RULEMAKING ISSUE
(Affirmation)

May 6, 1994 SECY-94-121

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: AMENDMENTS TO 10 CFR PART 73 TO PROTECT AGAINST MALEVOLENT USE OF VEHICLES AT NUCLEAR POWER PLANTS

PURPOSE:

To obtain Commission approval to publish a final rule that will require nuclear power plant licensees to protect their facilities against malevolent use of vehicles.

BACKGROUND:

In a staff requirements memorandum (SRM) of June 29, 1993, the Commission directed the staff to (1) proceed with rulemaking to modify the current design basis threat (DBT) for radiological sabotage to include use of a land vehicle by adversaries for the transport of personnel, hand-carried equipment, and/or explosives, (2) modify 10 CFR 73.55 to reflect the change to the DBT and allow for alternative measures when establishing standoff distances, and (3) expedite rulemaking to implement these changes. By an SRM of October 26, 1993, the Commission approved publication of proposed rulemaking and directed staff to seek comments from the Advisory Committee on Reactor Safeguards (ACRS) during the public comment period.

The proposed rule was published in the *Federal Register* on November 4, 1993 (58 *FR* 58804). Interested parties were invited to submit comments by January 3, 1994. The proposed rule specified that each licensee authorized to operate a nuclear power plant would be required to establish vehicle control measures, including vehicle barrier systems, to protect against the use of a design

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NOTE: TO BE MADE PUBLICLY AVAILABLE AT COMMISSION BRIEFING ON JUNE 9, 1994

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basis land vehicle as a means of transportation to gain unauthorized proximity to vital areas. The proposed rule also specified actions for licensees to determine the effectiveness of these measures in protecting against a land vehicle bomb. Characteristics of the design basis vehicle and explosive were sent to licensees in separate correspondence which was protected as Safeguards Information.

DISCUSSION:

The staff presented the proposed rulemaking package to the Security Subcommittee of the ACRS on November 3, 1993, and to the full committee on November 4, 1993. The full committee was briefed on December 10, 1993, in a closed session, by the Director, Office of Nuclear Material Safety and Safeguards. The ACRS's December 10, 1993 letter to the Chairman raised concerns about the rulemaking, particularly the justification for the rule, the lack of a quantitative risk assessment to support it, and the expedited nature of the rulemaking. On February 10, 1994, the ACRS heard presentations on the rulemaking from the Nuclear Management and Resources Council (NUMARC), the Nuclear Control Institute (NCI), one public citizen, and NRC staff members. A transcript of the February 10 meeting was made part of the record of the rulemaking. On April 7, 1994, the staff briefed the ACRS in a closed session regarding additional, quantitative evaluations that supported this rulemaking.

Written comments on the proposed rule were received from 25 licensees that operate commercial nuclear power reactors, two industry groups (NUMARC and Nuclear Backfitting and Reform Group (NUBARG)), two public citizens, one citizens' group, the NCI and one other advocacy group, one State nuclear safety agency, and two nuclear vendors. Earlier, at a May 10, 1993, NRC-sponsored public meeting, the staff invited comments on the DBT. The staff reviewed all comments of record that pertained to malevolent use of vehicles at nuclear power plants and considered them in the preparation of the final rule. The draft notice for the *Federal Register* (Enclosure 1) contains an analysis of all public comments and the staff's responses to them.

Several comments supported the rulemaking and expressed the view that rulemaking on this topic was the proper, proactive approach. A minority of 4 members of the ACRS expressed a view that the proposed rule represents a prudent and effective step toward enhancing public health and safety. The NCI commented that the rule was long overdue. Some of those that supported the rule offered more detailed comments proposing further expansion of the design basis threat and placing more rigid controls on licensee actions to implement the rule.

Like the ACRS, NUMARC, NUBARG, and numerous utilities expressed concern that the safety benefit was not adequately justified or quantified. In particular, the ACRS commented on the staff's failure to quantify the likelihood of a malevolent intrusion. The staff continues to believe that, although in many cases considerations of probabilities can provide insights into the relative risk of an event, in some cases it is not possible with current knowledge and methods to usefully quantify the probability of a specific vulnerability threat. The staff notes that, although not quantified, its regulatory

analysis recognizes the importance of the perception of the likelihood of an attempt to create radiological sabotage in assessing whether to redefine adequate protection. The staff's assessment that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry was an important consideration in concluding that neither the Three Mile Island intrusion nor the World Trade Center bombing demonstrated a need to redefine adequate protection.

The staff does not agree that quantifying the probability of an actual attack is necessary to a judgment of a substantial increase in overall protection of the public health and safety (a less stringent test of the justification for a rule change). Inherent in NRC's current regulations is a policy decision that the threat, although not quantified, is likely in a range that warrants protection against a violent external assault as a matter of prudence. In considering the risk from use of a vehicle to gain proximity to vital areas, the staff's regulatory analysis does not suggest that the likelihood of a violent external assault has increased. Rather, the staff focussed its regulatory analysis on whether a vehicle could provide an advantage to an adversary with the characteristics of the design basis threat.

The staff assessed lessons learned from the TMI intrusion and concluded that a vehicle could provide advantages to an adversary not previously considered. In SECY-86-101, "Design Basis Threat - Options for Consideration," March 31, 1986, the staff concluded that, even though perimeter chain link fences would not prevent vehicle intrusion, the requirement for prompt response by guards armed with shoulder-fired weapons would limit actions of intruders. Accordingly, in 1986 the staff concluded that the installation of vehicle barriers might not constitute a substantial overall increase in the protection of public health and safety. During the last several months, the staff has further analyzed the capability of existing licensee security measures to protect against a violent external assault that includes a vehicle as a mode of transportation. These new analyses support the staff's conclusions in the regulatory analysis for the proposed rulemaking.

In addition, the staff's recommendation in SECY-93-326, "Reconsideration of Nuclear Power Plant Security Requirements Associated with an Internal Threat," to permit licensees to leave some vital area doors unlocked was based in part on the earlier Commission directive for the staff to proceed expeditiously with rulemaking to require vehicle barriers. The subsequent Commission direction in an SRM of February 18, 1994, to allow licensees to leave all vital area doors unlocked increases the importance of requiring vehicle barriers. The staff believes that the vehicle intrusion issue alone warrants the installation of vehicle barriers at nuclear power plants.

As a result of the World Trade Center bombing, the staff believes that the construction of a vehicle bomb is more likely to develop without advance indications. The staff does not believe that it can quantify the likelihood of vehicle bomb attack. However, it has performed a conditional probabilistic risk analysis for an existing power reactor site, assuming an attempt to damage a nuclear power plant with a design basis vehicle bomb placed at locations within the protected area that would create the greatest risk to

public health and safety. The analysis indicated that the contribution to core damage frequency could be high.

Barriers installed to protect against vehicle intrusion into protected areas would also protect, to varying degrees, against vehicle bombs. The staff believes that adjusting the location of barriers where necessary to ensure a capability of protecting vital equipment against a design basis vehicle bomb would provide an additional substantial increase in the overall protection of the public health and safety. Further, the staff believes that the incremental costs to licensees to analyze the degree of protection against a vehicle bomb and to make adjustments in vehicle control measures in limited cases are justified, particularly considering the provisions in the rule allowing licensees to propose alternative measures if a site-specific analysis indicates that the costs of fully meeting the rule's design goals and criteria are not justified by the added protection that would be provided.

In response to ACRS and industry comments, the staff continued to explore the usefulness of various risk analysis techniques in providing insights regarding the likelihood of the sabotage consequences of selected threat scenarios. The additional deterministic evaluations and limited probabilistic assessments have supported staff's earlier findings that protecting against vehicle intrusion and a vehicle bomb would substantially increase the overall protection of public health and safety. The staff has updated the regulatory analysis to include these evaluations, details of which are given in a Safeguards Information attachment to the regulatory analysis. (This Safeguards Information attachment is being sent to the Commission under separate cover.)

NUMARC and the staff agree that protection against the malevolent use of vehicles would be prudent, but for different reasons. NUMARC stated that the industry agreed that unauthorized vehicles should not be allowed inside a nuclear power plant protected area and that a licensee must be able to safely shut down a plant following the detonation of an explosive device outside the protected area. However, NUMARC stated that these beliefs are based on business prudence (e.g., protection of employees and the investment in generating equipment inside the protected area) rather than on concern for radiological sabotage or nuclear safety considerations. NUMARC contended that existing NRC rules adequately protect the public health and safety.

NUMARC recommended several principles to guide the establishment of protection requirements for land vehicles and land vehicle bombs. Many of these recommendations are consistent with the threat characteristics specified in the proposed rulemaking. NUMARC's principles differ in the following ways: the design basis vehicle that could be used to attempt penetration of a protected area would carry only personnel and hand-carried equipment; and protection against a vehicle bomb would assume a stationary vehicle outside existing protected areas with explosive capability no greater than bombs previously detonated for malevolent purposes within the United States.

With respect to barrier penetration, the primary difference in implementation of the proposed rule and NUMARC's proposal is a presumption of a lower kinetic energy, since the vehicle would not be carrying a large explosive payload. It

is theoretically possible that, for some types of barriers, NUMARC's proposal could result in less costly barriers than under the proposed designed basis threat. However, the staff's analysis indicates the lower design basis kinetic energy resulting from NUMARC's proposal makes little practical difference for standard barriers. In addition, the staff's regulatory analysis indicated that, because of the short distances between vital areas and portions of some protected area boundaries, protection against a vehicle at existing boundaries would be inconsistent with NUMARC's stated goal of being able to safely shut down a plant following the detonation of an explosive device outside the protected area.

NUMARC, as supported by most utilities, raised specific concerns regarding the schedule for implementation. The only substantive changes made to the rule were extending the period for licensees to submit summary descriptions of their barrier system design and results of their blast effect analysis from 90 to 180 days and extending the date for implementation from 1 year to 18 months. Several other minor clarifications were made. No changes were made to the characteristic of the design basis vehicle and explosive device.

Regulatory Guide 5.68 references NUREG/CR-6190, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants," which was prepared for the NRC by the U.S. Army Corp of Engineers. NUREG/CR-6190 provides licensees with simplified guidance for design and selection of vehicle barriers and analysis of existing structures and equipment to demonstrate their ability to withstand the effects of an explosive blast. The staff is continuing work to supplement NUREG/CR-6190 with information that may further simplify licensee barrier design and blast effect analysis.

COORDINATION:

The Office of the General Counsel has no legal objection to publishing the rule. Resources to implement this rulemaking are included in the FY 1994-1998 Five Year Plan.

RECOMMENDATION:

That the Commission:

(1) Approve publication of rulemaking (Enclosure 1).

(2) Certify that this rule change, when implemented, will not have a significant economic impact on a substantial number of small entities in order to satisfy the requirements of the *Regulatory Flexibility Act* [5 U.S.C. 605(b)].

(3) Note the following:

(a) The notice of final rulemaking, Enclosure 1, will be published in the *Federal Register* to become effective 30 days after its publication.

(b) As required by 10 CFR 50.109, the staff completed a backfit analysis for the proposed rule. The staff has determined, based on this analysis, that backfitting to comply with the requirements of this rule will provide a substantial increase in protection to public health and safety or the common defense and security at a cost which is justified by the substantial increase. The analysis is included in the *Federal Register* Notice.

(c) An environmental assessment (Enclosure 2) has been prepared, pursuant to the *National Environmental Policy Act* of 1969, as amended (42 U.S.C. 4321 *et seq.*) and the Commission's regulations in Subpart A of 10 CFR Part 51, and has resulted in a finding of no significant environmental impact.

(d) The Chief Counsel for Advocacy of the Small Business Administration will be informed of economic impact of the certification on small entities and the reasons for it as required by the *Regulatory Flexibility Act*.

(e) This rule amends information collection requirements that are subject to Office of Management and Budget (OMB) approval. These provisions of the rule were approved by OMB on January 3, 1994.

(f) A public announcement will be issued (Enclosure 3).

(g) A regulatory analysis (Enclosure 4) has been prepared and will be placed in the NRC Public Document Room.

(h) Appropriate congressional committees will be informed (Enclosure 5).

(i) Regulatory Guide 5.68, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants", (Enclosure 6) will be made available when the rule is published and will be placed in the NRC Public Document Room.

(j) A copy of this rule will be distributed to all affected licensees and other interested persons.

James M. Taylor
Executive Director
for Operations

Enclosures:
1. *Federal Register* Notice
2 Environmental Assessment
3. Public Announcement
4. Regulatory Analysis
5. Congressional Letters
6. Regulatory Guide 5.68
7. NUREG/CR-6190

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Friday, June 17, 1994.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, June 10, 1994, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

This paper is tentatively scheduled for affirmation at an Open Meeting during the Week of June 20, 1994. Please refer to the appropriate Weekly Commission Schedule, when published, for a specific date and time.

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ENCLOSURE 1

Federal Register Notice

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 73

RIN 3150-AE81

Protection Against Malevolent Use of Vehicles at Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

Action: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its physical protection regulations for operating nuclear power reactors. The amendments modify the design basis threat for radiological sabotage to include use of a land vehicle by adversaries for transporting personnel and their hand-carried equipment to the proximity of vital areas and to include a land vehicle bomb. The amendments also require reactor licensees to install vehicle control measures, including vehicle barrier systems, to protect against the malevolent use of a land vehicle. The Commission believes this action is prudent based on an evaluation of an intrusion incident at the Three Mile Island (TMI) nuclear power station and a bombing of the World Trade Center. The objective of this final rule is to enhance reactor safety by protecting against the use of a vehicle to gain unauthorized proximity to vital areas. Further, the amendments will enhance reactor safety by protecting vital equipment from

damage by detonation of a large explosive charge at the point of vehicle denial.

EFFECTIVE DATE: (Insert 30 days from publication in the Federal Register.)

FOR FURTHER INFORMATION CONTACT: Phillip F. McKee, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC, telephone (301) 504-2933.

SUPPLEMENTARY INFORMATION:

Background

On November 4, 1993 (58 FR 58804), the Commission published a proposed rule in the Federal Register for public comment that presented amendments to the physical protection requirements for operating commercial nuclear power reactors. The amendments proposed to modify the design basis threat for radiological sabotage to include use of a land vehicle by adversaries for transporting personnel, hand-carried equipment, and/or explosives. A total of 35 letters of public comment were received from respondents representing more than 160 individual comments. Comments received in association with a public meeting conducted by the NRC on May 10, 1993, on this same topic have also been analyzed as part of this final rulemaking. An additional 11 comments were received as a result of the meeting, representing an additional 38 individual comments. Written comments received from the Advisory Committee on Reactor Safeguards (ACRS) and public comments made at a February 10, 1994, meeting of the ACRS are also addressed under the following analysis. Copies

of the public comments received on this proposed rule are available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington, DC.

Public Comment Analysis

General.

Public comment on the rule was received from 25 licensees that operate commercial nuclear power reactors; two industry groups, the Nuclear Management and Resources Council (NUMARC) and the Nuclear Utility Backfitting and Reform Group (NUBARG); two public citizens and one citizen's group, Ohio Citizen's for Responsible Energy; two advocacy groups, the Nuclear Control Institute (NCI) and the Committee to Bridge the Gap; one State nuclear safety agency; and two vendors.

Additional comments were received as a result of an NRC-sponsored public meeting of May 10, 1993. Comments were received from eight private citizens (the letter from one enclosed a petition signed by 40 individuals); two utilities; and one public interest group, Ohio Citizens for Responsible Energy. The proposed rule indicated that comments regarding malevolent use of vehicles submitted in association with the meeting would be treated under this final rule and that duplicate comments need not be submitted. Many of these respondents recommended strengthening the design basis threat to cover the maximum credible threat and increasing the number of security force members at power reactor sites as the best method to counter a terrorist vehicle bomb attack. The aforementioned petition, submitted to the Chairman of the NRC,

indicated, among other things, that Congress should strengthen safeguards at nuclear facilities and should legislate the use of Federal guards at NRC-licensed sites. Comments received from 2 utilities that operate commercial nuclear power reactors either indicated support for the then-developing NUMARC comments or were similar to comments received on the proposed rule.

A variety of general comments were received on the proposed rule and supporting documentation. Several strongly supported the rulemaking as proposed and expressed the view that rulemaking on this topic was the proper, proactive approach. A number of comments strongly supported a belief that vehicle intrusion and vehicle bomb threats exist. These comments refer to the Three Mile Island intrusion event and the World Trade Center bombing event as evidence of these threats. The NCI commented that the rule was long overdue. Some of those that supported the rule offered more detailed comments proposing further expansion of the design basis threat and placing more rigid controls on licensee actions to implement the rule.

NUMARC provided detailed comments on behalf of the industry. Fourteen utilities confirmed their support or agreement with NUMARC's comments. NUMARC commented that industry believes that it is important to deter unauthorized land vehicle penetration challenges to a licensee's protected area and that industry recognizes that facilities must be able to shut down safely in the unlikely event of the detonation of an explosive device outside the protected area. NUMARC considers these actions to be prudent for the protection of its employees, investment, and public confidence. NUMARC commented that because the NRC (as expressed in the proposed rule) and NUMARC agree in principle, the issue should be addressed in an integrated manner using a reasonable and realistic approach without imposing unnecessary conservatism. The details of

NUMARC's comments identified areas where they considered the proposed rule took too conservative an approach. NUMARC also expressed general concerns about the backfit justification for the rule and the schedule for implementation.

NUBARG, whose members include 15 nuclear utilities, provided comments that generally challenge the backfitting and regulatory analyses based on their concerns that the analyses did not provide a sufficient quantified basis for finding the requisite "substantial increase" in safety under the NRC's backfitting rule. Two of the comment letters provided by utilities confirmed their support or agreement with NUBARG's comments.

Several comments expressed the view that the proposed rule could not be substantiated based on the current threat. As support for this position, comments referred to conclusions reached by the NRC in denial of a 1991 petition for rulemaking to require licensees to protect against truck bombs. Other comments indicated that two isolated events (the Three Mile Island intrusion event and World Trade Center bombing) did not justify rulemaking, particularly in light of the fact that the Federal Bureau of Investigation (FBI), by their account, does not support the position that the threat of malevolent use of vehicles has increased and the NRC position is that no actual vehicle bomb threat against power reactors exists.

Several comments opposed the proposed rule because they considered that it did not provide a substantial increase in protection of public health and safety or common defense and security at a justifiable cost. Other comments indicated that the rule was extreme and unnecessarily burdensome with little if any safety benefit and that contingency plans for vehicle bombs currently in place adequately addressed the threat of malevolent use of vehicles.

The NRC staff presented the proposed rulemaking package to the Security Subcommittee of the Advisory Committee on Reactor Safeguards (ACRS) on November 3, 1993, and the full committee on November 4, 1993. The full committee was briefed on December 10, 1993, in a closed session, by the Director, Office of Nuclear Material Safety and Safeguards. Following these briefings, ACRS's December 10, 1993 letter to the Chairman raised concerns about the rulemaking, particularly the justification for the rule, the lack of a quantitative risk assessment to support it, and the expedited nature of the rulemaking. A minority of four members of the ACRS expressed a view that the proposed rule represents a prudent and effective step toward enhancing public health and safety. On February 10, 1994, the ACRS heard presentations on the rulemaking from the NUMARC, the NCI, one public citizen, and the NRC staff members. On April 7, 1994, the staff briefed the ACRS in a closed session regarding additional, quantitative evaluations that supported this rulemaking. Issues raised by the ACRS in their December 10, 1993, letter are encompassed by issues raised by the public and are addressed in the following responses.

Like the ACRS, NUMARC, NUBARG, and numerous utilities expressed concern that the safety benefit was not adequately justified or quantified. They challenged the validity of the regulatory and backfit analyses because of lack of quantification of the threat. They contended that the analyses contain no quantified risk data or safety goal evaluation to support the conclusion that the proposed regulations result in a substantial increase in public health and safety. Another comment, while acknowledging the potential difficulty in quantification of the threat, stated that the analyses were no more than "conclusionary" and fall short of demonstrating the requisite substantial increase in radiological safety.

The Commission notes that the use of probabilistic risk assessment (PRA) as a tool for estimating risk is sound when based on results from demonstrable, repeatable events and test data - for example, establishing the probability of failure and the mean time to failure for aircraft wing root structures due to metal fatigue or for valve failures due to water hammer or corrosion, etc. The NRC has examined the use of PRA to predict sabotage as an initiating event and concluded that to do so would not be credible or valid because terrorist attacks, by their very nature, may not be quantified. Past attempts to apply PRA techniques to acts of sabotage have resulted in similar findings. For example, in 1978, NUREG/CR-0400, the "Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission" stated, "it was recognized that the probability of sabotage of a nuclear power plant cannot be estimated with any confidence." For this same reason, according to this report, consideration of risk of sabotage was deliberately omitted in the Reactor Sa[illegible] Study (WASH-1400).

In the "Policy Statement on Safety Goals for the Operation of Nuclear Power Plants" published on March 14, 1983 (48 FR 10772), the Commission stated:

> The possible effects of sabotage or diversion of nuclear materials is not presently included in the safety goal. At present there is no basis on which to provide a measure of the risk of these matters. It is the Commission's intention that everything that is needed shall be done to keep such risks at their present, very low, level; and it is our expectation that efforts on this point will continue to be successful. With these exceptions it is our intent that the risk from all various

initiating mechanisms be taken into account to the best of the capability of the current evaluation techniques.

In the 1983 Indian Point licensing hearings, the NRC staff testified that PRA is unable to predict the probability of sabotage as an initiating event. Also, in a June 11, 1991, petition to institute an individual plant examination program for threats beyond the design basis, the NCI stated a position similar to the NRC's by recognizing that PRA-type methods cannot be used to analyze for core damage frequency since one cannot quantify the likelihood of a terrorist attack.

The Commission continues to believe that arbitrary selection of numbers to "quantify" threat probability without demonstrable, actual, supporting event data would yield misleading results at best. Knowledgeable terrorism analysts recognize the danger and are unwilling to quantify the risk. Over the past several years, a number of National Intelligence Estimates have been produced addressing the likelihood of nuclear terrorism. The analyses and conclusions are not presented in terms of quantified probability but recognize the unpredictable nature of terrorist activity in terms of likelihood. The NRC continues to believe that, although in many cases considerations of probabilities can provide insights into the relative risk of an event, in some cases it is not possible, with current knowledge and methods, to usefully quantify the probability of a specific vulnerability threat.

The NRC notes that, although not quantified, its regulatory analysis recognizes the importance of the perception of the likelihood of an attempt to create radiological sabotage in assessing whether to redefine adequate protection. The NRC's assessment that there is no indication of an actual

vehicle threat against the domestic commercial nuclear industry was an important consideration in concluding that neither the Three Mile Island intrusion nor the World Trade Center bombing demonstrated a need to redefine adequate protection.

The NRC does not agree that quantifying the probability of an actual attack is necessary to a judgment of a substantial increase in overall protection of the public health and safety (a less stringent test of the justification for a rule change). Inherent in the NRC's current regulations is a policy decision that the threat, although not quantified, is likely in a range that warrants protection against a violent external assault as a matter of prudence.

The potential threat posed by malevolent use of vehicles as part of a violent external assault and the need to protect against it have been the subject of detailed consideration and reconsideration by the Commission for more than fifteen years. The original requirements for physical security at power reactor sites proposed in the mid-1970s included a requirement for barriers to prevent ready access to vital areas by ground vehicles. The Commission decided not to include the requirement at that time.

The Commission reexamined the vehicle issue in great detail in the 1980s. In 1986, the Commission concluded that, even though perimeter chain link fences would not prevent vehicle intrusion, the requirement for prompt response by guards armed with shoulder-fired weapons would limit actions of intruders. In reconsidering the risk from use of a vehicle to gain proximity to vital areas, the NRC's regulatory analysis does not suggest that the likelihood of a violent external assault has increased. Rather, the staff focussed its regulatory analysis on whether a vehicle could provide an advantage to an adversary with the characteristics of the design basis threat.

The NRC assessed lessons learned from the TMI intrusion and concluded that a vehicle could provide advantages to an adversary not previously considered. In SECY-86-101, "Design Basis Threat - Options for Consideration," March 31, 1986, the NRC concluded that, even though perimeter chain link fences would not prevent vehicle intrusion, the requirement for prompt response by guards armed with shoulder-fired weapons would limit actions of intruders. Accordingly, in 1986, the NRC concluded that the installation of vehicle barriers might not constitute a substantial overall increase in the protection of public health and safety. More recently, the NRC has analyzed the capability of existing licensee security measures to protect against a violent external assault that includes a vehicle as a mode of transportation. These new analyses support the NRC's conclusions in the regulatory analysis for the proposed rulemaking. The NRC believes that the vehicle intrusion issue alone warrants the installation of vehicle barriers at nuclear power plants.

In the 1980s, the NRC also consulted with other Federal agencies, including the National Security Council, regarding the use of vehicle bombs in the Middle East and their possible impact on the domestic threat situation. In June 1988, the NRC decided that it would not be necessary to change the design basis threat for radiological sabotage (10 CFR 73.1(a)(1)) nor to require long-range planning by power reactor licensees for permanent protection against land vehicle bombs. However, as a matter of prudence, it directed development of NRC and licensee contingency plans for dealing with a possible land vehicle bomb threat to power reactors, should one arise.

On June 11, 1991 (56 FR 26782), the Commission denied a petition for rulemaking to revise the design basis threat to include explosive-laden vehicles (PRN-73-9). In denying that petition, the NRC noted that the

decision was based, in part, on the fact that only one truck bomb attack (1970) had occurred in the United States; there had been no other vehicle bomb attacks in the Western Hemisphere; there had been none outside areas of civil unrest; and there had been none directed against a nuclear activity. The vehicle bomb attack on the World Trade Center represented a significant change to the domestic threat environment that changed many of the points used in denying the petition and eroded the basis for concluding that vehicle bombs could be excluded from any consideration of the domestic threat environment. For the first time in the United States, a conspiracy with ties to Middle East extremists clearly demonstrated the capability and motivation to organize, plan, and successfully conduct a major vehicle bomb attack. Regardless of the motivations or connections of the conspirators, it is significant that the bombing was organized within the United States and implemented with materials obtained on the open market in the United States. Accordingly, the Commission believes that the threat characterized in the final rule is appropriate.

As a result of the World Trade Center bombing, the NRC believes that the construction of a vehicle bomb is more likely to develop without advance indications. The NRC does not believe that it can quantify the likelihood of vehicle bomb attack. However, it has performed a conditional probabilistic risk analysis for an existing power reactor site, assuming an attempt to damage a nuclear power plant with a design basis vehicle bomb placed at locations within the protected area that would create the greatest risk to public health and safety. The analysis indicated that the contribution to core damage frequency could be high.

Barriers installed to protect against vehicle intrusion into protected areas would also protect, to varying degrees, against vehicle bombs. The NRC

believes that adjusting the location of barriers where necessary to ensure a capability of protecting vital equipment against a design basis vehicle bomb would provide an additional, substantial increase in the overall protection of the public health and safety. Further, the NRC believes that the incremental costs to licensees to analyze the degree of protection against a vehicle bomb and to make adjustments in vehicle control measures in limited cases are justified, particularly considering the provisions in the rule allowing licensees to propose alternative measures if a site-specific analysis indicates that the costs of fully meeting the rule's design goals and criteria are not justified by the added protection that would be provided. The NRC's additional deterministic evaluations and limited probabilistic assessments have supported the NRC's earlier findings that protecting against vehicle intrusion and a vehicle bomb would substantially increase the overall protection of public health and safety. The NRC has updated the regulatory analysis to include these evaluations.

Additional issues raised and the NRC response to these issues are provided in the sections listed below that follow:

I. Threat Considerations

- A. Coupling Vehicle Intrusion and Vehicle Bomb Threat
- B. Characteristics of Design Basis Vehicle/Explosive
- C. "Margin of Prudence"
- D. Design Basis Threat Re-Evaluation
- E. Applicability of 10 CFR 50.13
- F. "Threat" or "Alert" Program

II. Regulatory and Backfit Analyses

- A. Redundant Engineered Safeguards Systems

I. Threat Considerations

A. Coupling Vehicle Intrusion and Vehicle Bomb Threat

Comment. NUMARC and several utilities commented that the proposed rule unnecessarily linked vehicle intrusion with a vehicle bomb. NUMARC commented that the proposed rule contemplates that the intruding vehicle would be fully loaded with personnel, equipment, and a large explosive device. NUMARC also commented that any considerations of a vehicle bomb should be for a stationary vehicle. NUMARC stated that coupling the vehicle intrusion event and vehicle bomb event added unnecessary conservatism. For example, to protect against a

moving vehicle, bomb barriers would, in some cases, need to be more substantial to stop penetration of vehicle. NUMARC proposed that the revised design basis threat should include either a land vehicle intrusion or a detonation of explosives outside the protected area, but not a combination of the two. Along this same line, one comment expressed the opinion that the proposed language implies the need to protect against a vehicle used for transport, not for breaching a barrier or for use as a truck bomb.

Another comment expressed a concern that a major defect in the rule is the lack of the assumption that the adversary could blast away a fence if a licensee were to choose to use, for example, cabling in the fence as the means to stop a vehicle. The respondent proposed that any barrier should be a heavy mass which would be resistant to destruction.

Response. The Commission agrees with the NUMARC comment that the proposed rule could be read to imply that licensees would be required to provide protection against an intrusion by adversaries using a vehicle for transportation coincident with a vehicle bomb. This was not the intent and the rule wording has been revised to clarify this point. Commission deliberations on the rule have considered use of the vehicle as transportation for an adversary and a vehicle bomb as separate threats to be protected against. Any coupling of adversary tactics associated with the rule was intended to allow for more efficient and cost effective protection against either a vehicle intrusion to gain rapid access to vital areas, as a single act, or against a vehicle bomb.

With respect to whether the vehicle bomb is moving or stationary, the Commission notes that the primary difference in implementation of NRC-proposed measures and NUMARC's proposal of protecting against a stationary vehicle is

the robustness of the barrier. It is theoretically possible, for some types of barriers, that NUMARC's proposal could result in less costly barriers than under the proposed design basis threat. However, NRC staff analysis indicates the lower design basis kinetic energy resulting from NUMARC's proposal makes no practical difference for standard barriers. In addition, the NRC's regulatory analysis indicated that, because of the short distances between vital areas and portions of some protected area boundaries, protection against a vehicle at existing boundaries would be inconsistent with NUMARC's stated goal of being able to safely shut down a plant following the detonation of an explosive device outside the protected area.

Regarding the comment that the rule should include the assumption that adversaries may use devices to destroy less substantial barriers and then gain access, the Commission does not agree that this assumption should be included in the rule. The NRC assessment of the threat environment does not support this assumption. Further, use of such a technique by an adversary would tend to diminish one of the major advantages of use of a vehicle - the element of surprise.

B. Characteristics of Design Basis Vehicle/Explosive

Comment. NUMARC provided a detailed proposal for characteristics of a design basis vehicle that could be used to attempt penetration of a nuclear power plant protected area and a design basis bomb that could be used in an attempt to damage plant equipment. Other comments indicated that vehicle speed should take into consideration terrain and seasonal conditions and that

the proposed vehicle explosive device size was excessive and not justified by historical experience, particularly that in the United States.

Response. The Commission notes that it has relied on analogous historical data when enumerating the attributes of a design basis threat because there has never been a terrorist attack on an NRC-licensed power reactor facility or a credible threat of an attack. This was the methodology used in formulating the original design basis threat statements in the late 1970s, and it was used in defining the proposed design basis vehicle threat. The design basis vehicle was defined after examining several hundred actual vehicle bombing attacks occurring worldwide during approximately the past decade. Historical data indicates that vehicle bombs, similar to the design basis vehicle, have been used in the past and their use can reasonably be expected to continue to occur in the future. The Commission has made no change to the characteristics of the design basis vehicle/explosive in response to these comments. However, the NRC's implementation guidance does discuss how the design of barrier systems can account for site-specific limits on the speed that a vehicle could attain because of factors such as terrain.

Comment. One comment expressed confusion over reference to the design basis vehicle as a "4-wheel drive vehicle" in that this could imply that non 4-wheel drive vehicles would not have to be protected against. The comment recommended that the final rule language be changed to require protection against all land vehicles.

Response. The Commission disagrees that the term "4-wheel drive vehicle" needs clarification. It reasons that protection against intrusion by a 4-wheel drive vehicle encompasses protection against a land vehicle with less than 4-wheel drive.

Comment. Other comments noted that the regulatory language should be changed to remove reference to equipment and explosives capable of being hand-carried, as opposed to that which the vehicle could carry.

Response. As stated previously, this issue is being clarified by a revision of the design basis threat statement to separate the threat of intrusion versus vehicle bomb. In an intrusion event, the vehicle is obviously capable of transporting the equipment and explosives proposed to be hand-carried by an adversary. While the vehicle could carry more equipment than can be carried by the persons being transported, it is unlikely that this additional equipment would be of use to the adversaries. The vehicle is essentially a means of transport for the adversaries, and it is unlikely that once adversaries have left the vehicle they would be able to return to obtain additional equipment or explosives.

Comment. One utility provided specific questions regarding several assumptions associated with the vehicle bomb. These included whether:

The vehicle is under control by adversaries up to the point of detonation;

The vehicle bomb automatically detonates when the adversary loses control of the vehicle or after a pre-defined time period;

The vehicle is used in combination with a secondary external event, e.g., loss of offsite power; and,

Point of detonation, i.e., crash point or at a later point as vehicle rolls towards a facility.

Response. With respect to a vehicle bomb, for analysis purposes the device would be considered to detonate at the point where the vehicle impacted the vehicle barrier system including the distance of penetration. Whether adversaries still have control of the vehicle or whether the detonation of the

device is delayed should have little impact on the analysis of the effect of the explosive blast. Because the barrier system is intended to protect against vehicles gaining proximity to vital areas, the barrier system should not allow a vehicle to fully penetrate it and continue to roll towards a facility.

With respect to a secondary external event, power reactor licensees must protect against all capabilities and attributes described by the design basis threat for radiological sabotage. This would not include protection against other natural events, such as damage from a hurricane, coincident with a sabotage threat. However, with respect to loss of off-site power, licensees should consider its loss, if vital equipment is assumed damaged, in their analysis of the effects of a vehicle bomb. This consideration is compatible with the basic premise that equipment not designated and protected as vital is vulnerable to damage and is not available.

C. "Margin of Prudence"

Comment. NUMARC and several utilities commented on NRC's use of the term "margin of prudence" as the basis for support of the proposed rulemaking. NUMARC commented that it is inappropriate to use such an undefined concept as a basis for rulemaking. These comments indicated that NRC expansion into matters of prudence is unwarranted and would result in expansion of the NRC's sphere of regulatory influence beyond plant safety.

Response. Use of the term "margin of prudence" must be put in perspective as used by the NRC in this rulemaking. The NRC requires an established level of security at nuclear power reactor sites as a provision against possible

security contingencies that might arise. The NRC has concluded that a satisfactory level of security is one that is designed and implemented to protect against a hypothetical threat (design basis threat) that contains certain adversary attributes. These attributes have been selected based on Commission analyses of actual terrorist attributes and on judgment. The term "margin of prudence" was used in recent Commission deliberations to suggest that the World Trade Center bombing and the Three Mile Island intrusion had caused a change in the domestic threat environment or in the NRC's understanding of the sabotage threat that was not satisfactorily addressed by the existing design basis threat. Further, the term was used to suggest that a modification of the design basis threat was necessary to reestablish a level of security commensurate with the nature of security contingencies that might arise. Its use was illustrative only of the relationship between an actual threat and the hypothetical design basis threat and the change in that relationship caused by the World Trade Center and Three Mile Island events. The NRC intended no wider or expanded use of the term.

D. Design Basis Threat Re-Evaluation

Comment. NUMARC and several utilities commented that the revision to the design basis threat to address malevolent use of vehicles should be addressed in an integrated manner so that rulemaking on this topic would not be impacted after completion of an ongoing, more comprehensive review of the design basis threat. Other comments expressed concerns about deficiencies in the design basis threat that need to be addressed. Deficiencies identified by these comments included: protection against more than one insider, protection

against a larger number of external attackers, capability of attackers to operate as more than one team, and use of aquatic vehicles. One comment was made that ongoing considerations for reductions in the insider requirements should be part of the overall reconsideration of the design basis threat.

Response. The Commission notes that use of a vehicle by adversaries was addressed under Phase I of a re-evaluation of the design basis threat which the NRC began in the Spring of 1993. This phase of the re-evaluation has been completed. Other attributes associated with the design basis threat, such as those characterized in comments on the proposed rule, have been reviewed and considered as part of Phase II of the re-evaluation. NRC staff recommendations on this part of the re-evaluation were provided to the Commission in a classified paper on March 15, 1994.

The NRC considered reductions in its requirements related to an insider as part of its reconsideration of the design basis threat. A Commission decision on February 18, 1994, to allow licensees to leave all vital area doors unlocked increased the importance of requiring vehicle barriers. The NRC believes that the vehicle intrusion issue alone warrants the installation of vehicle barriers at nuclear power plants.

E. Applicability of 10 CFR 50.13

Comment. NUMARC, NUBARG, and several utilities stated that the proposed change in the design basis threat to include malevolent use of a vehicle amounts to escalation of the threat to efforts by an enemy of the United States. The comments contended that the proposed changes to the design basis threat are, therefore, in conflict with 10 CFR 50.13, which specifies that

licensees are not required to provide for design features to protect against attacks and destructive acts by an enemy of the United States. One comment recommended that NRC should re-evaluate the design basis threat assumption to now include foreign enemies of the United States.

Response. In 10 CFR 50.13, which was promulgated on September 26, 1967 (32 FR 13445), the regulations provide that applicants for construction permits, operating licenses, or amendments thereto, need not provide for design features or other measures to protect against the attacks or destructive acts, including sabotage, by an enemy of the United States. The issue raised in a contested application for a power reactor construction permit, which led to the promulgation of 10 CFR 50.13, was whether the reactor should be constructed to withstand a missile attack from Cuba. There is a significant difference in the practicality of defending against a missile attack and constructing a vehicle barrier at a safe standoff distance from vital areas.

The statement of considerations for 10 CFR 50.13 makes it clear that the scope of that regulation is to relieve applicants of the need to provide protective measures that are the assigned responsibility of the nation's defense establishment. The Atomic Energy Commission recognized that it was not practical for the licensees of civilian nuclear power reactors to provide design features that could protect against the full range of the modern arsenal of weapons. The statement concluded with the observation that assessing whether another nation would use force against a nuclear power plant was speculative in the extreme and, in any case, would involve the use of sensitive information regarding both the capabilities of the United States' defense establishment and diplomatic relations.

The new rule, with its addition to the design basis threat and added performance requirements, is in response to a clearly demonstrated domestic capability for acts of extreme violence directed at civilian structures. The participation or sponsorship of a foreign state in the use of an explosives-laden vehicle is not necessary. The vehicle, explosives, and know-how are all readily available in a purely domestic context. It is simply not the case that a vehicle bomb attack on a nuclear power plant would almost certainly represent an attack by an enemy of the United States, within the meaning of that phrase in 10 CFR 50.13.

Further, characterizing the threat as "para-military" adds little to the understanding of the intent of 10 CFR 50.13. "Para-military" suggests an armed, trained group acting outside of a legally constituted military organization. In that sense, the design basis threat prior to this amendment already described a "para-military" group. "Para-military" groups of entirely domestic origin exist. Accordingly, the amended regulation and supporting analyses need not address 10 CFR 50.13, either on the grounds that a vehicle bomb attack is an attack by an enemy of the United States or the action of a "paramilitary" group. That regulation is irrelevant to the present rulemaking.

The implication of the comments regarding 10 CFR 50.13 is that the simple addition of a vehicle bomb to the design basis threat should shift the function of providing physical security for nuclear power plants from the licensee to the Federal Government. The respondents present no real evidence or persuasive arguments for such a radical change in the regulatory environment.

F. "Threat" or "Alert" Program

Comment. One comment suggested that the NRC develop and implement a "threat or alert" program similar to the Department of Defense's Defense Condition "DEFCON" program. It was recommended that, under such a program, the NRC would immediately notify the industry when information is received from the intelligence community of an impending security alert and provide a recommended level of action. Licensees, in turn, would be required to develop security response plans based on NRC-established threat levels.

Response. The Commission believes that its current Information Assessment Team approach for notifying licensees of significant events has been effective in disseminating and coordinating such information. The Information Assessment Team (IAT) assesses in a timely manner reported threats to NRC-licensed facilities, materials, and activities to determine credibility and make recommendations to NRC management. The IAT is composed of experienced Headquarter's and Regional staff who are on-call 24 hours a day and bring a variety of expertise to the assessment process, such as reactor systems, site specific information, and liaison with other Federal agencies, including close coordination with the Department of Energy on threat advisories to the utility industry and NRC licensees. The IAT was established in 1976, and since that time has supported NRC decision makers responding to a range of threats, from bomb threats against reactors to times of international tension during Operation Desert Shield and Storm. For example, coordinated threat advisories related to the latter were issued by the IAT on August 24, 1990, January 9, 1991, and April 2, 1991. However, the NRC does not believe that the IAT is an adequate alternative to vehicles barriers at nuclear power plants.

II. Regulatory and Backfit Analysis

A. Redundant Engineered Safeguards Systems

Comment. One comment indicated that the proposed rule did not adequately take into consideration the existing engineered safeguards systems installed at nuclear power plants. The comment was made that unauthorized access and possible damage to any one vital area does not necessarily prevent the safe shut down of the nuclear reactor.

Response. The Commission agrees that consideration should be given to engineered safeguards systems and believes that flexibility has been built into the rule to allow for consideration of such existing systems. The redundancy and diversity of existing engineered safeguards systems was considered in the NRC analysis of the capability of existing licensee security measures to protect against a violent external assault that includes a vehicle as a mode of transportation. Specific plant equipment layout can be a factor in protective considerations against a vehicle bomb. Equipment that is redundant or provides backup to equipment assumed to be damaged by a vehicle bomb may be considered in the analysis for determining whether protective measures established to protect against vehicle intrusion fully meet the design goals and criteria for protection against a land vehicle bomb.

B. Peer Review of Analysis

Comment. One comment recommended that any research results, risk analyses, cost calculations and other work by the NRC should be subject to peer review.

Response. The NRC believes that its work is subject to various types of review and, in a sense, is subject to peer review. Portions of the risk analyses were conducted by groups with appropriate expertise, including threat assessment, physical security system performance evaluation, critical target set analysis, safety system inspections, probabilistic risk analysis, vehicle barrier design, and vehicle bomb analysis. In addition, the types of efforts mentioned by the comment are often the subject of multiple office review within the NRC. Several technical review groups, both within and external to the NRC, provide further consideration of NRC staff work. Finally, with respect to rulemaking, analyses are the subject of public comment.

C. Clarification

Comment. One comment noted that the wording associated with the backfit analysis in the proposed Federal Register notice did not precisely coincide with that found under 10 CFR 50.109 (a)(3)

Response. The Commission notes that the wording in the notice is wording that is used for most NRC rules that are subject to backfitting. The Commission considers that this wording is consistent with the requirement cited.

III. Rule Implementation

A. Schedule

Comment. A large number of comments were received on the schedules associated with the proposed rule. Some indicated that the proposed schedule to submit a summary description of the barrier system and results of vehicle bomb comparison within 90 days was not long enough. One comment was received supporting the proposed schedule. Those commenting that the schedule was too tight expressed concern that 90 days did not provide sufficient time to perform a thorough design analysis, particularly if alternative measures were to be proposed. NUMARC, and several other respondents, recommended that licensees be provided 180 days after issuance of the rule to provide a summary description of the barrier system.

A number of comments were also received stating that the proposed schedule to confirm implementation within 360 days after issuance of the rule was not long enough. Those commenting that the schedule for completion of installation was too tight expressed concern that the schedule did not adequately account for material procurement and availability, outage schedules, and weather circumstances. NUMARC and several other respondents recommended that licensees be provided 18 months after issuance of the rule to complete installation of measures to meet the rule. A few comments were received that recommended that implementation schedules be established on a case-by-case basis.

Response. The Commission agrees that an extension to the schedule is reasonable based on the fact that this is a new program for power reactor

sites, that there may be some difficulty in procurement of active vehicle barrier systems, and that possible deleterious effects on scheduling may result from the weather or planned outages. Accordingly, the time period for submission of the summary required by 10 CFR 73.55(c)(9)(i) is extended from 90 to 180 days from the effective date of the rule. The implementation period required under 10 CFR 73.55 (c)(9)(ii) is extended from 360 days to 18 months from the rule's effective date.

B. NRC Review and Approval of Submittals

Comment. Three comments recommended that the NRC should review and approve all licensee submittals, including the summary description of the proposed measures to protect against vehicle intrusion, the results of the vehicle bomb comparison, and, for applicable licensees, alternative measures to protect against an explosive device.

Response. The NRC believes that approval of all summaries submitted under 10 CFR 73.55(c)(9)(i) would unnecessarily delay expeditious implementation of this rule. All licensees are required to amend their physical security plans to commit to the implementation and use of the vehicle barrier system described by the regulations. These commitments are fully inspectable and enforceable by the NRC. The NRC would review and approve the limited number of requests expected to use alternative measures that might not fully meet the design goals and criteria for protection against a vehicle bomb. The final rule has been changed to clarify that proposals for alternative measures be submitted in accordance with the provisions of 10 CFR 50.90.

C. Vehicle Barriers

Comment. NUMARC and several other respondents expressed concern that barrier systems would be required to be "nuclear grade" and that this would unnecessarily escalate costs. Another comment expressed the opinion that, instead of licensees certifying to the NRC that vehicle barriers meet requirements, they be able to choose barriers from some pre-approved list. NUMARC commented that design and certification needed to utilize existing technology and barrier device test results, or costs would unnecessarily escalate. NUMARC also requested that the discussion in the Regulatory Guide be expanded to describe flexibility available to licensees in designing and installing barriers.

Response. The NRC is unaware of any requirement for "nuclear grade equipment" and notes that the expression does not appear in the proposed rule or supporting guidance. The NRC agrees with the industry comment that commercially available materials suffice for the construction of the vehicle barrier if the barrier is capable of countering the design basis vehicle threat. As suggested by many respondents, the NRC recommends that affected licensees take advantage of available information on vehicle barrier testing, much of which has been conducted by Federal laboratories and agencies.

With respect to the use of "pre-approved barriers," the Commission believes that most vendors of commercial vehicle barrier systems know what the "stopping powers" of their barriers are. Licensees should use this as a resource in determining what barrier can counter the attributes of the Commission's design basis vehicle most cost effectively. In addition, the NRC has provided information on performance levels of several types of barriers to

affected licensees. The Commission agrees with the NUMARC comment concerning expansion of the discussion on the flexibility of designing and installing barriers in the regulatory guide supporting the rule. The regulatory guide now reflects this.

Comment. NUMARC expressed the view that compensatory measures, not explicitly addressed in the proposed rule or regulatory guide, for maintenance or repair of barriers should be determined by the licensee. Another comment stated that compensatory measures required if a barrier is temporarily inoperable, as with maintenance, need to be addressed at an early stage.

Response. The NRC anticipates that vehicle barriers, particularly passive barriers, will infrequently become non-functional once installed. For those infrequent cases, any compensatory measures should take into consideration the type and cause of the problem and the time the barrier will be non-functional. For example, or short term problems with active or passive barriers, compensatory measures would not be expected to be extensive. In cases where barriers are non-functional for longer periods, compensatory measures may include placement of heavy vehicular equipment, concrete highway median barriers arranged in a serpentine fashion, installation of strands of airplane arresting wires, or the positioning of an officer armed with a high power contingency weapon may be appropriate. The regulatory guide issued in support of this rulemaking has been revised to include guidance regarding compensatory measures.

D. Passive Vehicle Barriers

Comment. One comment was directed at the guidance that specified measures should be established to periodically verify the integrity of passive barriers outside the protected area. It was commented that passive barriers by their nature (ditches, berms, concrete filled embedded poles, etc.) do not require inspection, or if so, the period for inspecting should be on the order of several years. If licensees were to install a unique passive barrier that should need periodic inspection, it should be addressed on a case-by-case basis.

Response. The Commission agrees that the components of many passive barrier systems do not need to be inspected on a weekly or monthly basis due to the nature of their construction. Observations by routine security patrols should be sufficient to detect any degradation in the barrier. Some types of barriers may be more susceptible to deterioration, damage, or tampering and therefore should be subject to more frequent observation by security patrols or, in some cases, periodic inspection. Given the large variation in components of passive barriers, the Commission considers it appropriate to provide licensees with flexibility on how to assure the continued integrity of barrier components. If the barrier system is damaged, the Commission expects that such damage would be identified in a reasonable period and actions would be taken promptly to repair the damage.

E. Active Vehicle Barriers

Comment. Two comments were received requesting that the wording in the proposed regulatory guidance clarify that only one active barrier is needed to deny access. Also, one utility commented that the provision in the regulatory guide that specified vehicles and their operators be authorized for entry before being permitted access inside the vehicle barrier system would preclude their current practice of searching the vehicle after entry inside the active barrier.

Response. The NRC agrees with these comments and the guidance in the regulatory guide supporting the rule has been changed.

Comment. Another comment recommended that specific kinetic energy be identified for use in design of active barriers with documented performance satisfying specific energy requirements because this approach would help avoid costly independent testing to demonstrate performance.

Response. Guidance previously forwarded to licensees, designated as Safeguards Information, defines the kinetic energy associated with the design basis vehicle. As previously stated, the NRC has provided information to affected licensees on performance levels of several types of barriers to help avoid costly independent testing.

F. Alternative Measures to Protect Against Explosives

Comment. One comment objected to the rule's provisions that would allow some licensees to provide only "substantial protection" and not equivalent protection to fully meet the Commission's design goals and criteria for

protection against a vehicle bomb. One comment indicated that the NRC should not be considering costs in determining the acceptability of alternative measures because costs should not be considered relative to enforcing adequate protection. NUMARC commented that it was reasonable for licensees to have the option to propose alternative measures for Commission review when the design goals and criteria for protection against a vehicle bomb cannot be met without a significant resource burden.

Response. The NRC's regulatory analysis concluded that neither the Three Mile Island or World Trade Center events demonstrated a need to redefine adequate protection. The NRC's basis for the backfit being implemented by this rulemaking was a determination that it would result in a substantial increase in protection of the public health and safety. Paragraph 50.109(a)(3) of Title 10, Code of Federal Regulations, authorizes such a backfit only if the costs of implementation are justified in view of the increased protection. The NRC concluded that the estimated costs for all licensees to provide barriers to protect against vehicle intrusion were justified. However, at some sites, the location of barriers to protect against vehicle intrusion could provide substantial protection against a vehicle bomb without fully meeting the NRC's design goals and criteria for protection against an explosive device. For these licensees, the incremental costs for placing barriers further from vital areas or for providing additional protective measures to fully meet the design goal and criteria may not be justified by the incremental protection beyond the substantial level.

Comment. NUMARC objected to the provision that licensees proposing alternative measures must compare their costs with the costs of measures needed to fully meet the design goals and criteria for protection against a

vehicle bomb and must provide an assessment supporting a finding that the additional costs are not justified by the added protection that would be provided. NUMARC asserted that the NRC was requiring licensees to perform analyses beyond what the NRC staff has done in support of the proposed rule.

NUBARG similarly asserted that the NRC was requiring licensees to prove that alternative measures substantially increase safety, which is unfair. NUBARG asserts that this requires licensees to perform a backfit analysis on why they should not install a proposed modification (one that would fully meet the design goals and criteria) and that this runs counter to the backfit principle of the NRC providing the analysis.

Several respondents stated that they understood that the rule and regulatory guidance specified that those licensees proposing alternative measures would need to submit to the NRC a quantitative analysis to justify that the cost of plant specific measures are not justified by the added protection afforded. The comments indicated that, based on this understanding, such a task would be difficult, if not impossible.

A public interest group expressed the opinion that contingency planning as part of alternative measures is unacceptable when compared to a permanent vehicle control system.

Response. The optional licensee analysis provided for in the revised regulations is intended to be similar in approach to that performed by the NRC in the development of the regulatory analysis for the rulemaking. The Commission recognizes the difficulties with respect to quantification of the protection provided (see general discussion) and would expect licensees to provide a more deterministic analysis in comparing the relative protection provided by alternative measures taken by the licensee that don't fully meet

the Commission design goal and criteria for protection against a vehicle bomb. The Commission did not intend to require its licensees to do more of an analysis or a different type of analysis than that performed by the NRC. The quantitative aspects of the analysis required by the regulation only apply to cost considerations, particularly the comparison of costs needed to fully meet the Commission's design goals and criteria for protection against a vehicle bomb with the cost of alternative measures.

The comment that contingency planning would be an unacceptable alternative to permanent vehicle barriers does not recognize the provision in the rule that specifies that all licensees are required to establish a vehicle barrier system to protect against use of a land vehicle as a means of transportation to gain unauthorized proximity to vital areas. Licensees may not substitute contingency plans for vehicle barriers. Rather, contingency plans were identified as one possible option for licensees (those few where it may be practical for them to propose alternative measures to protect against explosives) to supplement protection provided by the licensee's vehicle barrier system for protection against a vehicle bomb.

IV. NRC Inspection

Comment. One comment indicated that the NRC should establish procedures to assure licensee compliance with the rule.

Response. The NRC plans to inspect licensee implementation of the rule as part of the ongoing reactor inspection program. Most likely the inspection will be accomplished using a temporary inspection procedure, which is planned

to be prepared after publication of the rule but before the required implementation date.

As previously stated, all affected licensees are required to amend their physical security plans in response to this rule. All commitments in physical security plans are fully inspectable and enforceable by the NRC.

V. Miscellaneous

A. Research Reactors

Comment. One comment recommended that, in light of the upcoming 1996 Olympics, all reactor fuel, heavy water, and kilocuries of Co and Cs be removed immediately from the Georgia Tech campus.

Response. While research reactors do not fall within the scope of this rulemaking, the Commission notes that its threat assessment activities are performed on a continuing basis, in close liaison with the intelligence community. Should the level of domestic threat change at any time, appropriate action will be taken by the NRC. Specifically, the Atlanta Field Office of the FBI has established liaison with all Federal agencies in Georgia, including the NRC, relative to the Olympics. The FBI is the lead law enforcement agency in charge of the Olympics and, to date, has not indicated that there is any threat to NRC-licensed facilities or materials relative to the Olympics.

B. Independent Spent Fuel Storage Installations

Comment. NUMARC commented that independent spent fuel storage installations (ISFSIs) should be clearly exempted from the rule.

Response. The NRC did not intend for ISFSIs to be subject to this regulation because of the lower consequences associated with storage of irradiated fuel removed from a power reactor core, particularly since spent fuel stored at ISFSIs must be aged for at least one year. The NRC is currently preparing a proposed rule to clarify physical protection requirements for ISFSIs. The lessons learned from the TMI intrusion will be considered in that rulemaking. In addition, the NRC is attempting to quantify the consequences of a vehicle bomb detonated in the vicinity of an ISFSI. The results of this study will assist in making a determination as to whether vehicle bomb protection is needed at ISFSIs. In the interim, the staff believes that the inherent nature of the fuel, along with the degree of protection provided by the approved storage means for spent fuel, provides adequate protection.

C. Office of Management and Budget Supporting Statement

Comment. One comment identified that the NRC-estimated financial burden to licensees did not include capital costs for modifications.

Response. The NRC notes that the financial burden cited by the comment was derived from the Office of Management and Budget Supporting Statement, required under the Paperwork Reduction Act. This statement deals solely with the licensee recordkeeping and reporting burden resulting from the new rule,

i.e., the paperwork burden. Actual construction costs are considered in the regulatory analysis that supports the rule.

Summary of Changes Made to Rule

The following changes have been made as a result of public comment analysis:

1. The design basis threat statement for radiological sabotage has been clarified to separate the threat of a land vehicle used for intrusion with that of a land vehicle used as a vehicle bomb.

2. ISFSIs have been specifically exempted from the rule.

3. Clarification of what is meant by "the Commission's design goals and criteria" has been added to the regulatory text.

4. The appropriate means for submitting alternative measures has been clarified under 10 CFR 73.55(c)(9)(i) by adding the phrase "in accordance with 10 CFR 50.90."

5. Summary and implementation schedules have been revised - from 90 to 180 days for summary submittals, and from 360 to 540 days (18 months) for completion of implementation. Both time periods are from the effective date of the rule which is 1 month from the date of publication in the Federal Register.

Availability of Supporting Guidance

Two guidance documents have been developed by the NRC in support of this rule and will be distributed to affected licensees. These documents are: (1) Regulatory Guide 5.68, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants" and (2) NUREG/CR 6190,"Protection Against Malevolent Use of Vehicles at Nuclear Power Plants."

Regulatory Guide 5.68 is available for inspection and copying for a fee at the Commission's Public Document Room 2120 L Street, NW. (Lower Level), Washington, DC. Copies of issued guides may be purchased from the Government Printing Office at the current GPO price. Information on current GPO prices may be obtained by contacting the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-2171. Issued guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5825 Port Royal Road, Springfield, VA 22161.

Copies of NUREG/CR-6190 may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. A copy is also available for inspection and copying for a fee in the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

Electronic Submittals

Required paperwork may be submitted, in addition to an original paper copy, in electronic format on a DOS-formatted (IBM compatible) 5.25 or 3.5 inch computer diskette. Text files should be provided in WordPerfect format or unformatted ASCII code. The format and version should be identified on the diskette's external label.

Finding of No Significant Environmental Impact: Availability

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, that this rule is not a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement is not required. The rule involves installation of vehicle barriers at operating power reactor sites and an evaluation of these barriers by the licensee to determine whether they provide acceptable protection against a land vehicle bomb under design goals and criteria established by the Commission.

Implementation of these amendments will not involve release of or exposure to radioactivity from the site. Construction activities associated with passive vehicle barriers will involve some earth movement, either for excavation or development of berms, and possible destruction of trees and shrubbery. Since most active vehicle barriers are hydraulically operated, there may on occasion be leakage of this fluid to the environment. The

activities required to implement these amendments involve no significant environmental impact.

The environmental assessment and finding of no significant impact on which this determination is based are available for inspection at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the environmental assessment and finding of no significant impact are available from: Carrie Brown, U.S. Nuclear Regulatory Commission, Washington, DC, telephone (301) 504 2382.

Paperwork Reduction Act Statement

This final rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et sec.). These requirements were approved by the Office of Management and Budget approval number 3150-0002.

The public reporting burden for this collection of information is estimated to average 497 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Information and Records Management Branch (MNBB-7714), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-3019, (3150-0002), Office of Management and Budget, Washington, DC 20503.

Regulatory Analysis

The Commission has prepared a regulatory analysis on this regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. Interested persons may examine a copy of the regulatory analysis at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the analysis may be obtained from Robert J. Dube, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 504-2912.

Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this final rule does not have a significant economic impact on a substantial number of small entities. The rule affects only licensees authorized to operate a nuclear power reactor. The utilities that operate these nuclear power reactors do not fall within the scope of the definition "small entities" as given in the Regulatory Flexibility Act or the Small Business Size Standards promulgated in regulations issued by the Small Business Administration (13 CFR Part 121).

Backfit Analysis

As required by 10 CFR 50.109, the Commission has completed a backfit analysis for the final rule. The Commission has determined, based on this analysis, that backfitting to comply with the requirements of this final rule provides a substantial increase in protection to public health and safety or

the common defense and security at a cost which is justified by the substantial increase. The backfit analysis on which this determination is based reads as follows.

I. Statement of the specific objectives that the proposed action is designated to achieve.

To publish a rule in response to direction from the Commission in a staff requirements memorandum dated June 29, 1993. The Commissioners' decision to proceed with expedited rulemaking was the result of two events. On February 7, 1993, there was a forced vehicle entry into the protected area (PA) at Three Mile Island (TMI) Unit 1. On February 25, 1993, a van bomb, containing between 500 and 1,500 pounds of TNT equivalent, was detonated at the World Trade Center in New York City.

In its subsequent review of the threat environment, the NRC staff concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. Nonetheless, in light of the vehicle intrusion at TMI and the World Trade Center vehicle bombing, the NRC staff concluded that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. The objective of the rulemaking is to enhance reactor safety by maintaining a prudent margin between what is the current threat estimate (low) and the design basis threat for radiological sabotage specified in 10 CFR 73.1(a) (higher).

II. General description of the activity that would be required by the licensee or applicant in order to complete the proposed action.

The rule requires each licensee authorized to operate a nuclear power plant to establish vehicle control measures to protect against the use of a design basis land vehicle as a means of transportation to gain unauthorized proximity to vital areas. This provides two benefits. First, it enhances a licensee's ability to interdict an adversary attempting to use a vehicle as an aid to reach critical safety equipment. Second, it provides protection against a land vehicle bomb.

The rule requires licensees to evaluate the effectiveness of their vehicle control measures with respect to the protection they provide against a land vehicle bomb. Licensees are required to confirm to the Commission that the vehicle control measures to protect against vehicle intrusion, alone or in combination with additional measures, fully meet the Commission's design goals and criteria for protection against a vehicle bomb. Licensees that can show that the additional costs for measures required to fully meet the Commission's design goals and criteria for protection against a vehicle bomb are not justified by the added protection that would be provided have the option to propose alternative measures to the Commission . These licensees will not be relieved of the requirement to protect the facility against vehicle intrusion.

Licensees that propose alternative measures are required to describe the level of protection that these measures would provide against a land vehicle bomb and compare the costs of the alternative measures with the

costs of measures necessary to fully meet the criteria. The NRC will approve the alternative measures if the measures provide substantial protection against a land vehicle bomb and if the licensee demonstrates by an analysis, using the essential elements of the criteria in 10 CFR 50.109, that the costs of fully meeting measures needed to protect against a vehicle bomb are not justified by the added protection provided.

III. Potential change in the risk to the public from the accidental offsite release of radioactive material.

The potential change in the risk to the public from the accidental offsite release of radioactive material is discussed in detail in pages 4 through 7 and 10 through 14 of the regulatory analysis that supports the rulemaking. Failure to protect against attempted radiological sabotage could result in reactor core damage and large radiological releases. Based on its assessment, the NRC concludes that amending the its regulations to protect against malevolent use of a vehicle bomb against a nuclear power plant provides a substantial increase in overall protection of the public health and safety.

In summary, the TMI event demonstrated some aspects regarding use of a vehicle by a potential adversary that could present some challenges not previously considered by staff and licensees. The NRC considers that providing vehicle intrusion protection provides substantial enhancement against such a threat. Enhancements to protect against the

vehicle intrusion threat also provide, to varying degrees dependent on site characteristics, enhancement for protection against vehicle bombs.

The World Trade Center event demonstrated a capability within the United States to construct a truck bomb undetected. This recently demonstrated capability indicates that although a vehicle bomb attack at a nuclear power plant is not reasonably to be expected, it is somewhat more likely to develop without advance indications than the NRC previously believed. Therefore, the NRC considers that providing permanently installed vehicle bomb protection provides substantial enhancement against such a threat.

IV. Potential impact on radiological exposure of facility employees and other onsite workers.

By enhancing protection against the malevolent use of a vehicle, the rule decreases the potential for radiological exposure of facility employees and other onsite workers. Although the threat of a determined, violent attack at a nuclear power plant is considered to be low, the rule also decreases the risk that onsite workers could be injured by weapons fire or an explosion.

V. Installation and continuing costs associated with the action, including the cost of facility downtime or the cost of construction delay.

Estimates of installation costs are discussed in detail on pages 7 through 10 and 14 of the regulatory analysis. Ranges in cost estimates

for three vehicle types illustrate the strong influence of vehicle characteristics. In addition, site-specific characteristics influence costs, including the need at some sites to extend the vehicle exclusion area beyond portions of the current PA boundary or providing a more substantial passive barrier to prevent vehicle penetration.

The NRC staff estimates that about 80 to 90 percent of the sites will provide safe standoff distances against a vehicle bomb by providing a vehicle barrier in proximity to the present PA boundary. For these sites, cost estimates range from $290K for protecting the smallest protected area against a passenger vehicle to $2,955K for protecting the largest protected area against a large truck. (The characteristics of the design basis vehicle used to establish protection goals are described in a Safeguards Information document provided separately to affected licensees.) For the remaining 10 to 20 percent of the sites, cost estimates range from $440K to $3,655K.

An important consideration in assessing costs for the 10 to 20 percent of the sites that may have to protect beyond the existing protected areas is that the only definitive requirement for all licensees is that they provide measures to protect against the use of a land vehicle as a means of transportaiion to gain proximity to vital areas and that they assess any incremental measures, if necessary, to meet the design goal for a land vehicle bomb. The NRC will accept alternative measures if the measures provide substantial protection against a land vehicle bomb and if the licensee demonstrates by an analysis, using the essential elements of the criteria in 10 CFR 50.109,

that the costs of fully meeting measures needed to protect against a vehicle bomb are not justified by the added protection provided.

Continuing costs to maintain barriers should be small. Implementation of the rule will not require facility downtime or construction delay.

VI. The potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements and NRC staff positions.

There should be no adverse safety impact from the rule. Construction of barriers will be near or beyond existing protected area perimeters and should not delay authorized access to the protected area.

VII. The estimated resource burden on the NRC associated with the action and the availability of such resources.

There should be no new resource burden on the NRC. There will be no NRC staff licensing review of licensees' vehicle control measures before implementation. Licensees will be required to retain their analyses on site for NRC staff review during routine inspections. Inspection of the approximately 67 total sites for explosive protection will be about 1 FTE. Reviewing licensee proposals for alternative measures and 10 CFR 50.109 type analyses will require approximately 1 FTE and 40K of technical assistance from the United States Army Corps of Engineers.

VIII. The potential impact of differences in facility type, design, or age on the relevancy and practicality of the proposed action.

The action is relevant for all nuclear power reactors. The action should also be practical at most sites. If a barrier stopped a vehicle at the PA perimeter with little or no further penetration, about 90 percent of the sites would provide significant protection against the design basis vehicle bomb.

In those cases where licensees determine additional security measures may be needed to protect safe shutdown capability, the rule permits licensees to either implement the additional security measures or develop alternative protection strategies. The licensee may propose alternative measures if the measures provide substantial protection against a land vehicle bomb and if they demonstrate by an analysis, using the essential elements of the criteria in 10 CFR 50.109, that the costs of fully meeting measures needed to protect against a vehicle bomb are not justified by the added protection provided. The NRC staff will review licensee's alternative proposals and make an acceptability determination. The Commission will be notified of such NRC staff action.

Barriers that result in no vehicle penetration for vehicle impacts at specified kinetic energies are typically more expensive than those that allow some penetration. For less expensive barriers, the design basis vehicle may penetrate as much as 30 feet into the PA. For these types of barriers, about 80 percent of the sites will provide significant protection. NRC staff's analysis also indicates that there is a high

likelihood that all sites will be capable of achieving and maintaining safe shutdown if a DBV were detonated at any land accessible location of a nuclear power plant outside of the owner controlled area.

IX. Whether the proposed action is interim or final, and if interim, the justification for imposing the proposed action on an interim basis.

The action is to promulgate a final rule. The rulemaking does not involve interim actions.

List of Subjects in 10 CFR Part 73

Criminal penalties, Hazardous materials transportation, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements, Security measures.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act, as amended, and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to Part 73.

PART 73 - PHYSICAL PROTECTION OF PLANTS AND MATERIALS

1. The authority citation for Part 73 continues to read as follows:

Authority: Secs. 53, 161, 68 Stat. 930, 948, as amended, sec.147, 94 Stat. 780 (42 U.S.C. 2073, 2167, 2201); sec. 201, as amended, 204, 88 Stat. 1242, as amended, 1245 (42 U.S.C. 5841, 5844).

Section 73.1 also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241, (42 U.S.C. 10155, 10161). Section 73.37(f) also issued under sec. 301, Pub. L. 96-295, 94 Stat. 789 (42 U.S.C. 5841 note). Section 73.57 is issued under sec. 606, Pub. L. 99-399, 100 Stat. 876 (42 U.S.C. 2169).

2. In §73.1, the introductory text of paragraph (a) and the text of (a)(1)(ii) are revised and new paragraphs (a)(1)(i)(E) and (a)(1)(iii) are added to read as follow:

§73.1 Purpose and scope.

(a) Purpose. This part prescribes requirements for the establishment and maintenance of a physical protection system which will have capabilities for the protection of special nuclear material at fixed sites and in transit and of plants in which special nuclear material is used. The following design basis threats, where referenced in ensuing sections of this part, shall be used to design safeguards systems to protect against acts of radiological sabotage and to prevent the theft of special nuclear material. Licensees subject to the provisions of §72.182, §72.212, §73.20, §73.50, and §73.60 are exempt from §73.1(a)(1)(i)(E) and §73.1(a)(1)(iii).

(1) ***

(i) ***

(E) A four-wheel drive land vehicle used for transporting personnel and their hand-carried equipment to the proximity of vital areas, and

(ii) An internal threat of an insider, including an employee (in any position), and

(iii) A four-wheel drive land vehicle bomb.

* * * * *

3. In §73.21, a new paragraph (b)(1)(xiii) is added to read as follows:

§73.21 Requirements for the protection of safeguards information.

* * * * *

(b) ***

(1) ***

(xiii) Information required by the Commission pursuant to 10 CFR 73.55 (c)(8) and (9).

* * * * *

4. In §73.55, new paragraphs (c)(7), (8), (9), and (10) are added to read as follow:

§73.55 Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage.

* * * * *

(c) ***

(7) Vehicle control measures, including vehicle barrier systems, must be established to protect against use of a land vehicle, as specified by the Commission, as a means of transportation to gain unauthorized proximity to vital areas.

(8) Each licensee shall compare the vehicle control measures established in accordance with 10 CFR 73.55 (c)(7) to the Commission's design goals (i.e., to protect equipment, systems, devices, or material, the failure of which could directly or indirectly endanger public health and safety by exposure to radiation) and criteria for protection against a land vehicle bomb. Each licensee shall either:

(i) Confirm to the Commission that the vehicle control measures meet the design goals and criteria specified; or

(ii) Propose alternative measures, in addition to the measures established in accordance with 10 CFR 73.55 (c)(7), describe the level of protection that these measures would provide against a land vehicle bomb, and compare the costs of the alternative measures with the costs of measures necessary to

fully meet the design goals and criteria. The Commission will approve the proposed alternative measures if they provide substantial protection against a land vehicle bomb, and it is determined by an analysis, using the essential elements of 10 CFR 50.109, that the costs of fully meeting the design goals and criteria are not justified by the added protection that would be provided.

(9) Each licensee authorized to operate a nuclear power reactor shall:

(i) By (insert 180 days from the effective date of the rule) submit to the Commission a summary description of the proposed vehicle control measures as required by 10 CFR 73.55 (c)(7) and the results of the vehicle bomb comparison as required by 10 CFR 73.55 (c)(8). For licensees who choose to propose alternative measures as provided for in 10 CFR 73.55 (c)(8), the proposal must be submitted in accordance with 10 CFR 50.90 and include the analysis and justification for the proposed alternatives.

(ii) By (insert 18 months from final rule effective date) fully implement the required vehicle control measures, including site-specific alternative measures as approved by the Commission.

(iii) Protect as Safeguards Information, information required by the Commission pursuant to 10 CFR 73.55(c)(8) and (9).

(iv) Retain, in accordance with 10 CFR 73.70, all comparisons and analyses prepared pursuant to 10 CFR 73.55 (c)(7) and (8).

(10) Each applicant for a license to operate a nuclear power reactor pursuant to 10 CFR 50.21(b) or 10 CFR 50.22 of this chapter, whose application was submitted prior to (insert effective date of rule), shall incorporate the required vehicle control program into the site Physical Security Plan and implement it by the date of receipt of the operating license.

* * * * *

Dated at Rockville, Maryland, this ____ day of_____ 1994.

For the Nuclear Regulatory Commission.

_____
Samuel J. Chilk,
Secretary of the Commission.

ENCLOSURE 2

Environmental Assessment

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT FOR AMENDMENTS TO 10 CFR 73

Protection Against Malevolent Use of Vehicles at Nuclear Power Plants

The Commission has determined, under the National Environmental Policy Act (NEPA) of 1969 as amended, and the Commission's regulations in 10 CFR Part 51, that promulgation of the amendments to 10 CFR Part 73 will not have a significant effect on the quality of the human environment and that, therefore, an environmental impact statement is not required.

This determination is based on an environmental assessment and finding of no significant impact performed in accordance with the procedures and criteria in Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," as published in the Federal Register, March 12, 1984.

Part 51 is NRC's regulation for assuring appropriate environmental consideration of licensing and regulatory actions. Generally, under Part 51 any licensing or regulatory action will fall within one of three classes.

The first class of actions consists of those which require an environmental impact statement. The criteria for and identification of this class of actions are given in 10 CFR 51.20. This class of actions includes matters such as issuance of a construction permit or operating license for a nuclear power plant.

The second class of licensing and regulatory actions consists of those requiring an environmental assessment. The criteria for and identification of this class of licensing and regulatory actions are given in 10 CFR 51.21. This class of actions, for purposes of environmental considerations, consists of those actions which are neither identified in 10 CFR 51.20 as requiring an environmental impact statement nor identified in 10 CFR 51.22 as qualifying for categorical exclusion from preparation of an environmental impact statement or assessment.

The third class of actions consists of those eligible for categorical exclusion following a Commission declaration that the category of actions does not individually or cumulatively have a significant effect on the human environment. The criteria for and identification of licensing and regulatory actions eligible for categorical exclusion are given in 10 CFR 51.22. Amendments to Commission regulations which are corrective, or of a minor or non-policy nature and do not substantially modify existing regulations, fall within this class of actions.

The amendments to 10 CFR Part 73 regarding protection against malevolent use of vehicles at nuclear power reactors are subject to the requirements of 10 CFR 51.21 (the second class of actions) and, accordingly, the assessment below has been prepared.

The required contents of an environmental assessment, set out in 10 CFR 51.30, are as follows:

§51.30 Environmental assessment.

(a) An environmental assessment shall identify the proposed action and include:

(1) A brief discussion of:

(i) The need for the proposed action;

(ii) Alternatives as required by section 102(2)(E) of NEPA;

(iii) The environmental impacts of the proposed action and alternatives as appropriate; and

(2) A list of agencies and persons consulted, and identification of sources used.

The following comments respond to the specific requirements of 10 CFR 51.30.

Need for Action

The Nuclear Regulatory Commission (NRC) is amending its physical protection regulations for operating nuclear power reactors. The amendments modify the design basis threat for radiological sabotage to include use of a four-wheel drive land vehicle by adversaries for transporting personnel, hand-carried equipment and/or hand-carried explosives and also for use as a vehicle bomb. Implementation of the rule requires applicable licensees to design and install a vehicle barrier system to protect vital areas and equipment from proximity by unauthorized land vehicles. Licensees are also required to evaluate the effectiveness of these measures to protect against a vehicle bomb.

The Commission believes this action is necessary based on an evaluation of an unauthorized intrusion at the Three Mile Island nuclear power station which demonstrated that a vehicle could be used to gain quick access to the protected area at a nuclear power plant. In addition, the bombing at the World Trade Center demonstrated that a large explosive device could be assembled, delivered to a public area and detonated in the United States without advance warning. Although the Commission has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry, the Commission believes that a vehicle intrusion or bomb threat to a nuclear power reactor could develop without advance warning in the future. The amendments will directly affect 67 nuclear power reactor sites.

Alternatives

Section 102(2)(E) of NEPA provides that agencies of the Federal Government shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The objective of the rule is to enhance reactor safety by protecting against the malevolent use of a vehicle to gain unauthorized proximity to a vital areas. Further, the rule will enhance reactor safety by protecting vital equipment from damage by detonation of an explosive charge at the point of vehicle denial. This objective will be accomplished through use of a vehicle barrier system and a

licensee evaluation of the effectiveness of the barrier system to protect against a vehicle bomb.

It is estimated that most sites will meet the Commission design goals and criteria for protection against a vehicle bomb by providing protective measures against vehicle intrusion. Licensees that find that measures to be taken to meet the vehicle intrusion requirements do not fully meet the design goals and criteria for protection against a land vehicle bomb have two options. They may implement additional measures that would fully meet the design goals and criteria, or they may propose to the Commission additional measures other than ones needed to fully meet the design goals and criteria, provided this approach provides substantial protection against a vehicle bomb and that it can be demonstrated that the costs of measures to fully meet the design goals and criteria are not justified by the added protection that would be provided. The amendments explicitly include provision for licensees to propose, if determined necessary, alternative measures to protect against a vehicle bomb.

However, the amendments will allow a licensee to take additional measures such as expanding the barrier boundary or establishing cross-ties between redundant safety equipment maintenance of vital equipment to maintain the reactor in a safe condition. One alternative measure that was considered and rejected was the deployment of security measures at the owner controlled boundary. This alternative proved to be cumbersome from an operational perspective and man-power intensive. No appropriate alternatives were identified beyond placement of vehicle barriers to prevent intrusion in the proximity of vital areas of the plant.

Environmental Impacts

Implementation of the amendments involves two components, installation of physical barriers and a process for licensees to assess whether the protective measures established to protect against vehicle intrusion provide protection against a vehicle bomb. The latter activity may require, for some licensees, measures in addition to those needed to protect against vehicle intrusion. Neither of these activities would involve release of or exposure to radioactivity at affected sites.

The installation of barriers to prevent vehicle intrusions to vital areas of the facility involves placement of "active" vehicle barriers, most often hydraulically operated vehicle gates, at entry/exit points and static or "passive" vehicle barriers, such as concrete bollards or secured airplane cable, about the remaining protected area perimeter. Active vehicle barriers require a power source to operate and generally some site excavation at the point of placement, although surface-mounted active vehicle barrier systems are commercially available. Since most active vehicle barrier systems are hydraulically operated, there may on occasion be leakage of this fluid to the environment. This leakage would be of the order of 20 gallons or less per active barrier over the life of the system. Additionally, a non-toxic biodegradable oil is currently being used successfully at some Federal facilities.

The strategy for protection against vehicle intrusion will also involve placement of passive vehicle barriers around vital areas, most likely close or adjacent to the protected area boundary. In addition, some licensees may need to take additional measures, such as expanding the barrier perimeter or establishing cross-ties between redundant safety equipment, to provide a specified level of protection against a vehicle bomb.

Construction activities associated with passive vehicle barriers will involve some earth movement, either for excavation or development of berms, and possible destruction of trees and shrubbery. Establishing cross-ties between redundant safety equipment will take place entirely within a facility's protected area and, as previously stated, will not involve release of or exposure to radioactivity from the site.

In summary, these activities are expected to be minor in nature with respect to environmental impact and, accordingly, support a finding that the amendments involve no significant environmental impact.

Agencies and Persons Consulted

In the development of this environmental assessment, staff consulted with several Federal agencies and personnel involved with development and construction of vehicle barrier systems. The United States Army Corps of Engineers provided strong support for the entire project by developing measures to counter a revised design basis threat and possible environmental impacts were discussed with representatives of this group. Counsel was also received from the Treasury Department where practical experience was gained in the installation of active vehicle barrier systems. Additional practical experience on the installation of active and passive vehicle barrier systems was obtained from consultation with one class of licensees currently required to install vehicle barriers. Staff discussed environmental impacts from construction and installation of active vehicle barrier systems with commercial vendors of this equipment. Finally, the Nuclear Regulatory Commission sponsored a public forum on May 10, 1993, to obtain comment on all aspects of a revised design basis threat from public interest groups, affected licensees, and other interested parties.

Determination of Need for Environmental Impact Statement

Section 51.31 provides that upon completion of an environmental assessment, the appropriate NRC staff director will determine whether to prepare an environmental impact statement and finding of no significant impact on the proposed action. The Executive Director for Operations has determined that the environmental assessment adequately supports a finding that the amendments will have no significant environmental impact. Accordingly, the Commission has determined not to prepare an environmental impact statement for this rulemaking. The amendments will not significantly affect safe operation of the affected facilities nor the routine release of or exposure to radioactivity from the facilities.

ENCLOSURE 3

Public Announcement

NRC REVISES PHYSICAL SECURITY REQUIREMENTS FOR NUCLEAR POWER PLANTS

The Nuclear Regulatory Commission is amending its physical protection regulations for operating nuclear power plants. The amendments modify the design basis threat for radiological sabotage to include the use of land vehicles by adversaries for transporting personnel, hand-carried equipment and explosives.

Nuclear power plant licensees are required to imp system that protects against acts of radiological sabotage, and specifically against the design basis threat for radiologica sabotage as set out in the Commission's regulations.

Based on current information derived by continually monitoring and evaluating the worldwide threat environment and briefings by various government intelligence agencies, the NRC has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. However, based on the unauthorized intrusion at the Three Mile Island nuclear power plant and the bombing of the World Trade Center in New York City, the NRC believes that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future.

Licensees will therefore be required to establish control measures to protect the facility from use of a vehicle to gain unauthorized proximity to vital areas. They will also be required to assess whether the measures taken to protect against

vehicle intrusion provide protection against a vehicle bomb consistent with design goals and criteria specified by the Commission. Licensees who cannot demonstrate that they fully meet the Commission's design goal for protection against a vehicle bomb will have the option of proposing alternative measures for protection against this threat.

Programs of licensees who are in the process of decommissioning or are contemplating decommissioning in the near-future will be evaluated on a case-by-case basis by the NRC to determine if full or partial exemption from the new rule is appropriate.

A proposed rule on this subject was published in the Federal Register for public comment on November 4, 1993. The NRC also held a public meeting on this topic on May 10, 1993, and received comments from its Advisory Committee on Reactor Safeguards. As a result of the comments received, the schedule for implementing the new requirements has been revised. Licensees authorized to operate a nuclear power plant will be required (1) to submit within 180 days (versus 90 days in the proposed rule) of the effective date of the final rule a summary description of the proposed vehicle control measures and the results of their cost-benefit analysis and (2) to fully implement the required vehicle control measures or the site-specific alternative measures as approved by the Commission within 18 months (versus 360 days in the proposed rule) of the effective dat. of the final rule.

The revised regulations will be effective on _____ (30 days after publication of a Federal Register notice on _____).

ENCLOSURE 4

Regulatory Analysis

REGULATORY ANALYSIS
Malevolent Use of Vehicles at Nuclear Power Plants

1.0 STATEMENT OF THE ISSUE

1.1 Background

The original requirements for physical security at power reactor sites proposed in the mid-1970's included a requirement for barriers to prevent ready access to vital areas by ground vehicles. The Commission decided not to include the requirement at that time. The Commission began more detailed deliberations on the vehicle issue in 1985 and a series of Commission meetings and papers followed. These meetings and papers focused on a range of options to respond to the potential threat posed by vehicles, Nuclear Regulatory Commission and other agency assessments of the threat, and the continuing validity of the design basis threat (DBT) for radiological sabotage. Staff provided options to the Commission in SECY-86-101 and SECY-88-127. Options were included for both short-range and long-range contingency planning by licensees and NRC, and for various physical security requirements. The physical security options addressed were: 1) vehicle denial system on existing access roads to power reactor sites, 2) vehicle denial system for land portions of the protected area (PA) perimeter, and 3) surface vehicle bomb protection.

The Commission also solicited the views of other agencies. A number of Commission meetings between 1985 and 1987 included threat briefings by the Central Intelligence Agency (CIA), the Federal Bureau of Investigation (FBI), and the Department of Energy. Further, guidance was sought from the National Security Council (NSC). The NSC and the FBI documented their assessments in classified correspondence to the NRC.

Although staff recommended that the Commission approve contingency plans for use by the NRC staff in the event that a vehicle bomb threat were to arise, the Commission directed in a Staff Requirements Memorandum (SRM) dated June 16, 1988, that short-range contingency planning by licensees be required that would assure that plans were in place for installation of temporary emergency measures for response to a surface vehicle bomb threat. In choosing short-range contingency planning, the Commission also chose not to modify the DBT. Contingency planning for surface vehicle bombs was addressed in Generic Letter 89-07 and developed by licensees in 1989.

1.2 Recent Events

On February 7, 1993, there was a forced vehicle entry into the PA at Three Mile Island (TMI) Unit 1. An NRC Incident Investigation Team report on the event highlighted the fact that PA barriers could be penetrated by vehicles and that assessment and response to such a penetration was difficult. On February 25, 1993, a van bomb, containing between 500 and 1500 pounds of TNT equivalent, was detonated in a public underground parking garage at the World Trade Center in New York City. In a memorandum from Samuel J. Chilk, Secretary of the Commission, to James M.Taylor, Executive Director for Operations, dated March 1, 1993, the Commissioners directed staff to reevaluate and, if necessary, update the design basis threat for vehicle intrusion and the use of vehicle bombs.

In SECY-93-102, "Review and Update of Options To Protect Against Malevolent Use of Vehicles and Related Threat Information," dated April 16, 1993, staff provided information regarding the 1985-1988 Commission deliberations on the need to require nuclear power reactors to protect against malevolent use of vehicles and provided an updated range of protection options along with current cost information. Staff and the Nuclear Control Institute, a public interest group, briefed the Commission on April 22. Staff solicited comments on the issues at a public meeting on May 10, 1993.

Staff forwarded SECY-93-166, "Staff Recommendation for Protection Against Malevolent Use of Vehicles at Nuclear Power Plants," to the Commission on June 14, 1993. Enclosure 6 to SECY-93-166 was a regulatory analysis that included the four options discussed in SECY-93-102. To provide flexibility in implementing DBV protection at some distance from vital equipment at a reasonable cost, staff also developed and analyzed a fifth option. In a memorandum from Samuel J. Chilk, Secretary of the Commission, to James M. Taylor, Executive Director for Operations, dated June 29, 1993, the Commission directed staff to initiate expedited rulemaking to implement option 5. Staff forwarded SECY-93-270, "Proposed Amendments to 10 CFR Part 73 to Protect Against Malevolent Use of Vehicles at Nuclear Power Plants," to the Commission on September 29, 1993. Enclosure 5 to SECY-93-270 updated the regulatory analysis provided in SECY-93-166.

The proposed rule was published in the Federal Register on November 4, 1993. A number of the public comments on the rulemaking and comments by the Advisory Committee on Reactor Safeguards were directed at the regulatory analysis. The major thrust of these comments were that the analysis should be more quantitative, particularly with respect to analysis of the benefits of the rulemaking. This regulatory analysis takes into consideration these comments and updates the analysis provided in Enclosure 5 to SECY-93-270.

2.0 OBJECTIVES OF THE RULEMAKING

To prepare a rule in response to direction from the Commissioners in an SRM dated June 29, 1993. The Commissioners' decision to proceed with expedited rulemaking was the result of two recent events. On February 7, 1993, there was a forced vehicle entry into the PA at Three Mile Island (TMI) Unit 1. On February 25, 1993, a van bomb, containing between 500 and 1,500 pounds of TNT equivalent, was detonated at the World Trade Center in New York City.

In its subsequent review of the threat environment, staff concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. Nonetheless, in light of the vehicle intrusion at TMI and the World Trade Center vehicle bombing, staff concluded that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. The objective of the rulemaking is to enhance reactor safety by maintaining a prudent margin between what is the current threat estimate (low) and the design basis threat for radiological sabotage specified in 10 CFR 73.1(a) (higher).

3.0 ORIGINAL OPTIONS

3.1 Option 1

No change in current position.

3.2 Option 2

Roadway Protection - Require a vehicle protection system on existing roadways and some distance on either side of the vehicle control points into PAs.

This option would protect against forced vehicle entry only in the immediate area of existing vehicle gates into the PA. Because the remainder of the PA perimeter would remain vulnerable to vehicle intrusions, licensee contingency planning for land vehicle bombs would be retained.

Barriers that could be used to protect gates include permanent active barriers that can be lowered to permit passage of authorized vehicles and temporary barriers that can be moved. Adjacent areas could be protected by passive barriers such as concrete blocks, bollards (i.e., heavy posts), or concrete planters, all of which must be properly anchored into the ground.

3.3 Option 3

PA Perimeter Protection - Instead of existing contingency procedures, require protection against vehicle intrusions into Pas.

This option would extend vehicle protection to the entire PA. In addition to the type of barriers discussed in Option 2, licensees could use other techniques such as trenching or reinforcing the existing perimeter with anchored cabling systems.

This option would also provide varying degrees of protection against a vehicle bomb. At facilities with an average sized PA and typical concrete structures, a vehicle bomb similar to that reportedly used at the World Trade Center may cause moderate damage to some concrete walls. However, the safety equipment located behind typical concrete walls, but not contiguous to outside walls, would likely be protected. Some facilities also have intervening structures which might absorb some of the energy from an explosive blast.

However, some PAs are smaller and have portions of the PA perimeter that are close to a vital area barrier and would likely be severely damaged. In addition, not all safety equipment is protected by reinforced concrete walls. At a few sites, significant portions of safety systems are not behind concrete walls.

3.4 Option 4

Protection at Standoff Distance for a Design Basis Vehicle (DBV) and Explosive Device - Instead of existing contingency procedures, require protection against a vehicle bomb of a specified size. Existing vehicle bomb contingency procedures would remain in effect until permanent measures are implemented.

At some sites, protection against vehicle intrusions into PAs may be sufficient to protect against the DBV bomb. At other sites, licensees would

have to provide additional measures to protect against unauthorized vehicles approaching close enough to vital equipment to cause a significant safety risk. Staff believes that this could be done at most sites without reconfiguring existing PA perimeters, intrusion detection systems, and closed-circuit television (CCTV) or increasing the size of security forces. The extent of additional measures required for some sites would vary depending on the size of the design basis explosive used in determining appropriate stand-off distances. Implementation options would include installing permanent or moveable barriers to protect against vehicle access to portions of the PA perimeter or installing blast shields or deflectors to protect vital equipment.

4.0 CONSEQUENCES

4.1 Analytical Approach

Staff conducted a preliminary analysis of the benefits and costs of the four options in support of SECY-93-102. Because of the short time available, this preliminary analysis was limited in scope. To assess the benefit from protection against use of a vehicle for forced entry into the PA (absent a bomb threat), staff reviewed NUREG-1485, "Unauthorized Forced Entry into the Protected Area at Three Mile Island Unit 1 on February 7, 1993." For the purposes of this analysis, staff also reviewed prior assessments of the vehicle intrusion issue. It also examined details of the times it would have taken an adversary to reach vital areas from the PA at TMI, both using a vehicle and on foot, which was outside the scope of NUREG-1485.

In analyzing the benefits of protecting against a vehicle bomb for SECY-93-102, staff reviewed drawings of all 67 power reactor sites that are currently operating or are in temporary outages, that showed the owner controlled area, the PA, and the location of buildings that contained vital equipment. For all sites, staff estimated the shortest distance between the outer edge of the owner controlled area and a vital area. For 26 sites, chosen at random, staff estimated the length of the PA perimeter, the shortest distance between the PA perimeter and a vital area, and the shortest distance between a parking area and the nearest vital area. Because of the small scales involved, many of the estimates of distances were imprecise.

To estimate the impact of a truck bomb of the size described in Enclosure 8 of SECY-93-166, staff assumed a building with concrete walls 18 inches thick and an effective density of rebar of 0.2 percent. Most vital area barriers equal or exceed this assumption, although several sites have a few pieces of vital equipment that are not within structures. Staff assumed that the ceilings or roofs of vital area structures would provide protection at least equivalent to the wall. For distances at which the closest vital area structure would provide a low level of protection, staff assumed that vital equipment within the structure would be disabled. Staff estimated the impact of an explosive blast on building structures using the United States Corps of Engineers Blast Analysis Manual, PDC-TR-91-6, July 1991. Staff did not assess the significance of the actual equipment in the nearest vital area structures nor did it assess whether redundant or diverse equipment would continue to function.

Since preparing SECY-93-102, staff has expanded the scope of its analysis of vehicle bomb protection. It has expanded its review of site drawings to all

67 sites. It then identified the 30 sites that its initial analysis indicated had a specified distance between the PA and the nearest vital area. (At a distance greater than the specified distance, most vital area barriers should provide at least a medium level of protection. The Corps of Engineers uses medium level of protection to describe a structure that would be damaged, but repairable. Occupants or other assets within the structure may sustain minor injuries or damage.) For these 30 sites, it determined, through information obtained by the resident inspectors, more precise estimates of the distance from the PA to all vital areas that were within the specified distance. For these vital areas it obtained available details on the wall structures. For vital area structures that appeared to provide less than medium protection, it assumed that the vital equipment within the structure would be disabled and then determined whether redundant or diverse equipment would be available to perform the same function.

More recently, staff has further analyzed the capability of existing licensee security measures to protect against a violent external assault that includes a vehicle as a mode of transportation. Staff has also evaluated the specific consequences of a vehicle bomb of the size specified in the rule. These new analyses are site-specific (at a few selected sites) and are described in a Safeguards Information Addendum to this Regulatory Analysis. They are also summarized in Section 8.0, Resolution of Comments.

Staff has been unable to obtain data on the direct effect of an explosive blast on unprotected equipment, but has established a conservative, minimum safe distance for such equipment. Staff is conducting further studies to establish more precise criteria for determining minimum safe distance for such equipment. Its initial assessment on equipment not in buildings focused on the availability of diverse systems, substantial intervening buildings, and standoff distances sufficient to reduce blast overpressures to the same range as static pressures used in design to protect against natural phenomena.

4.2 Benefits

Traditionally, the staff has not attempted a quantitative evaluation of the benefits associated with safeguards requirements. In 1983 the NRC reviewed past efforts to quantify risk due to sabotage of nuclear power plants in an attempt to include consideration of that risk in the Commission's safety goal. The review led the staff to conclude that sabotage should not be included in the safety goal because no technical basis was available for quantifying the contribution of sabotage to the overall risk from nuclear power plant operations.

For the purpose of this analysis, a quantitative evaluation would require, among other things, quantification of the likelihood that someone would use a vehicle as a means for transport of personnel and equipment or as a means to deliver a large explosive device. For a vehicle bomb, the evaluation would require quantifying the likelihood the bomb would be used by someone in an attempt to damage a nuclear power plant, the probability that the bomb would be set off from a stationary location or that forced entry into the PA would be attempted, the probability that a bomb of a particular size would be used, and the probability that the bomb would be in a particular location. Staff is unable to quantify any of these factors.

Assuming that a knowledgeable person or persons would use a vehicle bomb in an attempt to damage a reactor, the safety enhancement from protecting against such an act would be substantial. Reactor containment would likely survive a large blast at close proximity, but most other buildings containing safety equipment would not. If a large vehicle bomb was detonated in the one of the worst locations, damage to safety equipment would likely be severe.

In analyzing protective Options 2 and 3, staff first qualitatively considered the benefits that would be gained from avoiding a TMI-type intrusion, assuming that the intruders had malevolent intent and the characteristics of the DBT specified in 10 CFR 73.1(a). Option 2 would provide little incremental benefit, since portions of the PA perimeter at most sites would still be protected by only a chain link fence. A typical unenhanced chain link fence provides little protection against a moving vehicle. For any sites where Option 2 would be effective because natural terrain or other site features prevent access to the PA perimeter away from vehicle access points, the site would effectively meet Option 3 at no additional costs beyond those to meet Option 2.

With respect to Option 3, staff identified several lessons learned from the vehicle intrusion at TMI. Although the intrusion detection system generated an alarm, the alarm station operators were not able to confirm the intrusion promptly by CCTV. A foot patrol was sent to evaluate the cause of the alarm. There was confusion and misinformation given to operations and security staff until a positive assessment of the intrusion could be made. Out of the confusion and concern for personal safety, operations staff made decisions that could have negatively affected the public health and safety. Even when an initial assessment was made, licensee staff did not know how many unauthorized individuals were inside the PA, where they were, and whether they possessed weapons or explosives. The vehicle also could have provided some protection from responder weapons fire, could have been used as a breaching device, or could have been used as a weapon against onsite personnel.

Although at many sites, vital area doors can be reached on foot within similar periods of time as with a vehicle, the incident demonstrated that a person in a vehicle could penetrate a PA barrier and quickly approach a vital area barrier. Staff estimates that at TMI an adversary in a vehicle could have reached vital areas about 50 seconds faster than on foot. At some sites, this difference could significantly affect the licensee's ability to interdict an adversary before critical safety equipment was reached.

By providing protection against vehicle intrusion into the PA, Option 3 also provides varying degrees of protection against a vehicle bomb. If a barrier stopped a vehicle at the PA perimeter with little or no further penetration, about 90 percent of the sites would provide significant protection against a vehicle bomb of the type specified in Enclosure 8 of SECY-93-166. Barriers that result in no vehicle penetration for vehicle impacts at specified kinetic energies are typically more expensive than those that allow some penetration. For less expensive barriers, a vehicle of the type specified in Enclosure 8 may penetrate as much as 30 feet into the PA. For these types of barriers, about 80 percent of the sites would provide significant protection. Staff's analysis also indicates that there is a high likelihood that all sites would be capable of achieving and maintaining safe shutdown if a vehicle bomb of the size specified in Enclosure 8 were detonated at any land accessible location of a nuclear power plant outside of the owner controlled area.

Option 4 would provide an additional benefit by assuring that the remaining 10 to 20 percent of the sites would provide substantial protection against a vehicle bomb of the type specified in Enclosure 8. Enclosure 7 of SECY-93-166 provided information (Safeguards Information provided under separate cover) regarding the potential impact at certain sites that might not provide significant protection against a large vehicle bomb that was stopped at the PA perimeter.

4.3 Assumptions Used in Predicting Backfit Costs

General Assumptions

1. Based on analysis of all power reactor sites, site perimeters range between about 2,000 and 9,000 feet. Site PA perimeters that have potential for land vehicle access range from 2,000 to 7,000 feet. This range assumes some protection by natural terrain features which would preclude the need for protection of portions of the PA.

2. Site has four vehicle access points. Some sites may have up to 15 vehicle access points to protect.

Costs of Specific Intrusion Protection Devices

Active barriers - Active vehicle access barriers include reinforced sliding gates and pop-up barriers. Vendor prices for materials and installation of active barriers of these types with a width of 10 - 12 feet range between $15 - 35K. Price is dependent on several factors, most important of which is the design characteristics (size and speed) of the vehicle to be stopped. To account for licensee overhead costs (engineering, interface connections, procurement, and training) the vendor costs have been doubled. Therefore, the prices used in the cost estimates are as follows:

a. $30K for an active barrier to stop a passenger vehicle

b. $40K for an active barrier to stop a pickup truck

c. $70K for an active barrier to stop a large truck

Passive Barriers - Commonly used passive barriers are concrete barriers (Jersey Bounces) or cabling that can be placed at the PA fence and anchored at periodic intervals. Passive barriers to stop larger size vehicles include concrete planters and reinforced concrete walls. Price is dependent on a number of factors, most important being the size and speed of the vehicle (kinetic energy). Licensees may also choose combinations of options, such as a means to slow down a vehicle, which would justify less substantial barriers. Vendor prices for concrete barriers and cabling that can stop passenger size vehicles are estimated to be between $16 and $25 per foot. Vendor prices for passive barriers that can stop pickup trucks are estimated to be between $36 and $60 per foot, although staff did not find specific barrier test data for barriers that stop this size vehicle. Vendor prices for passive barriers that can stop large trucks are estimated to be between $110 and $136 per foot. To account for licensee overhead costs (engineering and procurement) the vendor costs have been tripled. Therefore, the prices used in the cost estimates are as follows:

a. $60/ft for a passive barrier to stop a passenger size vehicle with some penetration
   $90/ft for a passive barrier to stop a passenger size vehicle with no penetration
b. $150/ft for a passive barrier to stop a pickup truck with some penetration
   $225/ft for a passive barrier to stop a pickup truck with no penetration
c. $375/ft for a passive barrier to stop a large truck with some penetration
   $550/ft for a passive barrier to stop a large truck with no penetration

Standoff Distance Analysis - If required to do a site-specific analysis, it is assumed that a licensee would need to do one similar to that described in NUREG/CR-5246, "A Methodology to Assist in Contingency Planning for Protection of Nuclear Power Plants Against Land Vehicle Bombs." This analysis would consist primarily of two major elements.

1. Blast Effect Analysis - The blast analysis would require assessment of what vital structures would be damaged and what vital equipment in those structures would be damaged (assuming an explosive size). At many sites, where equipment was located inside reinforced concrete walls at sufficient standoff distances from the PA, this analysis would not need to be extensive. At other sites, with shorter distances between the PA boundary and vital area structures, this analysis could be significantly more complex. Vital equipment needed to be protected and not located in a building would also add to the complexity of the analysis.

2. Systems Analysis - Once it was determined what equipment was damaged, analysis would need to be done to determine if there was backup equipment, not damaged, that would allow the plant to maintain a safe shutdown condition.

4.4 Results of Costs Analysis

Option 1 - No change in current position.

Cost Summary:

No additional costs

Option 2 - Roadway vehicle intrusion protection at PA perimeter.

Cost Summary:

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120	160	280
2. 800' Passive Barrier	48	120	300
Total	$168K	$280K	$580K

Option 3 - Vehicle intrusion protection at PA perimeter.

Cost Summary:

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120/120	160/ 160	280/ 280
2. 2,000/7,000' Passive Barrier	120/420	300/1,050	750/2,625
Total	$240/540K	$460/1,210K	$1,030/2,905K

Option 4 - Protection at safe standoff distance for DBV and explosive device.

Cost Summary Case 1: (Assumes analysis demonstrates safe standoff distances are within present PA - About 80 percent of sites)

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120/120	160/ 160	280/ 280
2. 2,000/7,000' Passive Barrier	120/420	300/1,050	750/2,625
3. Standoff Analysis	115/115	115/ 115	115/ 115
Total	$355/655K	$575/1,325K	$1,145/3,020K

Cost Summary Case 2: (Assumes analysis demonstrates safe standoff distances go beyond PA boundary for about 1/3 of boundary and further hardening of portions of PA barrier to penetration needed)

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120/120	160/ 160	280/ 280
2. 2000/7000' Passive Barrier	120/420	300/1,050	750/2,625
1000/2000' Passive Barrier - hardened	90/100	225/ 450	550/1,100
3. Standoff Analysis	300/300	300/ 300	300/ 300
Total	$630/940K	$985/1,960K	$1,880/4,305K

Discussion of Factors Impacting Cost of Option 4:

Ranges in cost estimates for the three vehicle types illustrate the influence of site-specific characteristics on costs, including the need

at some sites to extend the vehicle exclusion area beyond portions of the current PA boundary or providing a more substantial passive barrier to prevent vehicle penetration. At a few sites, extension of the vehicle exclusion area beyond the current PA boundary may result in costs that exceed the upper range of the cost estimate.

The need for a licensee to provide additional measures beyond those needed to protect against vehicle penetration into the PA (Option 3) is a factor of the structural details of buildings containing vital equipment and the distance of the buildings from the PA. In SECY-93-102, staff indicated that at facilities with an average sized PA and typical concrete structures, a vehicle bomb similar to that reportedly used at the World Trade Center may cause moderate damage to some concrete walls. However, the safety equipment located behind typical concrete walls, but not contiguous to outside walls, would likely be protected.

5.0 DECISION RATIONALE

The staff continually monitors and evaluates the threat environment worldwide. In addition, the Commission was briefed by the CIA and the FBI on March 5, 1993. Neither agency provided information regarding an actual vehicle threat to domestic commercial nuclear power reactors that could serve as the basis for modifying the DBT. Further, staff reported on its analysis of more than 500 vehicle bomb attacks worldwide. The bombing at the World Trade Center demonstrated that a large explosive device could be assembled, delivered to a public area, and detonated in the U.S. without advance intelligence knowledge. In addition, the unauthorized intrusion at TMI demonstrated that a vehicle could be used to gain quick access to PAs of the plant. Consequently, the staff has concluded that a modification to the DBT is warranted.

The DBT is not intended to represent a real threat. It serves three purposes. It provides a standard with which to measure changes in the real threat environment. It is used to develop regulatory requirements. And it provides a standard for evaluation of implemented safeguards systems.

In assessing the impact on the DBT of the events at TMI and the World Trade Center, staff has considered the following two issues: first, whether these events establish the need for NRC to revise its regulations to redefine adequate protection of the health and safety of the public, in the sense that adequate protection is used by section 182 of the Atomic Energy Act; and second, whether these events demonstrate that amending NRC's regulations to protect against malevolent use of a vehicle at nuclear power plants would result in a substantial increase in the overall protection of the public health and safety. With respect to the first issue, the NRC cannot consider cost. With respect to the second issue, the NRC must determine that the direct and indirect costs of implementation are justified in view of the increased protection.

The staff's assessment as to whether to redefine adequate protection is as follows:

> The vehicle intrusion at TMI demonstrated that a person in a vehicle could penetrate a PA barrier and quickly approach a vital

area barrier. However, for the public health and safety to be actually affected (absent a vehicle bomb threat, which will be discussed with respect to World Trade Center event), the following would also have to be true. The person or persons in the vehicle would have to possess the intent, knowledge of the plant skills, and equipment necessary to create radiological sabotage. They would have to leave the vehicle and reach one or more vital areas barriers. They would have to penetrate the vital area barriers, which are typically reinforced concrete walls and locked and alarmed steel doors. They would have to create a significant loss-of-coolant accident or create a reactor transient. They would have to disable sufficient safety systems to prevent the reactor from reaching a safe condition. They would have to cause a breach of containment. And they would have to accomplish all of this without intervention by the licensee's armed responding security officers.

The NRC interpretation of the DBT for radiological sabotage does not preclude adversaries' use of vehicles, other than vehicle bombs, for transportation and for breaching PA barriers. The vehicle should be detected by an intrusion detection system as it enters the PA. The nature of the threat should be assessed using CCTV or other means. Responding security officers should be able to neutralize the threat before sufficient damage can be done to create radiological sabotage. At many sites, vital area doors can be reached on foot within similar periods of time as with a vehicle. Therefore, staff has concluded that the TMI event has not demonstrated a need to redefine adequate protection.

In denying a 1991 petition for rulemaking to upgrade the DBT for radiological sabotage to include protection against a vehicle bomb, one factor identified by the staff was that a terrorist group would have to construct a large truck bomb undetected. The World Trade Center event demonstrated that this can happen. However, to conclude that protection of the public health and safety is not adequate, the NRC would have to conclude that the use of a vehicle bomb to create radiological sabotage is reasonably to be expected and that there would not be sufficient time to implement contingency procedures for protecting against a vehicle bomb. Based on its analysis of the current threat environment, staff has concluded that the use of a vehicle bomb to create radiological sabotage at a nuclear power plant is not currently a reasonable expectation. If a significant change in the general threat environment causes staff to change this conclusion in the future, current contingency planning, which is designed to be implemented in a timely manner, would provide staff with a rapid regulatory mechanism to implement temporary protection measures and maintain an adequate level of protection while its regulations are amended to require permanent protection. Therefore, the staff concludes that the World Trade Center event has not established a need to redefine adequate protection.

The staff assessment as to whether to amend its regulations to protect against malevolent use of a vehicle bomb against a nuclear power plant so as to

provide a substantial increase in overall protection of the public health and safety is as follows:

> Staff has identified several lessons learned from the vehicle intrusion at TMI. Although the intrusion detection system generated an alarm, the alarm station operators were not able to confirm the intrusion promptly by CCTV. A foot patrol was sent to evaluate the cause of the alarm. There was confusion and misinformation given to operations and security staff until a positive assessment of the intrusion could be made. Out of the confusion and concern for personal safety, operations staff made decisions that could have negatively affected the public health and safety. Even when an initial assessment was made, licensee staff did not know how many unauthorized individuals were inside the PA, where they were, and whether they possessed weapons or explosives.
>
> The TMI event demonstrates some aspects regarding use of a vehicle by a potential adversary that could provide advantages not previously considered. Therefore, staff considers that providing vehicle intrusion protection would provide a substantial enhancement against such a threat. Enhancements to protect against the vehicle intrusion threat also provide, to varying degrees dependent on site characteristics, enhancement for protection against vehicle bombs.
>
> The World Trade Center event has demonstrated a capability within the United States to construct a truck bomb undetected. This recently demonstrated capability indicates that although a vehicle bomb attack at a nuclear power plant is not reasonably to be expected, it is somewhat more likely to develop without advance indications than staff previously believed. Staff therefore considers that providing vehicle bomb protection would provide substantial enhancement against such a threat.

Based on the analysis of the four options discussed in Sections 4 and 5, staff concluded that a fifth option should be proposed that would offer a more realistic and practical approach.

6.0 OPTION 5

This new Option 5 incorporates the protection measures of Option 3 - hardened perimeter against intrusion. However, for Option 5, staff would develop criteria that could be used by licensees to determine, through simplified site-specific analyses, that protecting against vehicle intrusion would also provide high assurance of protection against a vehicle bomb with characteristics of the type specified in Enclosure 8 of SECY-93-166. These criteria would specify safe standoff distances for various types of typical power reactor building constructions that protect vital equipment against explosive blasts. All licensees would be required to review their sites against these criteria, and those sites meeting these criteria would confirm this to the NRC. Staff estimates that this confirmatory process would demonstrate that about 80 to 90 percent of the sites could meet these criteria without further analysis or consideration of additional measures.

Sites not meeting these criteria would have choices that would include using more substantial (and expensive) barriers for a portion of their protected area to reduce vehicle penetration, extending vehicle barriers out from their planned locations, performing a more detailed analysis of existing structures and equipment to demonstrate their ability to protect against a vehicle bomb using barriers, or evaluating other alternatives. Some licensees may be able to demonstrate that atypical building structures would provide adequate protection, that building damage would not disable vital equipment, or, if vital equipment were damaged, that redundant or diverse equipment could provide a backup function. If this capability could not be demonstrated, a licensee may have to establish additional security measures to assure protection from a vehicle explosive for vital equipment. Examples of these measures are extending the hardened barrier outward from the current protected area boundary, placement of blast shielding, or providing backup systems for those assumed to be damaged.

For most sites (80 to 90 percent), the costs for Option 5 would be about $50,000 more than Option 3. This amount assumes a confirmation analysis that vital area structures meet staff specified criteria for safe standoff distances. Many of the remaining sites would have choices available to provide equivalent protection with additional cost. For the few sites where analysis indicated that standoff distances may be less than those specified in staff guidance, Option 5 permits evaluation of alternative approaches.

In those cases where licensees determine additional security measures may be needed to protect safe shutdown capability, Option 5 would permit licensees to either implement the additional security measures or develop alternate protection strategies. Staff would review licensees' alternative proposals and make an acceptability determination. The staff will accept the proposed alternative measures if they provide substantial protection against a land vehicle bomb and the costs of fully meeting the design goals and criteria are not justified by the added protection which would be provided. The Commission would be notified of such staff action.

Staff has concluded that Option 5 would substantially increase protection of the public health and safety. Staff has also determined that the direct and indirect costs of implementation of Option 5 are justified in view of the increased protection. Staff also notes that the determination on costs of implementation of Option 5 is based on the premise that the only definitive requirement for all licensees is that they provide measures to protect against the use of a land vehicle as a means of transportation to gain proximity to vital areas and that they assess any incremental measures, if necessary to meet the design goal for a land vehicle bomb. A determination of whether incremental costs were not justified by incremental benefit would be made on a site-specific basis.

A summary of cost estimates follows for two cases, one where analysis demonstrates that safe standoff distances are within the present PA and one where the standoff distances go beyond the PA boundary.

Cost Summary Case 1: (Assumes analysis demonstrates safe standoff distances are within present PA - About 80 to 90 percent of sites)

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120/120	160/ 160	280/ 280
2. 2,000/7,000' Passive Barrier	120/420	300/1,050	750/2,625
3. Standoff Analysis	50/ 50	50 / 50	50/ 50
Total	$290/590K	$510/1,260K	$1,080/2,955K

Cost Summary Case 2: (Assumes analysis demonstrates standoff distances go beyond PA boundary for about 1/3 of boundary and further hardening of portions of PA barrier to penetration needed)

Items	Passenger Vehicle	Pickup Truck	Large Truck
1. 4 Active Vehicle Access Barriers	120/120	160/ 160	280/ 280
2. 2,000/7,000' Passive Barrier	120/420	300/1,050	750/2,625
3. Standoff Analysis	100/100	300/ 300	500/ 500
4. Additional Measures	100/100	150/ 150	250/ 250
Total	$440/740K	$910/1,660K	$1,780/3,655K

Conclusion: Staff has concluded that Option 5 would substantially increase protection of the public health and safety. Staff has also determined that the direct and indirect costs of implementation of Option 5 are justified in view of the increased protection. Staff also notes that the determination on costs of implementation of Option 5 is based on the premise that the only definitive requirement for all licensees is that they provide measures to protect against the use of a land vehicle as a means of transportation to gain proximity to vital areas and that they assess any incremental measures, if necessary, to meet the design goal for a land vehicle bomb. A determination of whether incremental costs were not justified by incremental benefit would be made on a site-specific basis.

7.0 IMPLEMENTATION

7.1 Rulemaking Options

On June 29, 1993, the Commission directed staff to implement Option 5 by expedited rulemaking. The proposed rule was issued for public comment on November 4, 1993.

7.2 Guidance for Licensees

As indicated above, staff has developed criteria that could be used by licensees to determine, through simplified site-specific analyses, that protecting against vehicle intrusion into the PA would also provide substantial protection against a vehicle bomb with characteristics of the type specified in Enclosure 8 of SECY-93-166. These criteria specify safe standoff distances for various types of typical power reactor building constructions that protect vital equipment against explosive blasts. The safe standoff guidance considers such variables as wall height, width, and thickness; the size, spacing and depth of rebar, and boundary conditions.

Sites not meeting the criteria would have choices that would include using more substantial and expensive barriers for a portion of their PA (to reduce vehicle penetration), extending vehicle barriers beyond their intended location to protect against vehicle intrusion, performing a more detailed analysis of existing structures and equipment to demonstrate their ability to protect against a vehicle bomb using barriers at the PA, or performing a qualitative analysis of alternatives. The qualitative analysis would address the enhanced protection that would be achieved by protective measures that exceed protecting against vehicle intrusion as a means to gain proximity to vital areas. Some of these licensees may be able to demonstrate that atypical building structures would provide adequate protection, that building damage would not disable vital equipment, or, if vital equipment were damaged, that redundant or diverse equipment could provide a backup function. If this capability could not be demonstrated, a licensee may have to establish additional security measures to assure an acceptable level of protection from a vehicle explosive for vital equipment. Examples of these measures are extending the hardened barrier outward from the current PA boundary, placement of blast shielding, or providing backup systems for those assumed to be damaged.

In those cases where the licensee determines additional security measures are needed to protect a safe shutdown capability, this option would permit licensees to either implement the additional security measures, or develop alternative protection strategies. Staff would have to review the licensee's alternative solution against developed criteria and make a determination on its acceptability. For those licensees proposing not to implement additional security measures beyond those to protect against vehicle intrusion, staff would need to make a determination of whether the costs were not justified by the incremental benefit. The Commission will be informed of the staff decision.

8.0 RESOLUTION OF COMMENTS

The staff presented the proposed rulemaking package to the Security Subcommittee of the ACRS on November 3, 1993, and to the full committee on November 4, 1993. The full committee was briefed on December 10, 1993, in a closed session, by the Director, Office of Nuclear Material Safety and Safeguards. The ACRS's December 10, 1994 letter to the Chairman raised serious concerns about the rulemaking, particularly the justification for the rule, the lack of a quantitative risk assessment to support it, and the expedited nature of the rulemaking.

Written comments on the proposed rule were received from 25 licensees that operate commercial nuclear power reactors, two industry groups (NUMARC and Nuclear Backfitting and Reform Group (NUBARG)), two public citizens, one citizens' group, the NCI and one other advocacy group, one State nuclear safety agency, and two nuclear vendors. Earlier, at a May 10, 1993 NRC-sponsored public meeting, the staff invited comments on the design basis threat. The staff reviewed all comments of record that pertained to malevolent use of vehicles at nuclear power plants and considered them in the preparation of the amendment to the final rule.

Several comments supported the rulemaking and expressed the view that rulemaking on this topic was the proper, proactive approach. A minority of 4 members of the ACRS expressed a view that the proposed rule represents a prudent and effective step toward enhancing public health and safety. The NCI commented that the rule was long overdue.

Like the ACRS, NUMARC, NUBARG, and numerous utilities expressed concern that the safety benefit was not adequately justified or quantified. In particular, the ACRS commented on the staff's failure to quantify the likelihood of a malevolent intrusion. The staff continues to believe that estimates of various sabotage threats are not amenable to probabilistic risk assessment techniques and that determination of threats required to be protected against should be a matter of prudence. The staff notes that, although not quantified, this regulatory analysis recognizes the importance of the perception of the likelihood of an attempt to create radiological sabotage in assessing whether to redefine adequate protection. The staff's assessment that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry was an important consideration in concluding that neither the Three Mile Island intrusion nor the World Trade Center bombing demonstrated a need to redefine adequate protection.

The staff does not agree that quantifying the probability of an actual attack is important to a judgment of a substantial increase in overall protection of the public health and safety (a less stringent test of the justification for a rule change). Inherent in NRC's current regulations is a policy decision that the threat, although not quantified, is likely in a range that warrants protection against a violent external assault as a matter of prudence. In considering the risk from use of a vehicle to gain proximity to vital areas, the staff's regulatory analysis does not suggest that the likelihood of a violent external assault has increased. Rather, the staff contends that, given a violent external assault (the likelihood of which has not changed), the likelihood of an adversary using a vehicle to gain rapid access to vital areas is high if the adversary perceives it as a significant advantage.

In response to comments on the regulatory analysis, the staff further assessed lessons learned from the TMI intrusion and concluded that a vehicle could provide advantages to an adversary not previously considered. In SECY-86-101, "Design Basis Threat - Options for Consideration," March 31, 1986, the staff concluded that, even though perimeter chain link fences would not prevent vehicle intrusion, the requirement for prompt response by guards armed with shoulder-fired weapons would limit actions of intruders. Accordingly, in 1986 the staff concluded that the installation of vehicle barriers might not constitute a substantial overall increase in the protection of public health and safety. During the last several months, the staff has further analyzed the capability of existing licensee security measures to protect against a

violent external assault that includes a vehicle as a mode of transportation. These new analyses support the staff's conclusions in the original regulatory analysis for the proposed rulemaking and suggest that, if the staff concluded that a threat was likely in the near future, the issue would be one of redefining adequacy.

In addition, the staff's recommendation in SECY-93-326, "Reconsideration of Nuclear Power Plant Security Requirements Associated with an Internal Threat", to permit licensees to leave some vital area doors unlocked was based in part on the earlier Commission directive for the staff to proceed expeditiously with rulemaking to require vehicle barriers. The subsequent Commission direction in an SRM of February 18, 1984, to allow licensees to leave all vital area doors unlocked increases the importance of requiring vehicle barriers. The staff believes that the vehicle intrusion issue alone warrants the installation of vehicle barriers at nuclear power plants.

As a result of the World Trade Center bombing, the staff believes that the construction of a vehicle bomb is more likely to develop without advance indications. The staff does not believe that it can quantify the likelihood of vehicle bomb attack. However, it has performed a conditional probabilistic risk analysis for an existing power reactor site, assuming an attempt to damage a nuclear power plant with a design basis vehicle bomb placed at locations within the protected area that would create the greatest risk to public health and safety. The analysis indicated that the contribution to core damage frequency could be high.

Barriers installed to protect against vehicle intrusion into protected areas would also protect, to varying degrees, against vehicle bombs. Staff believes that adjusting the location of barriers where necessary to ensure a capability of protecting vital equipment against a design basis vehicle bomb would provide an additional substantial increase in the overall protection of the public health and safety. Further, staff believes that the incremental costs to licensees to analyze the degree of protection against a vehicle bomb and to make adjustments in vehicle control measures in limited cases are justified, particularly considering the provisions in the rule allowing licensees to propose alternative measures if a site-specific analysis indicates that the costs of fully meeting the rule's design goals and criteria are not justified by the added protection that would be provided.

The additional deterministic evaluations and limited probabilistic assessments, prepared in response to ACRS and industry comments, have supported staff's earlier findings that protecting against vehicle intrusion and a vehicle bomb would substantially increase the overall protection of public health and safety.

NUMARC and the staff agree that protection against the malevolent use of vehicles would be prudent, but for different reasons. NUMARC stated that the industry agreed that unauthorized vehicles should not be allowed inside a nuclear power plant protected area and that a licensee must be able to safely shut down a plant following the detonation of an explosive device outside the protected area. However, NUMARC stated that these beliefs are based on business prudence (e.g., protection of employees and the investment in generating equipment inside the protected area) rather than on concern for radiological sabotage or nuclear safety considerations. NUMARC contended that existing NRC rules adequately protect the public health and safety.

NUMARC recommended several principles to guide the establishment of protection requirements for land vehicles and land vehicle bombs. Many of these recommendations are consistent with the threat characteristics specified in the proposed rulemaking. NUMARC's principles differ in the following ways: the design basis vehicle that could be used to attempt penetration of a protected area would carry only personnel and hand-carried equipment; and protection against a vehicle bomb would assume a stationary vehicle outside existing protected areas with explosive capability no greater than bombs previously detonated for malevolent purposes within the United States.

With respect to barrier penetration, the primary difference in implementation of the proposed rule and NUMARC's proposal is a presumption of a lower kinetic energy, since the vehicle would not be carrying a large explosive payload. It is theoretically possible that, for some types of barriers, NUMARC's proposal could result in less costly barriers than under the proposed designed basis threat. However, the staff's analysis indicates the lower design basis kinetic energy resulting from NUMARC's proposal makes little practical difference for standard barriers. In addition, the staff's regulatory analysis indicated that, because of the short distances between vital areas and portions of some protected area boundaries, protection against a vehicle at existing boundaries would be inconsistent with NUMARC's stated goal of being able to safely shut down a plant following the detonation of an explosive device outside the protected area.

Referenced in Regulatory Guide 5.68 is NUREG/CR-6190, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants," which was prepared for the NRC by the U.S. Army Corp of Engineers. NUREG/CR-6190 provides licensees with simplified guidance for design and selection of vehicle barriers and analysis of existing structures and equipment to demonstrate their ability to withstand the effects of an explosive blast. The staff is continuing work to supplement NUREG/CR-6190 with information that may further simplify licensee barrier design and blast effect analysis.

ENCLOSURE 5

Congressional Letters

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

The Honorable Richard H. Lehman, Chairman
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Nuclear Regulatory Commission (NRC) is sending the enclosed final amendments to 10 CFR Part 73 to the Office of the Federal Register for publication. NRC has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. However, based on recent events, NRC believes that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. To maintain a prudent margin between what is the current threat estimate (low) and the design basis threat (higher), NRC is amending 10 CFR Part 73 to modify the design basis threat for radiological sabotage to include protection against malevolent use of vehicles at nuclear power plants.

The amendments explicitly require measures to deny the access of a four-wheel drive land vehicle by an adversary for the transport of personnel, hand-carried equipment, and/or hand-carried explosives or in use as a vehicle bomb. Specifically, the rule requires applicable licensees to establish vehicle control measures to protect against use of a land vehicle as a means of transportation to gain unauthorized proximity to vital areas. Licensees would also be required to provide substantial protection against a vehicle bomb. The rule is effective 30 days after publication in the Federal Register. Vehicle control measures must be implemented within eighteen months of the effective date of the rule

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Representative Barbara Vucanovich

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

The Honorable Joseph Lieberman, Chairman
Subcommittee on Clean Air and Nuclear Regulation
Committee on Environment and Public Works
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The Nuclear Regulatory Commission (NRC) is sending the enclosed final amendments to 10 CFR Part 73 to the Office of the Federal Register for publication. NRC has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. However, based on recent events, NRC believes that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. To maintain a prudent margin between what is the current threat estimate (low) and the design basis threat (higher), NRC is amending 10 CFR Part 73 to modify the design basis threat for radiological sabotage to include protection against malevolent use of vehicles at nuclear power plants.

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Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Senator Alan K. Simpson

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

The Honorable Philip R. Sharp, Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Nuclear Regulatory Commission (NRC) is sending the enclosed final amendments to 10 CFR Part 73 to the Office of the Federal Register for publication. NRC has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. However, based on recent events, NRC believes that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. To maintain a prudent margin between what is the current threat estimate (low) and the design basis threat (higher), NRC is amending 10 CFR Part 73 to modify the design basis threat for radiological sabotage to include protection against malevolent use of vehicles at nuclear power plants.

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Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Representative Michael Bilirakis

The Honorable Richard H. Lehman, Chairman
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
United States House of Representatives
Washington, DC 20515

Identical letters sent
to Senator Lieberman
and Rep. Sharp

Dear Mr. Chairman:

The Nuclear Regulatory Commission (NRC) is sending the enclosed final amendments to 10 CFR Part 73 to the Office of the Federal Register for publication. NRC has concluded that there is no indication of an actual vehicle threat against the domestic commercial nuclear industry. However, based on recent events, NRC believes that a vehicle intrusion or bomb threat to a nuclear power plant could develop without warning in the future. To maintain a prudent margin between what is the current threat estimate (low) and the design basis threat (higher), NRC is amending 10 CFR Part 73 to modify the design basis threat for radiological sabotage to include protection against malevolent use of vehicles at nuclear power plants.

The amendments explicitly require measures to deny the access of a four-wheel drive land vehicle by an adversary for the transport of personnel, hand-carried equipment, and/or hand-carried explosives or in use as a vehicle bomb. Specifically, the rule requires applicable licensees to establish vehicle control measures to protect against use of a land vehicle as a means of transportation to gain unauthorized proximity to vital areas. Licensees would also be required to provide substantial protection against a vehicle bomb. The rule is effective 30 days after publication in the Federal Register. Vehicle control measures must be implemented within eighteen months of the effective date of the rule

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Representative Barbara Vucanovich
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ENCLOSURE 6

Regulatory Guide 5.68

REGULATORY GUIDE 5.68

PROTECTION AGAINST MALEVOLENT USE OF VEHICLES AT NUCLEAR POWER PLANTS

A. INTRODUCTION

10 CFR Part 73, "Physical Protection of Plants and Materials," Section 73.1(a)(1)(i)(E) requires a licensee to protect against a determined violent external assault, attack by stealth, or deceptive actions, by several persons using a four-wheel drive land vehicle for the transport of personnel, hand-carried equipment and/or explosives. Section 73.1(a)(1)(iii) requires licensees to protect against a four-wheel drive land vehicle used for the transport of an explosive. In 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage," Section 73.55(c)(7) requires a licensee to establish vehicle control measures, including vehicle barriers, to protect against the use of a land vehicle, as specified by the Commission, as a means of transportation to gain unauthorized proximity to vital areas. Section 73.55(c)(8) requires a licensee to compare the vehicle control measures established in accordance with Section 73.55(c)(7) to the Commission's design goals and criteria for protection against a land vehicle bomb. Section 73.55(c)(8) also provides for a process to use alternative measures for protection against a land vehicle bomb, for example, for those licensees with a particularly difficult site configuration. These alternative measures must provide substantial protection against a land vehicle bomb and must be supported by a licensee analysis, using the essential elements of the criteria in 10 CFR 50.109, demonstrating that the costs of fully meeting the design goals and criteria are not justified by the added protection that would be provided. The alternative measures must be submitted to the Commission for approval. The rule does not apply to licensees who are in the process of decommissioning and have amended their operating license to a possession-only status. The rule would apply to licensees who plan to decommission in the near future but do not have a possession-only license. The Commission would need to evaluate each of these licensees individually to determine if an exemption from the rule is appropriate.

Section 73.55(c)(9) requires a licensee to submit to the Commission a summary description of their proposed control measures as required by Section 73.55(c)(7) and the results of their vehicle bomb comparison. Section 73.55(c)(10) pertains to applicants for a license to operate a nuclear power reactor.

This regulatory guide is being developed to provide guidance acceptable to the NRC staff by which the licensee can meet the requirements of the amended 10 CFR Part 73.1(a)(1) and 73.55(c)(7),(8),(9)and(10). This regulatory guide will be used by licensees in conjunction with separate Safeguards Information that has already been provided to affected licensees. This Safeguards Information is not available to the general public. Also available is NUREG/CR-6190, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants," Volumes 1 and 2, which provides acceptable measures to satisfy the requirements of this rule.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Part 73, which provides the regulatory basis for this guide. The information collection requirements in 10 CFR Part 73 have been approved by the Office of Management and Budget, Approval No.3150-0002.

DISCUSSION

Measures To Protect Against Unauthorized Use of a Land Vehicle as a Means of Personnel Transport

Protection against use of a land vehicle as a means to gain unauthorized proximity to vital areas can be provided by establishing a continuous barrier system that encompasses vital areas of the facility. The features and structures that form the barrier system would need to be sufficient to stop the forward motion of a land vehicle with the design characteristics established by the Commission. These design characteristics have been provided to affected NRC licensees in a separate document that is Safeguards Information, and therefore is not available to the public.

Since the protected area perimeter serves as an outer barrier to vital areas, one approach would be to establish the vehicle barrier contiguous with or in close proximity to the protected area perimeter. At many facilities, natural terrain features such as water barriers, steep cliffs, large rocks, or existing structures such as buildings or cooling towers located adjacent to the protected area would be well suited and may be linked with barriers to serve as part of the continuous barrier. As a matter of economy and convenience, the barrier system would likely include the present vehicle access points to the protected area. At these locations, active barriers that would allow controlled vehicle entry would need to be installed.

Passive vehicle barriers are appropriate for those portions of the barrier system that are not needed for vehicle access. The passive barriers may make use of natural topographic features and structures provided these features, along with other segments of the barrier, provide a continuous vehicle barrier against land access to the facility's vital areas. In considering a barrier, natural features or devices that limit vehicle direction and speed also may be appropriate to simplify or reduce the performance required of the vehicle barrier system.

Active vehicle barriers are appropriate for those portions of the barrier system that need to provide for vehicle access. Active vehicle barriers have two positions: one position that denies passage of a vehicle and a second position that allows passage. Barriers remain in the denial position to prevent entry and are moved to allow entry only after authorization for the vehicle has been confirmed.

The energy-absorbing capability of various vehicle barriers and the speed-reducing capability of natural and man-made obstacles can be based on presently available test data developed for other Federal agencies or by national laboratories or barrier manufacturers. Much of the available data is included in the Safeguards Information that has already been provided to affected licensees. For vehicle barriers and obstacles for which test data is

not available, the licensee can perform an engineering analysis to determines its effectiveness in stopping or slowing a vehicle.

Access control measures for vehicles crossing the boundary of the established vehicle barrier system need to be sufficient to provide assurance that the vehicle is appropriately authorized and not transporting an explosive device. In addition to barriers, access control measures include required vehicle searches, personnel searches, and escorts (if necessary). It would be expected that, at most facilities, one active vehicle barrier would be established for each of the present protected area vehicle access points. Searches of vehicles for explosives and other personnel access control measures, which remain in effect for protected area entry, are rigorous, and provide assurance against unauthorized vehicle entries. Vehicle searches may be conducted inside the vehicle barrier system (VBS) at previously established search points after proper authorization of the vehicle has been obtained. For barrier system layouts that have vehicle denial barriers located outside the protected area boundary, vehicle access control measures, including searching for explosives, would have to be provided for vehicles permitted access inside the barrier, even if the vehicle did not enter the protected area.

Portions of the VBS located outside the protected areas should be periodically observed to identify damage, deterioration, or indications of tampering that impact the effectiveness of the barrier. These observations may be performed as part of routine security patrols.

The NRC anticipates that vehicle barriers, particularly passive barriers, will infrequently become non-functional once installed. For those infrequent cases, any compensatory measures should take into consideration the type and cause of the problem and time the barrier will be non-functional. For example, for short term problems with active or passive barriers, compensatory measures would not be expected to be extensive. For cases where barriers are non-functional for longer periods, compensatory measures may include placement of heavy vehicular equipment, concrete highway median bounces arranged in a serpentine fashion, installation of strands of airplane arresting wires, or the positioning of an officer armed with a high power contingency weapon may be appropriate.

Measures To Protect Against Use of a Vehicle as a Means of Transport of an Explosive Device

The design goal for protection against explosive devices transported by a vehicle is to protect equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Such equipment, systems, devices, or material are designated by licensees as vital equipment and are required by 10 CFR 73.55(c)(1) to be located within vital areas. Vital areas in turn are required to be located inside protected areas. At many facilities the vital area barrier, which separates vital equipment from the protected area, is located at a considerable distance from the protected area barrier. Further, vital area barriers generally are quite substantial. These features, assuming the vehicle barrier system is located along or adjacent to the protected area barrier, provide substantial protection for vital equipment from an explosive blast. Many of the issues discussed in the previous section related to active and passive barriers apply to the protection against explosives.

The effects of an explosive device diminish rapidly with distance. The distance of the structure or equipment from the explosive blast is referred to as "standoff distance." If the vehicle is transporting an explosive device and the device is detonated at the vehicle barrier or at the distance of barrier penetration, the standoff distance would be that distance from the blast detonation to a vital area barrier. Different vital areas have different standoff distances depending on the postulated locations of the vehicles.

Penetration of a barrier by the vehicle before it comes to rest needs to be considered in determining standoff distances. The distance the vehicle penetrates beyond the barrier would result in the standoff distance between the explosive blast and the vital area barrier being shortened by that distance. Considering typical plant layouts and the placement of vehicle barriers at or adjacent to the protected area, vital area barriers at many facilities would be afforded sufficient protection against a relatively large explosive device.

In addition to the protection afforded by distance from the blast, vital equipment at most sites is provided substantial protection by structures containing the equipment. Vital equipment is frequently located within seismic structures (often reinforced concrete walls).

"Safe standoff" distance is the distance (from the blast to the structure) at which the structure protects equipment within the structure from being disabled. Safe standoff distances can be determined by blast effect analyses that take into account the size of the explosive, distance between the explosive and the affected structure, and characteristics of the structure. These analysis techniques are described in the separate Safeguards Information document that has been sent to licensees.

When the blast analysis shows that a vital area barrier structure would be damaged, further analysis may be able to demonstrate that vital equipment within the structure is not damaged. For example, the vital equipment may be located in a separate cubicle within the main structure that is unaffected by the analyzed blast damage to an outer wall or a roof. If the blast effect analysis indicates that the explosion could damage vital equipment, the ability to shut down and maintain the facility in a safe shutdown condition may be demonstrated by identifying alternative plant equipment that could serve the same safety function as the equipment analyzed as being damaged by the explosion. Also, it may be demonstrated that damage control measures can be taken that could support plant shutdown and maintain the plant in a safe shutdown condition.

If the blast effects analysis demonstrates that vital equipment would be damaged, that alternative equipment is not available, and that damage control measures can not adequately support plant shutdown and maintaining shutdown conditions, other measures (in addition to those required to protect against the use of a land vehicle as a means of transportation to gain proximity to vital areas) may be needed. To fully meet the Commission's design goals and criteria for protection against a land vehicle bomb, additional measures that can be taken include: (1) extending the vehicle barrier location out from those positions shown by the analysis that the barrier does not provide sufficient safe standoff distance for vital area structures from the explosive, (2) constructing structures that shield the vital area barrier from blast effects, (3) installing equipment to back up that equipment assumed to be damaged, or (4) interconnecting other systems to the damaged equipment.

Certain security-related electric power supplies and the central alarm

station are required by 10 CFR Part 73 to be protected within vital areas; however, in the absence of safety-related equipment necessary for plant shutdown, these vital areas need not be considered as areas needing protection in the licensee's analysis.

Alternative Measures To Protect Against a Vehicle Bomb

As provided in Section 73.55(c)(8), under certain circumstances a licensee may propose measures other than those needed to meet the design goals and criteria specified for protection against a land vehicle bomb. This does not relieve the licensee of the requirement to protect against use of a vehicle to gain proximity to vital areas. Alternative measures developed by a licensee will be acceptable to the NRC staff if it can be demonstrated that they, along with measures that protect against vehicle intrusions, provide substantial protection against a land vehicle bomb and if the licensee demonstrates by an analysis, using the essential elements of 10 CFR 50.109, that the costs of fully meeting the design goals and criteria are not justified by the added protection by these additional measures. These alternative measures must be approved by the NRC staff.

Factors to be considered in assessing proposed alternative measures to protect against a vehicle bomb include:

- The characteristics (e.g., size, location, and mobility) of the vehicle bomb that the alternative measure would protect against.
- The percent of the perimeter that would be vulnerable to a design basis vehicle explosion.
- The amount of time that the reactor could be maintained in a safe condition if subjected to a design basis vehicle explosion at the most vulnerable portion of the barrier system.
- The licensee's severe accident management program.
- The offsite consequences of a design basis vehicle explosion at the most vulnerable portion of the barrier system.
- The cost difference between the proposed alternative measures and measures that would fully meet the design goals and criteria for protection against a vehicle bomb.

The NRC's approval of the licensee's proposal for alternative measures will be based on the extent that the vehicle barrier system, including alternative measures added to enhance protection against a vehicle bomb, provides protection against a vehicle transporting an explosive device.

Definitions

The following are definitions of terms used in this guide.

Design Basis Threat Bomb: An explosive device with the TNT equivalent force that is described to licensees in the separate Safeguards Information.

Design Basis Threat Land Vehicle: A vehicle with design characteristics described to licensees in the separate Safeguards Information.

Design Goals and Criteria for Protection Against a Land Vehicle Bomb: The design goal is to protect equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. The criteria are that protection needed to protect against the design basis threat land vehicle and the design basis threat bomb.

Level of Protection: The degree of protection from a bomb blast that a structure provides to equipment housed inside the structure.

Safe Standoff Distance: The distance between vital equipment or a structure housing vital equipment and the point of detonation of the design basis threat bomb that would protect the equipment or equipment within the structure to a medium level of protection. A medium level of protection is afforded vital equipment when there is a low probability of damage to the equipment from an explosion occurring at the vehicle barrier or at a point of penetration of the vehicle barrier.

Standoff Distance: The distance between vital equipment or a structure housing vital equipment and the point of detonation of the design basis threat bomb. This distance should account for penetration of the barrier by the design basis threat land vehicle.

Vehicle Barrier System (VBS): A continuous barrier, which may include buildings, natural barriers, commercially available barriers, and any combination of these items, utilized to stop a land vehicle used as transportation to gain proximity to vital areas or used to transport a bomb.

C. REGULATORY POSITION

1. MEASURES TO PROTECT AGAINST UNAUTHORIZED VEHICLE INTRUSION

A vehicle barrier system (VBS) that is capable of preventing forced access of a land vehicle to gain proximity to vital areas should be established at each nuclear power reactor site. The VBS should provide a perimeter around vital areas of the facility such that no location along the perimeter would permit forced entry of a land vehicle. The VBS, regardless of type of barriers used, should be of a design capable of stopping the forward motion of the design basis land vehicle (DBV). The VBS may be incorporated as part of the protected area perimeter system but should not diminish or remove any requirements established for the protected area.

1.1 Passive Barriers

The passive barrier portion of the VBS may include natural terrain features such as steep cliffs and large rocks, alone or in combination with man-made structures or barriers, provided the overall effectiveness of the barrier at any point is capable of stopping the forward motion of the DBV. Man-made or natural features that limit the direction and speed of the DBV may

be used in conjunction with a barrier design. The separate Safeguards Information, that has already been sent to affected licensees, provides design guidance that is acceptable to the NRC on the performance capabilities of barriers and specifications for measures that reduce vehicle speed.

1.2 Active Barriers

Access by vehicles to locations inside the VBS should be through active vehicle denial barriers that, in the denial position, are capable of stopping the forward motion of the DBV. Operational design features of the active barrier or barrier system when allowing access for authorized vehicles should be capable of preventing being bypassed and allowing access of unauthorized vehicles. A single active barrier may be used in conjunction with other vehicle control measures to ensure denial of an unauthorized vehicle. The separate Safeguards Information that was sent to affected licensees provides design guidance that is acceptable to the NRC on the performance capabilities of barriers and specifications for measures that reduce vehicle speed.

1.3 Vehicle and Personnel Access Authorization Measures

Vehicles and their operators should be authorized for entry prior to being permitted access inside the VBS. Vehicle authorization should also include confirmation that the vehicle has a legitimate purpose for entering the VBS. Authorization for the vehicle operator should include confirmation that the individual has a legitimate purpose for operating the vehicle inside the VBS. For VBS designs that are adjacent to the protected area boundary and whose active vehicle barrier access points are the same as the protected area vehicle access points, vehicle and personnel authorization measures for entering the protected area provide adequate authorization controls.

1.4 VBS Description

The security plan should contain an attachment that describes the VBS. The description should include site drawings that identify the VBS, the various components and combinations of components that compose the VBS, and access authorization measures for vehicle and personnel within the VBS.

2. MEASURES TO PROTECT VITAL AREAS AGAINST A LAND VEHICLE BOMB

Section 73.55(c)(8) requires a licensee to compare the vehicle control measures established in accordance with Section 73.55(c)(7) with the design goals and criteria for protection against a land vehicle bomb specified by the Commission. The design basis bomb size is specified in the separate Safeguards Information that has already been provided to affected licensees.

2.1 Blast Effect Analysis

The comparison of vehicle control measures with the design goals and criteria for protection against a land vehicle bomb should consist of an analysis that establishes that the capability of vital equipment to maintain the plant in a safe condition is not lost as a result of a detonation of a design basis bomb at the VBS boundary. Depending on the VBS design and site-

specific considerations, this comparison could result in a determination that the design goals and criteria for protection against a land vehicle bomb are satisfied at the conclusion of any one of the following measures.

2.1.1 Screening Analysis

This screening process determines whether a more detailed analysis of the effects of an explosive blast of the size of the design basis bomb is required.

For each location along the VBS perimeter the standoff distance (distance between vital equipment or structure housing vital equipment and the point of detonation of the design basis bomb) should be determined. The standoff distance should take into account the distance of barrier penetration by the DBV.

Licensees should determine whether the standoff distances for each location along the VBS provide a safe standoff distance. This determination should be made by an analysis that takes into account the size of the explosive; both reflective and side-on blast loads on walls, roofs, and supporting members; the distance between the explosive and the affected structure; and the characteristics of the structure. Vital equipment can be assumed to remain operational if the structure containing the equipment provides such a level of protection that there is a low probability of damage to the equipment from an explosion occurring at the vehicle barrier or at a point of penetration of the vehicle barrier. The separate Safeguards Information that has already been provided to affected licensees specifies approaches acceptable for determining safe standoff distances.

If vital area structures and equipment are found to be located at distances equal to or greater than the safe standoff distance, the design goals and criteria for protection against a land vehicle bomb are considered fully met and no further analysis is necessary.

2.1.2 Detailed Analysis

If the screening analysis described in Section 2.1.1 of this guide cannot establish that vital equipment would be protected from damage by detonation of the design basis bomb at any location along the VBS boundary, the analysis should then consider:

(1) Whether any obstructions in the blast path would affect the level of protection provided to vital equipment. The analysis may incorporate the effects of natural topography that diminish the effects of the bomb blast effect. The analysis may also include an assessment of interior building designs (e.g., interior walls, supports) that may protect vital equipment even if the outer wall or structure is significantly damaged. The analysis should show whether or not the blast damage impacts the functional operability of the vital equipment.

(2) Whether the plant can be shut down and maintained in a shutdown condition with equipment not damaged by the explosion. The evaluation may allow for damage control actions to mitigate the consequences of the explosion. These damage control actions should be included in applicable station operating procedures and referenced in the safeguards

contingency procedures. In addition, the analysis should consider loss of off-site power, an assumption which is compatible with the basic premise that equipment not designated and protected as vital is vulnerable to damage and is not available.

If the detailed analysis determines that all vital equipment remains functional or that the ability to shut down the facility and maintain it in a shutdown condition can be provided even with the loss of vital equipment identified in the screening analysis, the design goals and criteria for protection against a land vehicle bomb are considered fully met and no further analysis is necessary.

2.1.3 Additional Protection Measures

If the screening and detailed analyses determine that the design goals and criteria for protection against a land vehicle bomb cannot be fully met, a determination should be made concerning additional measures needed to fully achieve the design goals and criteria. Additional measures may include installing blast shields, changing planned vehicle barriers to extend standoff distances, strengthening current structures, or installing or relocating plant equipment or systems.

If analysis of the effects of additional measures finds that vital equipment remains functional or that the ability to shut down and maintain the facility in a safe condition can be provided, the design goals and criteria for protection against a land vehicle bomb are considered fully met and no further analysis is necessary.

As provided in Section 73.55(c)(8), the licensee may propose to the NRC additional measures other than ones needed to fully meet the design goals and criteria, provided this approach provides substantial protection against a vehicle bomb and it can be demonstrated that the costs of measures to fully meet the design goals and criteria are not justified by the added protection that would be provided. If so, the actions in Regulatory Position 2.2 should be taken.

2.2 Alternative Measures To Protect Against Explosives

As provided in Section 73.55(c)(8), a licensee may propose to the NRC additional measures other than the ones needed to meet the design goals and criteria, provided this approach provides substantial protection against a vehicle bomb and that it can be demonstrated that the costs of measures to fully meet the design goals and criteria are not justified by the added protection that would be provided. This submittal should include:

(1) The findings regarding the extent of the protection against a vehicle bomb provided by the vehicle control measures designed to meet the requirements of Section 73.55(c)(7). These findings should be expressed in explicit terms such as the size of explosive for which the measures provide protection and locations along the barrier system perimeter where the design goals for protection against a vehicle bomb cannot be fully met.

(2) A description and analysis of additional measures needed to fully meet the design goals and criteria for protection against a vehicle bomb. The description should include an estimate of the cost of the measures.

(3) A description and analysis of additional measures, alternative to those needed to fully meet the design goals and criteria, that are proposed to be taken. The analysis should address the enhanced protection provided by the additional measures. The description should include an estimate of the costs of the measures.

(4) A comparison of the costs of the measures described in (2) and (3) above and an assessment supporting a finding that additional costs of fully meeting the design goals and criteria are not justified by the added protection that would be provided.

3. DOCUMENTATION

In accordance with Section 73.55(c)(9), each licensee authorized to operate a nuclear power reactor is required to submit to the Commission a summary description of the proposed vehicle control measures and the results of the vehicle bomb comparative analysis. The summary description should include identification of active and passive components of the VBS and any natural terrain features or man-made obstructions that complete the VBS. A site drawing or diagram that outlines the VBS should be included with the description. The results of the vehicle bomb comparative analysis should identify the basis for determining that the Commission's design goals and criteria for protection against a land vehicle bomb are fully met. When applicable, the results of the comparison should include damage control actions that must be taken and additional security measures taken to protect against the design basis bomb.

Licensees whose comparative analysis determines that they do not fully meet the design goals and criteria for protection against a vehicle bomb and who propose alternative measures should submit the analysis and justification for the alternatives as specified in Regulatory Position 2.2.

Details of the "as built" VBS and of the land vehicle bomb analysis should be maintained on site.

D. IMPLEMENTATION

Except in those cases in which an applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the methods described in this guide will be used in the evaluation of submittals in response to the amendments to 10 CFR Part 73.

REGULATORY ANALYSIS

A separate regulatory analysis has not been provided for this regulatory guide. The regulatory analysis that was prepared for the rule provides the basis for this regulatory guide and examines the costs and benefits of the rule as implemented by this guide. A copy of "Regulatory

Analysis for Malevolent Use of Vehicles at Nuclear Power Plants" is available for inspection and copying for a fee at the Commission's Public Document Room, 2120 L Street NW., Washington, DC, under Regulatory Guide 5.68.

ENCLOSURE 7

NUREG/CR-6190

NUREG/CR-6190
VOL. I

Protection Against Malevolent Use of Vehicles at Nuclear Power Plants

Vehicle Barrier System Siting Guidance for Blast Protection

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ABSTRACT

This manual provides a simplified procedure for determining the minimum safe standoff distance between vital area barriers and the design basis vehicle bomb threat adopted by the U.S. Nuclear Regulatory Commission. Vital safety related equipment should survive the design basis vehicle bomb attack when the minimum safe standoff distance is provided. The types of vital area barriers addressed are 12-, 18-, 24-, and 30-inch-thick reinforced concrete slabs with reinforcing ratios of 0.2, 0.4, 0.6, and 1.0 percent.

Contents

SECTION 1 - INTRODUCTION

1.1 Purpose

This manual provides a simplified procedure for determining the minimum safe standoff distance between vital area barriers and the design basis vehicle bomb threat adopted by the U.S. Nuclear Regulatory Commission. The procedure presented can be used to determine the adequacy of standoff distance provided by an existing vehicle barrier system (VBS) or it can be used for the siting of a new VBS. The user of this manual should either have a background in civil engineering or should consult a civil engineer when using the manual.

1.2 Protection Strategy

Protection from blast effects is primarily accomplished by keeping the explosive source at a distance from the target. This distance is referred to as standoff distance. The amount of standoff distance required to provide an acceptable level of protection to a vital area is a function of the quantity of explosives considered and the type of vital area barrier used. For bombs transported by vehicles, providing standoff distance is accomplished by installing a vehicle barrier system (VBS) capable of stopping the vehicle at the desired standoff distance. For further information on VBS refer to Volume II of this NUREG.

1.3 Scope

This manual presents a simplified method for determining a minimum safe standoff distance based on dynamic nonlinear blast analysis of several different vital area barriers. Vital area barriers considered are planar two-way acting reinforced concrete slabs. These slabs may be either wall or roof slabs. The minimum safe standoff distance applies only to walls and roofs and not to doors and windows. Four slab thicknesses and five reinforcing ratios are addressed. Review indicates that this range applies to most vital area barriers. Vital area barriers and exposed vital equipment not addressed will require more advanced analysis beyond the scope of this manual. The procedure described in the manual is an accepted way of determining the minimum safe standoff distance; however, it is not exclusive. Other procedures based on sound scientific and engineering principles are also acceptable. More rigorous analysis may result in lesser standoff distances than are given in this manual.

1.4 Organization

The procedure for determining the minimum safe standoff distance is organized into the sections indicated below.

Section	Topic
2	Design Basis Threat
3	Determining Standoff Distance
4	Determining Minimum Safe Standoff Distance
5	Documentation
6	Conclusions

SECTION 2 - DESIGN BASIS THREAT

The design basis vehicle bomb threat that a vital area barrier must resist is an explosive weight in terms of its equivalency to TNT. The design basis vehicle bomb threat can be found in the Addendum to Regulatory Guide 5.68. This information, and any information derived from it, has been determined by the Nuclear Regulatory Commission to be Safeguards Information, and it should be handled accordingly.

SECTION 3 - DETERMINING STANDOFF DISTANCE

3.1 Purpose

This section defines the effective standoff distance that a vehicle barrier system (VBS) provides a vital area barrier.

3.2 Definition

The effective standoff distance for a vital area barrier is the shortest distance from the vital area barrier to the closest possible explosive source location. The effective standoff distance is measured from the point of maximum vehicle penetration. The amount of vehicle penetration allowed by a barrier is discussed in Volume II of this NUREG. If barriers that allow different amounts of penetration are used in the VBS near the vital area barrier being considered, the actual distance to the VBS and penetration for each type of barrier should be examined to determine the closest possible explosive source location. Refer to figure 3.1.

3.3 Obstructed Facilities

In situations where an obstruction exists between the vital area barrier and the VBS, in the absence of rigorous analysis, the obstruction should be disregarded and the standoff distance determined as defined in paragraph 3.2.

3.4 Maximum Considered Standoff Distance

If a standoff distance of 360 feet or greater is provided, no further analysis is required. It can be assumed that the vital area barrier, regardless of construction, will provide adequate protection except for doors and windows.

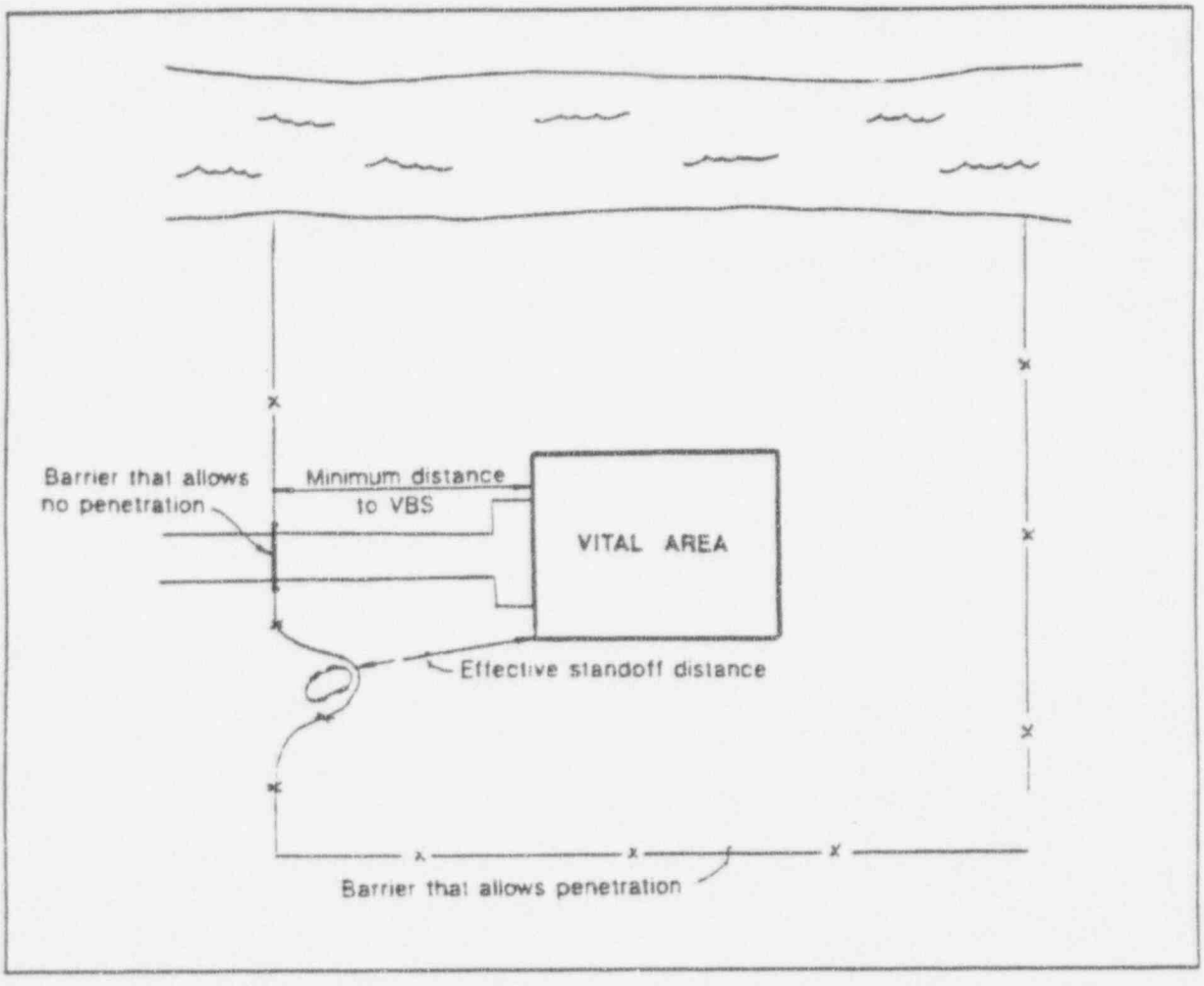

Figure 3.1 Illustration of effective standoff distance

SECTION 4 - DETERMINING MINIMUM SAFE STANDOFF DISTANCE

4.1 Purpose

This section provides tables that can be used to determine minimum safe standoff distances for the range of vital area barriers considered in this manual.

4.2 Basis of Tables

The tables presented in this section are based on the U.S. Army Corps of Engineers Protective Design - Mandatory Center of Expertise Technical Report PDC-TR 91-6, *Blast Analysis Manual, Part 1 - Level of Protection Assessment Guide*. Simplifying assumptions have been applied to the procedure contained in this document for flat concrete slabs with reinforcing in both the long and short directions. These simplifying assumptions allow for expedient, conservative determination of the minimum safe standoff distance. The minimum applicable standoff associated with the design threat for this procedure is 36 feet. The assumptions made on input parameters for the PDC-TR 91-6 chart are as follows:

Compressive strength of concrete - 4,000 psi
Yield strength of reinforcing - 60,000 psi
Acceleration due to gravity - 386.4 in/sec^2
Weight density of section - 0.0868 lb/in^3
Simple supports
Boundary coefficient - 0.55 (ordinate term)
- 0.35 (abscissa term)
Average depth of tensile reinforcing - thickness - 3 in for 12 & 18-in slabs
thickness - 6 in for 24 & 30-in slabs
Short span length - greater than or equal to 8 feet

Once these assumptions are made for a given thickness and reinforcing ratio, the minimum safe standoff distance can be determined. The tables are conservative for members with greater material strengths and/or support fixity. For the purposes of this manual, the minimum safe standoff distance is that associated with the medium level of protection defined in PDC-TR 91-6. If a slab has a total area of openings greater than 2 percent of the total slab area, a more rigorous analysis of the slab beyond the scope of this manual is required.

4.3 Types of Blast Loads

Blast loads can be separated into the two categories of reflected and side-on. A reflected load occurs when the vital area barrier faces, or nearly faces, the explosive source and is at approximately the same elevation. Side-on loading is applied to vital area barriers which do not face the explosive source or where the difference in elevation is large. Examples of vital area barriers which experience side-on loading are roofs, side walls, rear walls, and the upper panels of the front wall of a tall building. When performing an assessment, loads can be defined using the following criteria in terms of the angle of the path of the blast wave with respect to a line perpendicular to the structural component:

- Angles less than or equal to 45 degrees, use reflected criteria
- Angles greater than 45 degrees, use side-on criteria

An illustration of this criteria is provided in figure 4.1.

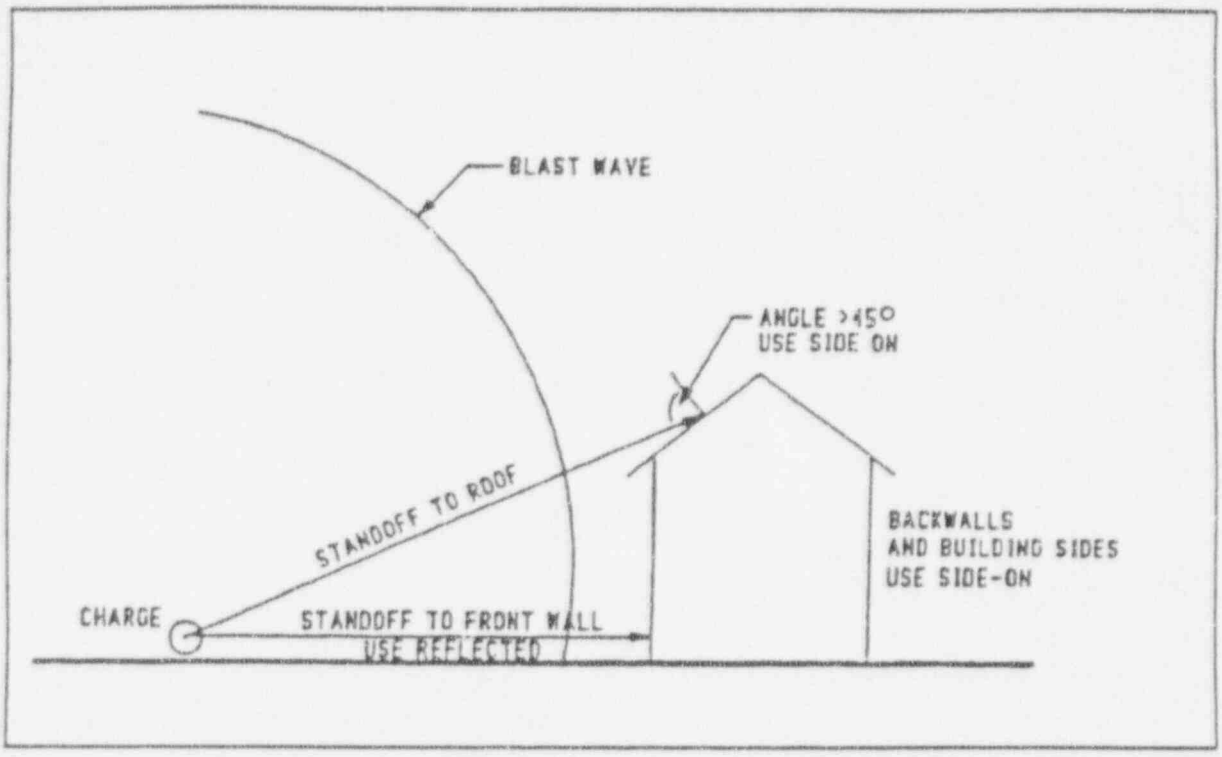

Figure 4.1 Criteria for using reflected or side-on blast loads

4.4 Assessment Tables

Tables 4-1 through 4-4 represent four slab thicknesses and list five reinforcing ratios. To use these tables, the following steps should be taken.

4.4.1 Step 1

Determine if the tables apply to the vital area barrier to be considered; i.e., if the vital area barrier is a flat concrete slab with reinforcing in both the long and short directions. If these tables do not apply, use an alternate analysis technique such as that contained in PDC-TR 91-6.

4.4.2 Step 2

Determine the slab thickness and reinforcing ratio (the average of the long and short span tensile reinforcing ratios) from as-built construction drawings.

4.4.3 Step 3

Determine if the vital area barrier will be subject to a reflected or side-on blast loading in accordance with section 4.3.

4.4.4 Step 4

Using the table for the thickness involved, move to the line for the appropriate reinforcing ratio. For thicknesses and reinforcing ratios greater than or in between those provided in the tables, use the next lesser value provided. Move across the row to the applicable blast loading criteria and read the minimum safe standoff distance.

4.4.5 Step 5

If the minimum safe standoff distance determined from the table is less than or equal to the existing or proposed standoff distance, the user needs to document the analysis and can move on to the next vital area barrier to be considered.

If the minimum effective safe standoff distance is greater than the effective standoff distance provided or proposed, the user may perform a more rigorous analysis or adjust the siting of the vehicle barrier system (VBS) to provide a standoff distance equal to or greater than the minimum safe standoff distance.

Table 4.1 Minimum safe standoff distances for 12-inch-thick slabs

Reinforcing ratio (percent)	Reflected standoff (feet)	Side-on standoff (feet)
1.0	48	36
0.8	50	36
0.6	56	36
0.4	70	36
0.2	108	44

Table 4.2 Minimum safe standoff distances for 18-inch-thick slabs

Reinforcing ratio (percent)	Reflected standoff (feet)	Side-on standoff (feet)
1.0	38	36
0.8	40	36
0.6	46	36
0.4	56	36
0.2	84	36

Table 4.3 Minimum safe standoff distances for 24-inch-thick slabs

Reinforcing ratio (percent)	Reflected standoff (feet)	Side-on standoff (feet)
1.0	36	36
0.8	36	36
0.6	36	36
0.4	40	36
0.2	62	36

Table 4.4 Minimum safe standoff distances for 30-inch-thick slabs

Reinforcing ratio (percent)	Reflected standoff (feet)	Side-on standoff (feet)
1.0	36	36
0.8	36	36
0.6	36	36
0.4	36	36
0.2	54	36

SECTION 5 - DOCUMENTATION

Documentation guidelines are contained in Regulatory Guide 5.68.

SECTION 6 - CONCLUSIONS

This manual provides a simplified procedure for determining the minimum safe standoff distance between vital area barriers and the design basis vehicle bomb threat adopted by the U.S. Nuclear Regulatory Commission. The procedure presented can be used to determine the adequacy of standoff distance provided by an existing vehicle barrier system (VBS) or it can be used for the siting of a new VBS. The procedure applies to most existing vital areas.