. That was not the first attack against OSIRAK, as the Israeli air force had bombed the facility on 30 September 1980. During the Iran – Iraq war, Iraq launched six attacks against Iranian nuclear installations between 1984 and 1988. Cf. Carnahan, op. cit., p. 535.

17. Cf. Carnahan, op. cit., p. 524-525.

18. Rogers, op. cit., p. 125.

19. Ibid., p. 526.

20. Ibid.

21. Meyrowitz, Henri (1993), "La guerre du Golfe et le droit des conflits armés", *Revue générale de droit international public*, p. 581. Editor's translation: "...that the consensus which undeniably exists with regard to the legality and justness of the nuclear disarmament of Iraq also covered the bombardments aiming at nuclear installations".

For that matter, investigation in light of Protocol I of the events during the first Gulf War is misleading, chiefly because neither Iraq nor the three leading powers of the coalition (the United States, the United Kingdom, and France) were contracting Parties to the Protocol I at that time.²² Moreover, as mentioned before, the protection accorded by the Protocol does not extend to research reactors.

4. The definition of “attack” on protected installations is given by the provisions of Article 49 of the Protocol, and covers not only offensive acts of violence against the adversary, but also defensive counter-attacks. In addition, under paragraph 2 of this Article, the provisions on the attacking Party apply to any attack anywhere, including attacks by a Party on its own territory under the control of the adverse Party.²³

In the case of installations protected by paragraph 1 of Article 56 this means that dams, dykes and nuclear electrical generating stations enjoy protection even if they are located on a Party’s own territory, but have come under the control of the enemy. At the same time, however, as is stressed by writers, this paragraph does not prohibit destroying dams or dykes under a State’s own control as part of an effort to halt or impede an advancing enemy.²⁴

There are two factors to be stressed in this context. On the one hand, such action undertaken on a Party’s own territory to halt the enemy or to prevent the advancing may only be carried out under Article 53 of the Fourth Convention of 1949 on Humanitarian Law if such destruction is rendered absolutely necessary by military operations. On the other hand, the power ordering the action must ensure, even in such circumstances, that the civilian population is protected, that is, there is no damage to it.²⁵

I should like to point out that damaging a nuclear power plant on a Party’s own territory for the purpose of preventing the advance of the enemy is highly unlikely and would involve enormous destruction inevitably causing severe losses among the civilian population. For purposes of defence, however, a nuclear power plant in the territory of the Party concerned may happen to be damaged in order to be rendered useless if it comes under the control of the enemy.

The protection is extended in the second sentence of Article 56, paragraph 1, – in addition to dams, dykes and nuclear electrical generating stations – to “military objectives located at or in the vicinity of such works or installations”, which, if attacked, could lead to the release of dangerous forces and could consequently cause severe losses among the civilian population. In other words, other civil engineering works, e.g., a bridge, railway line etc., enjoy immunity from military objectives if they are in the immediate vicinity of a dam, dyke or nuclear electrical generating station, and if attack against them could release dangerous forces.²⁶

22. However, several other members of the coalition were party to the Protocol. For more detail, see Meyrowitz, *op. cit.*, p. 565. The United Kingdom ratified Protocol I on 28 January 1998, France did it on 11 April 2001.

23. Commentary..., *op. cit.*, p. 602-605.

24. Bothe, Partsch and Solf, *op. cit.*, p. 353.

25. Commentary..., *op. cit.*, p. 669.

26. Commentary..., *op. cit.*, p. 670.

Article 52, paragraph 1, of Protocol I provides in general terms that civilian objects must not be the object of attack or reprisals. Such objects include, among other things, installations containing dangerous forces.

II. The problem of terminating the special protection

Paragraph 2 of Article 56 provides that the special protection of installations containing dangerous forces is to cease in certain cases. It should be emphasised that termination of protection is conditional in that the attack on installations containing dangerous forces is *the only way to stop support by such installations for military operations*.

As regards the cessation of special protection, the Protocol deals separately with dams and dykes on the one hand and with nuclear electrical generating stations on the other. In the former case special protection ceases when three cumulative conditions are present, namely:

- a dam or a dyke is used for other than its normal function;
- a dam or a dyke is used in *regular* (not occasional), *significant and direct support* of military operations;
- attack is the only feasible way to terminate such support.²⁷

In the case of nuclear electrical generating stations, protection ceases if attack is *the only feasible way to terminate significant and direct support of military operations*.

The provisions concerning termination of the protection of nuclear facilities are undesirable for several reasons. As mentioned earlier, termination of the protection of nuclear electrical generating stations is aimed at preventing their continued support of military operations. Such support, however, can also be terminated by other means, as is pointed out in the Commentary on Protocol I, namely by attacking the electricity lines, thereby preventing the use for military operations of electricity generated by a nuclear electrical generating stations.²⁸ Otherwise the practical application of the provision on termination of the protection of nuclear facilities can be rather problematical, since it is rather difficult to identify the source of electricity in an integrated electric network.²⁹

Considering that support by nuclear electrical generating stations for military operations can also be secured by means other than attack, it would be much more comforting to provide for the *absolute protection of civilian nuclear installations in all circumstances*.

Absolute protection of civilian nuclear installations is also supported by the fact that attack on such installations is likely to cause severe losses among the civilian population. The sad experience of the Chernobyl disaster shows that pernicious consequences can occur not only in the installation State, but also in a region hundreds of kilometres apart. *In other words, severe losses can be suffered not only by the belligerents, but also by the civilian population of a third State, or neutral State.*

27. Bothe, Partsch and Solf, op. cit., p. 354.

28. Commentary..., op. cit., p. 672.

29. This point was made by the Swiss delegation at the Diplomatic Conference. Cf. Bothe, Partsch and Solf, op. cit., p. 355.

It is known that dams and dykes can fulfil various functions. In addition to energy production, they are used for water supply to the population. When they are used for supplying water to the population, for instance, attack against them offends Article 54 of the Protocol, which provides for the protection of objects indispensable to the survival of the civilian population.

If protection ceases, attack is permissible on the basis of military necessity. As Goldblat points out,³⁰ that leaves the military commander much room for discretion. Goldblat writes that military commanders have to balance such unquantifiable factors as human suffering and military necessity, and to decide during military actions whether attack on an installation is lawful or not.³¹

If the protection of installations containing dangerous forces ceases, the civilian population remains entitled, under paragraph 3 of Article 56, to “all the protection accorded them by international law”. This article refers in fact to Articles 51 and 57 of the Protocol, which provide for the protection of the civilian population and the precautionary measures to be taken during attack.

Subject to the provisions of Articles 51 and 57, even if protection ceases, all these reasons combine:

- to *prohibit indiscriminate attack*, namely one during which methods of warfare are used with such consequences as cannot be limited as required by Protocol I and as therefore indiscriminately affect in each case military objectives and civilian population or civilian objects alike;
- to require observance of the rule of *proportionality*, namely it is forbidden to launch an attack which claims so many civilian victims and injuries as well as so much damage to civilian objects such that, by themselves or together, it would exceed the concrete and direct military advantage to be expected from the attack.

The last sentence in paragraph 3 of Article 56 stresses in particular that even if the protection of dams, dykes and nuclear electrical generating stations ceases, all practical precautions must be taken to avoid the release of dangerous forces.

If we attempt to apply these criteria to the situation in which a nuclear power plant is attacked, it is difficult to meet the requirements. Attacks on nuclear installations are similar to a nuclear accident in the sense that the system “fails to function” and is therefore very likely to result in uncontrolled emission of radioactive material.³² In other words, attacks on nuclear electrical generating stations make it rather difficult to prevent the release of dangerous forces. So it is strongly questionable whether at the Diplomatic Conference framing the two Protocols of 1977 the Rapporteur was right in saying about paragraph 3 of Article 56 that, “...given the panoply of weapons available to modern

30. Goldblat, “Legal Protection”, p. 3. Reference to it is made by Rogers, A.P.V. (1996), *Law on the Battlefield*, Manchester University Press, Manchester and New York, p. 117.

31. Ibid.

32. In time of armed conflict it would of course be necessary to shut down the nuclear installation immediately, but it is questionable whether in case of surprise attack – which may be launched, within the meaning of the Protocol, precisely because a nuclear power plant produces electricity in regular, significant and direct support of military operations – the operators have time enough to do so.

armies, this provision should ensure real protection against the catastrophic release of dangerous forces.”³³

Rogers takes a less strict view of attack on nuclear installations. The author writes that attacks on power stations are justified if the power stations are military objectives and if it can be attacked in such a way that there is no risk of radioactive contamination.³⁴ However, the author holds that even if radioactive materials are released, the question of proportionality may arise as to the severity of pollution and the effect on the civilian population and the environment.³⁵

However, *the extent of radioactive contamination that may be caused by the attack cannot in fact be known in advance* of a decision to attack a nuclear facility. If the attack is directed at an external unit of such an installation, it may happen, provided that the installation was shut off, that no radioactive contamination will result. An attack upon an operating nuclear installation, however, may entail unpredictable consequences.

III. Protection of installations containing dangerous forces and protection of the natural environment

It is worthwhile to examine the question of an attack on nuclear electrical generating stations in the light of other provisions of Protocol I as well. In this context it is necessary to consider above all the articles of the Protocol dealing with the protection of the natural environment.

Protocol I lays down express provisions on the protection of the natural environment. The related articles were not contained in the draft that the ICRC submitted to the Diplomatic Conference, and the relevant two articles [Article 35(3) and Article 55] were presented at the Conference itself, which shows clearly the special consideration given to environmental protection in the early 1970s.³⁶

Nevertheless, there are important differences between the two provisions on the protection of the environment.³⁷ Paragraph 3 of Article 35 deals with the protection of the environment as such, whereas Article 55, while essentially repeating paragraph 3 of Article 35, provides for environmental protection in connection with the protection of the civilian population.³⁸

33. Commentary..., op. cit., p. 673.

34. Rogers, op. cit., p. 125.

35. Ibid.

36. Bouvier, Antoine, “Protection of the Natural Environment in Time of Armed Conflict”, *International Review of the Red Cross*, November-December 1991. p. 574.

37. For paragraph 3 of Article 35 and Article 55, see Kiss, Alexandre, “*Les Protocoles additionnels aux Conventions de Genève de 1977 et la protection de biens de l’environnement*”, *Études et essais sur le droit international humanitaire et sur les principes de la Croix-Rouge en l’honneur de Jean Pictet*, op. cit., p. 184-186.

38. Paragraph 3. of Article 35 reads as follows:

“It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread long-term and severe damage to the natural environment.”

Article 55 contains the following provisions:

“1. Care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods

Concerning these two provisions on environmental protection, Alexandre Kiss writes that paragraph 3 of Article 35 provides for general protection of the environment in all cases covered by the Protocol. The scope of application of Article 55 is somewhat more limited owing to the fact that this article is included, not among the basic rules, but in Part IV among the provisions on the protection of the civilian population.

Bouvier emphasises that one should come to terms with the fact that environmental damage is inevitable in time of war despite any sort of precautionary measures. According to the author, the rules of international humanitarian law relating to the protection of the environment are therefore designed, not to prevent environmental damage in general, but to keep such damage at a tolerable level.³⁹

There arise two questions in connection with attack on nuclear electrical generating stations when their protection has ceased. On the one hand, can the resulting environmental damage be kept at a “tolerable” level and what may really be a tolerable level in such a case? On the other hand, will attack not offend Article 55 on the protection of the natural environment? While it is not so simple to answer the first question, one can safely say that an attack on a nuclear electrical generating station when protection has ceased is very likely contrary to Article 55.

IV. Conclusions

The foregoing clearly indicates the need for Article 56 of Protocol I of 1977 to be supplemented particularly in respect of protection accorded to nuclear installations in case of armed conflict.

Article 56, paragraph 6, of the Protocol upholds the idea, contained in the 1956 Draft of the ICRC, that “The High Contracting Parties and the Parties to the conflict are urged to conclude further agreements among themselves to provide additional protection for objects containing dangerous forces”. As can be seen, this article invites the contracting Parties to elaborate further rules on the special protection of installations containing dangerous forces. In the light of what has been said above, it appears that *provision for the full-scale protection, in all circumstances, of all civilian nuclear installations, including research reactors, could be the thrust for a new regulation.*

It should be noted that this proposal is not new at all. The full protection of nuclear installations was also suggested during the disarmament talks surrounding the treaty on radiological weapons at the end of the 1970s. In the course of those talks Sweden presented a draft prohibiting attack on nuclear facilities containing sufficient radioactive material to cause “mass destruction” if released.⁴⁰ At the time such facilities were defined as reprocessing plants, large deposits of spent fuel or radioactive waste having a thermal effect of more than 10 MW capacity. The United States did not agree with the Swedish proposal as it raised practical military problems, because it gave protection to installations expressly defined as military objectives and permitted no attack in any case on nuclear installations capable of releasing a certain quantity of radiation.⁴¹

or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.

2. Attacks against the natural environment by way of reprisals are prohibited.”

39. Cf. Bouvier, op. cit., p. 569.

40. Cf. Carham, op. cit., p. 534.

41. Ibid.