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HUDSON INST INC CROTON-ON-HUDSON NY  
RESPONSES TO DRAMATIC PROLIFERATION EVENTS.(U)  
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HUDSON INSTITUTE

Proposal No. 852

RESPONSES TO DRAMATIC  
PROLIFERATION EVENTS

PREPARED FOR THE  
DEPARTMENT OF STATE

August 20, 1979

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HUDSON INSTITUTE, INC.  
Quaker Ridge Road  
Croton-on-Hudson  
New York 10520

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## RESPONSES TO DRAMATIC PROLIFERATION EVENTS

### A. Statement of Work

A number of dramatic proliferation events probably will occur in the next several years. These range from acquisition by additional countries of covert nuclear weapon capabilities, through detonation of a nuclear explosive device by a currently nonnuclear weapon state, to possibly even the transfer by a new proliferator to another country of nuclear explosive material and weapon design information. Their occurrence may also entail violation of the Nonproliferation Treaty (NPT), of safeguards agreements, or of other legally binding nonproliferation obligations.

In response, U.S. nonproliferation policy will have to balance pursuit of three partially conflicting objectives: holding down the particular country's level of proliferation, checking any regional proliferation cascade effect, and avoiding the erosion of diffuse global perceptions of the risks of "going nuclear" and of the unlikelihood of "runaway proliferation." The relative success of the United States and other key countries in pursuing these objectives will influence greatly the scope and pace of proliferation in the 1980s.

To help clarify the issues and choices confronting American policy makers, Hudson Institute proposes to examine alternative responses to several of these dramatic proliferation events. More specifically, the proposed study would:

1. identify alternative responses--carrots as well as sticks--and assess their potential impact on a group of selected prospective proliferators;

2. evaluate alternative responses' possible consequences and risks, focusing attention on counter-measures that target countries could adopt in reaction to sanctions as well as on the indirect domestic and international repercussions of carrying out particular responses;
3. highlight and discuss key choices, factors, and other conditions influencing the design of a U.S. response and its effectiveness;
4. provide an overall assessment of alternative responses, including a discussion of how the preferred response might vary depending on the specific dramatic proliferation event; and
5. consider possible next steps that the United States could take in establishing a broader multinational consensus or framework for thinking about responses to these proliferation events.

1. Depending on the particular dramatic proliferation event, the country in question, and other contextual factors, many responses are conceivable.

These include, for example:

- a. imposition of varied economic, financial, or nuclear program-related sanctions;
- b. "agonizing alliance reappraisals";
- c. termination of arms transfers and supplies of spare parts;
- d. selective transfer of advanced conventional arms;
- e. diplomatic initiatives in the region that might provide a last clear chance at avoiding mini nuclear arms races and full-fledged deployment of nuclear forces, e.g., support for nuclear weapon free zones or for restrictions on deployment;
- f. provision of nuclear security guarantees;
- g. side-payments in other negotiations, particularly those dealing with economic issues; and
- h. countenancing the local use of conventional force against the new proliferator's nuclear weapon facilities.

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| DTIC TAB           | <input type="checkbox"/>                   |
| Unannounced        | <input type="checkbox"/>                   |
| Justification      |                                            |
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This task will begin by assessing the impact on a selected set of prospective proliferators of these and other responses if carried out unilaterally by the United States. As appropriate, a quantitative appraisal of that impact will be supplied, e.g., of what percentage of capital flows into a target country could be cut off by, say, terminating U.S. economic aid within a package of economic sanctions. Then the incremental impact were other countries to respond in a similar manner will be assessed. Throughout the analysis the emphasis will be on developing a data base on the impact of alternative responses and on identifying coalitions of countries whose common action would increase significantly the potential leverage of any specific response.

2. The varied consequences and risks of alternative responses for the United States and for other countries cooperating with U.S. policy also would be evaluated. In contrast with some current discussions of responses to one or another proliferation event, and especially those calling for imposition of strong sanctions, special care will be taken to assess the risks of possible counter-measures designed to manipulate particular vulnerabilities of the United States or its partners. What would be the effect, for example, if the new proliferator responded by embargoing critical raw materials, refusing to repay debts, engaging in disruptive nuclear exports practices, realigning its foreign policy, and so on. In turn, how might its friends manipulate U.S. and friendly countries' vulnerabilities on its behalf? How the impact of counter-measures might vary from the

United States to other countries will be considered as well. For the differing vulnerabilities of these countries would be a key issue in agreeing on a multinational response to these dramatic proliferation events.

But more than purposeful counter-measures come under the rubric of risks and consequences. Indirect domestic and international repercussions with significant implications for U.S. economic, security, or political interests--and those of other key countries--also may be present. American financial and business institutions might find themselves adversely affected if economic sanctions led to the bankruptcy of a new proliferator with which they had extensive investments and other economic links. Taken a step further, the longer term repercussions of manipulating with the support of three or four key countries the World Bank voting procedures to block loans to a target country need to be thought through and assessed. Or, in some cases, the decline of the new proliferator's conventional military capabilities on account of the loss of access to advanced conventional arms could threaten regional peace and erode American interests there. Similarly, appraisal of the longer term consequences and risks of turning a blind eye to local self-help or of agonizing alliance reappraisals and security decoupling if a U.S. ally "goes nuclear" is needed. In addition, the potential corrosive effects over time of countries manipulating successfully "the threat to go nuclear" warrants more careful delimitation.

3. Building on the preceding more country-specific analyses, this task will highlight and discuss key tactical choices, contextual factors, and

other conditions likely to influence the design of a U.S. response and its potential effectiveness. Some issues to be considered include:

a. Building local firebreaks v. supporting global norms: In some instances there will be a tension between efforts to build a proliferation firebreak holding down the level of the new proliferator's nuclear weapon activities and its regional ripple effect and those designed to prevent an erosion of important global perceptions buttressing the nonproliferation regime. For example, deterring a new proliferator from further tests might necessitate not imposing sanctions immediately but deferring them while trying to retain influence over that country's program. But to do so could erode other countries' perceptions of the risk of nuclear testing. Ways to reduce that tension need to be sought. One means could be a strategy of disaggregating recourse to sanctions, imposing some but not all available sanctions, while holding out incentives for stopping further advances up the nuclear weapon ladder. But if no reduction is possible, what considerations should come into play in striking a balance between those conflicting purposes? Are there even some contexts in which one or the other approach would have to take clear precedence?

b. Flexibility v. Congressional restraints: Congressional legislation already reduces the flexibility of response by mandating imposition of economic, military assistance, and nuclear program sanctions under specified conditions. More thinking is needed about how that lessened flexibility might be put to use in designing a response to these dramatic proliferation events. For example, could some mixture of automatically imposed Congressionally mandated punitive measures--with specified conditions



for their lifting, the threat of further penalties, and the offer of incentives for desired behavior be devised which would lessen the tension between local demands and global necessities? Alternatively, to what degree does the Congressional reduction of flexibility comprise a serious impediment to an effective response balancing the varied purposes already noted and what changes in its restrictions might be most usefully sought?

c. Deterring further advances up the nuclear weapon ladder v. compelling the dismantling of prior activities: Greater precision also is needed on what would constitute holding down the level of local proliferation in response to a given dramatic proliferation event. Without a more subtle and varied conception of what stopping points exist between, say, a covert nuclear weapon program and a full-fledged nuclear force, U.S. policy may be handicapped in choosing a realistic objective for its response. Past experience indicates that it often may be more feasible to deter other countries from taking unwanted actions than to compel them to undo actions already taken. For example, the dismantling of all nuclear weapon activities after an isolated nuclear weapon test may be an objective that could be realized only where the United States and others have great leverage over the target country and can offer weighty incentives. What other stopping points are discernible that still might be worth realizing where the leverage and balance of carrots and sticks is different? What would be the risks of seeking to hold the line at those points, say at no further tests as opposed to at internationally inspected dismantling of a nuclear weapon facility?

d. Reducing vulnerabilities: The readiness of the United States and other countries with which it might cooperate to impose sanctions in response to these events could depend on their respective vulnerabilities to counter-measures by the target country or its friends. Having identified important vulnerabilities in Task 2, this task will consider how their impact could be neutralized or reduced. Possible unilateral U.S. responses to those vulnerabilities will be assessed and their broader repercussions discussed. Of equal importance, attention will focus on procedures for mutual burden-sharing by the members of any U.S.-supported sanctions coalition. Pooling of vital resources, agreements to avoid disruptive unilateral responses, coordinated management of indirect financial repercussions, and temporary exports preferences will be among the types of mechanisms assessed.

4. This task will provide an overall assessment of alternative responses to each of the dramatic proliferation events. Particular attention will focus on whether and how the preferred response might vary from event to event. For example, would there be greater flexibility available for designing a response to evidence of a covert nuclear weapon program than to a nuclear weapon test? How should such flexibility be used and how might its presence affect the balance to be struck between local/regional considerations and global ones? Or, in the event of a clear violation of a legally binding nonproliferation obligation, would standing by global norms have to take precedence even if that meant accepting a higher level of country and intra-regional proliferation? In turn, are there any

conditions under which countenancing local self-help, if not indirectly supporting limited military special action, against a new proliferator's nuclear weapon facilities, would be the least bad alternative?

5. The support of other key countries would increase the potential effectiveness of the U.S. response to these dramatic proliferation events. This final task, therefore, will briefly examine possible next steps for forming a broader multilateral consensus for responses to these proliferation events. Basic principles and propositions that eventually might become guidelines within a common framework of response and whose acceptability to other key countries could warrant exploring will be discussed. These might run the gamut from agreement that standing firmly behind legal nonproliferation obligations should take precedence over other considerations in designing a multinational response to an international declaration that the transfer of nuclear explosive material and weapon design information from a new proliferator to another country would comprise a serious and unacceptable threat to global order. A common understanding of the objectives to be pursued after a dramatic proliferation event and of the risks of alternative responses also could be important. That would be part of a broader attempt to foster a shared mode of thinking about these issues. In turn, if multilateral support for sanctions is important to their potential impact, what types of prior agreement in principle on acceptable evidence of violation, level of response, burden-sharing, and so on are necessary to pave the way for that support?

B. Phasing of Work

Hudson Institute proposes to undertake this study in a manner designed both to provide timely support for the current examination of some of these issues in the Department of State and to serve as a partial foundation for later responses to these dramatic proliferation events. Therefore, rather than performing each of the tasks successively, the following phasing with a start date of November 1, 1979 is proposed:

- |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase I:<br>(Nov. 1, 1979-<br>Jan. 1, 1980)  | During the first two months of the study, the impact of alternative responses and their risks and consequences will be examined for two or three selected prospective proliferators (part of Tasks 1 and 2). From this initial data base, preliminary hypotheses and propositions about key choices, factors, and conditions of successful response (Task 3) will be developed. An interim report will be prepared and discussed with the Department of State. |
| Phase II:<br>(Jan. 1, 1980-<br>Mar. 1, 1980) | Analysis under Tasks 1 and 2 will be completed for the remaining selected countries. The propositions developed as part of Task 3 will be refined. Work will begin on Tasks 4 and 5. An updated interim report will be provided and discussed with the Department of State.                                                                                                                                                                                    |
| Phase III:<br>(Mar. 1, 1980-<br>May 1, 1980) | Work on Tasks 3, 4, and 5 will be completed. A final report, blending together insights developed within the Department of State on these issues and at Hudson, will be prepared.                                                                                                                                                                                                                                                                              |

C. Classification and Access to Material

It is expected that the study and reports would be classified by the Department of State.

The basic material needed for the study would not require access to intelligence data or other sensitive classified material.

D. Reporting Procedure

Interim reports, briefings, and a final report will be prepared according to the proposed Phasing of Work.

E. Past Related Studies

Hudson Institute has undertaken studies on related nonproliferation subjects, including several preliminary studies on sanctions. In brief, these include:

"Responding to a Second Indian Nuclear Test," U.S. Arms Control and Disarmament Agency (1975): A quick-reaction paper on a range of economic, political, and other sanctions that might be adopted after a second Indian nuclear test.

Trends in Nuclear Proliferation, 1975-1995, U.S. Arms Control and Disarmament Agency (1976): An assessment of the possible scope, dynamics, and problems of more widespread nuclear weapon proliferation from 1975-1995.

Changing Dimensions of Proliferation Policy, U.S. Arms Control and Disarmament Agency (1977): As part of this study, the purposes, types, risks, and mode of implementing sanctions were assessed. A classified appendix analyzed the impact of specific sanctions on a selected group of prospective proliferators. This report also discussed other policies for slowing proliferation as well as coping with its consequences.

The Role of Sanctions in Non-Proliferation Policy, U.S. Congress, Office of Technology Assessment (1977): Analysis of the potential impact of alternative economic, political, security, nuclear, and military sanctions in increasing proliferation disincentives.

Routes to Nuclear Weapons: Aspects of Purchase or Theft, U.S. Congress, Office of Technology Assessment (1977): Analysis of nuclear black and gray marketeering and possible responses to each.

U.S. Defense Planning for a More Proliferated World, Department of Defense, PA&E (1979) An analysis of the implications for U.S. force posture of more widespread proliferation. Possible consequences were assessed in terms of projecting U.S. power

abroad, supporting friends and allies, reducing threats to CONUS, Soviet-American relations, and U.S. relations with newly nuclear allies or friends.

Institutional Arrangements for Improving the Proliferation-Resistance of the Global Nuclear Energy Regime, Department of Energy, NASAP (in progress): Various alternative institutions for dealing with key proliferation vulnerabilities of the global nuclear energy regime are being examined.

F. Personnel

Lewis A. Dunn will serve as project leader and principal investigator for this study. At Hudson Institute, Dr. Dunn has served in that role on proliferation studies conducted for the U.S. Arms Control and Disarmament Agency, the Department of Energy, the Department of Defense, and the Office of Technology Assessment. Other Hudson personnel will include Nancy Hoagland, Keith Payne, and Jimmy Wheeler. *Complete biographical sketches are included below.*

G. Start Date and Funding

A start date of November 1, 1979 is proposed at a level of funding of \$78,000. A detailed cost proposal is included below.

LEWIS A. DUNN  
Professional Staff, Hudson Institute

Lewis A. Dunn is a political scientist whose background is in the analysis of international politics and United States foreign policy. His special interests include nuclear proliferation, national security policy issues, and alliance relationships.

Dr. Dunn has served as project leader for studies of nuclear proliferation conducted at Hudson for the United States Arms Control and Disarmament Agency, the Department of Energy, the Department of Defense, and the Office of Technology Assessment. He is the principal author of Hudson's studies Trends in Nuclear Proliferation, 1975-1995 and Changing Dimensions of Proliferation Policy, 1975-1995. In addition to continuing his work on nuclear proliferation at Hudson, he is completing a book on Beyond Nonproliferation: U.S. Policy in a Proliferating World for the Twentieth Century Fund.

Dr. Dunn's publications have appeared in Foreign Policy, World Politics, International Security, Orbis, International Journal, Survival, The Annals, and elsewhere.

Before joining the Hudson staff, Dr. Dunn taught courses in international politics and arms control, *American foreign policy*, and *comparative foreign policy* at Kenyon College, where he was a tenured member of the political science department.

Born in New York City in 1944, Dr. Dunn received his A.B. degree (with honors in government) from Cornell University (1965) and his Ph.D. degree from the University of Chicago (1973). At the University of Chicago he was the recipient of a NASA Predoctoral Fellowship, a Ford Foundation Dissertation Fellowship, and an Earhart Fellowship.

NANCY HOAGLAND  
Professional Staff, Hudson Institute

Nancy Hoagland received her Bachelor of Arts degree from Mary Washington College in Fredericksburg, Virginia. Ms. Hoagland double-majored in history and political science, and was elected to membership in Phi Beta Kappa during her senior year.

Before joining the Hudson Institute staff to assist in nuclear proliferation studies, she worked for G. P. Putnam's Sons in New York City as a publicist for childrens' books, writing releases and booking tours and appearances for authors and illustrators.

7.79



KEITH B. PAYNE  
Professional Staff, Hudson Institute

Keith Payne is a political scientist specializing in areas of strategic and defense policy, International security affairs and Soviet strategy.

Born in 1954, Mr. Payne received an M.A. from the University of Southern California School of International Relations in 1977. In 1979 he completed oral and written Doctoral exams "with distinction", and is currently a Haynes Dissertation Fellow.

During 1978 Mr. Payne taught both graduate and undergraduate courses at the University of Southern California. He has written extensively on SALT issues, Soviet foreign and defense policy and strategic doctrine, and has contributed articles to The California Seminar on Arms Control and Foreign Policy and Studies in Comparative Communism.

Mr. Payne is participating in Hudson Institute studies of ballistic missile defense issues, SALT issues, European security issues, and U.S. and Soviet defense and foreign policy.

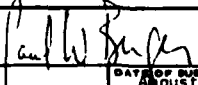
JIMMY W. WHEELER  
Professional Staff, Hudson Institute

Jimmy W. Wheeler is an economist specializing in the application of economic analysis to public policy issues with an emphasis on monetary theory and policy, international trade and finance, and economic development. Since joining Hudson Institute in 1977, Mr. Wheeler has researched international trade and payment flows, the foreign exchange market, world energy issues, and economic prospects for the U.S., Japan, and Thailand. Currently he is engaged in a multiclient study, "The Future of Mexico," and is co-directing a study of industrial structure change in the OECD countries. Results of this latter study will soon be available as Western Economies in Transition: Structural Change and Adjustment Policies in Industrial Countries, edited by Irving Leveson and Jimmy W. Wheeler (Boulder, Colo., Westview Press 1979).

Recent policy studies of which Mr. Wheeler is a principal author include "Stagnation in the West?," "What Risks Are There for a 1979-80 Dollar Collapse?," "World Energy and Economic Outlook in the Next Decade," and "Development of Offshore Gas Fields: Some Impacts on Thailand's Economy". He has also contributed to a variety of other studies including "The Future of the U.S. and its Regions", World Economic Development, and The Japanese Challenge.

Before joining Hudson Institute, Mr. Wheeler was an Assistant Professor of economics at Florida International University. He has also served as a teaching assistant and instructor at Rutgers University, a teaching assistant at the University of Missouri, and a research assistant on studies of school finance, energy and water resources, and telecommunications.

Mr. Wheeler was born in 1948 and did his undergraduate studies at the University of Missouri, and completed his graduate work in economics at Rutgers University. Mr. Wheeler is a member of Omicron Delta Epsilon, the American Economic Association, the Eastern Economic Association, and the Society for Policy Modeling.

| DEPARTMENT OF DEFENSE<br>CONTRACT PRICING PROPOSAL<br>(RESEARCH AND DEVELOPMENT)                                                                                                    |  |                                                                                                    |               | Form Approved<br>Budget Bureau No. 33-80100 |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------|---------------|---------------------------------------------|----------------|
| This form is for use when (i) submission of cost or pricing data (see ASPR 3-607.3) is required and (ii) substitution for the DD Form 633 is authorized by the contracting officer. |  |                                                                                                    |               | PAGE NO.                                    | NO. OF PAGES   |
| NAME OF OFFEROR<br><b>HUDSON INSTITUTE, INC.</b>                                                                                                                                    |  | SUPPLIES AND/OR SERVICES TO BE FURNISHED                                                           |               |                                             |                |
| HOME OFFICE ADDRESS (Include ZIP Code)<br>Quaker Ridge Road<br>Croton-on-Hudson, N.Y. 10520                                                                                         |  |                                                                                                    |               |                                             |                |
| PLANT AND LOCATION(S) WHERE WORK IS TO BE PERFORMED                                                                                                                                 |  | TOTAL AMOUNT OF PROPOSAL<br>\$ 78,478                                                              |               | GOVT SOLICITATION NO.                       |                |
| DETAIL DESCRIPTION OF COST ELEMENTS                                                                                                                                                 |  |                                                                                                    |               |                                             |                |
| 1. DIRECT MATERIAL (Itemize on Exhibit A)                                                                                                                                           |  | EST COST (\$)                                                                                      |               | TOTAL<br>EST COST                           | REFER-<br>ENCE |
| a. PURCHASED PARTS                                                                                                                                                                  |  |                                                                                                    |               |                                             |                |
| b. SUBCONTRACTED ITEMS                                                                                                                                                              |  |                                                                                                    |               |                                             |                |
| c. OTHER (1) RAW MATERIAL                                                                                                                                                           |  |                                                                                                    |               |                                             |                |
| (2) YOUR STANDARD COMMERCIAL ITEMS                                                                                                                                                  |  |                                                                                                    |               |                                             |                |
| (3) INTERDIVISIONAL TRANSFERS (At other than cost)                                                                                                                                  |  |                                                                                                    |               |                                             |                |
| TOTAL DIRECT MATERIAL                                                                                                                                                               |  |                                                                                                    |               |                                             |                |
| 2. MATERIAL OVERHEAD (Rate % X \$ base =)                                                                                                                                           |  |                                                                                                    |               |                                             |                |
| 3. DIRECT LABOR (Specify)                                                                                                                                                           |  | ESTIMATED<br>HOURS                                                                                 | RATE/<br>HOUR | EST<br>COST (\$)                            |                |
| Research Staff                                                                                                                                                                      |  | 1,850                                                                                              | 13.20         | 24,420                                      |                |
| Research Support Staff                                                                                                                                                              |  | 600                                                                                                | 6.00          | 3,600                                       |                |
| TOTAL DIRECT LABOR                                                                                                                                                                  |  |                                                                                                    |               | 28,020                                      |                |
| 4. LABOR OVERHEAD (Specify department or cost center)                                                                                                                               |  | O.H. RATE                                                                                          | X BASE =      | EST COST (\$)                               |                |
| Overhead                                                                                                                                                                            |  | 90%                                                                                                | 28,020        | 25,218                                      |                |
| Payroll Related Costs                                                                                                                                                               |  | 20%                                                                                                | 28,020        | 5,604                                       |                |
| TOTAL LABOR OVERHEAD                                                                                                                                                                |  |                                                                                                    |               | 30,822                                      |                |
| 5. SPECIAL TESTING (Including field work at Government installations)                                                                                                               |  |                                                                                                    |               | EST COST (\$)                               |                |
| TOTAL SPECIAL TESTING                                                                                                                                                               |  |                                                                                                    |               |                                             |                |
| 6. SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)                                                                                                                      |  |                                                                                                    |               | EST COST (\$)                               |                |
| 7. TRAVEL (If direct charge) (Give details on attached Schedule)                                                                                                                    |  |                                                                                                    |               | EST COST (\$)                               |                |
| a. TRANSPORTATION 6 Trips to Washington, D.C. @ \$125                                                                                                                               |  |                                                                                                    |               | 750                                         |                |
| b. PER DIEM OR SUBSISTENCE 12 Days @ \$50                                                                                                                                           |  |                                                                                                    |               | 600                                         |                |
| TOTAL TRAVEL                                                                                                                                                                        |  |                                                                                                    |               | 1,350                                       |                |
| 8. CONSULTANTS (Identify - purpose - rate)                                                                                                                                          |  |                                                                                                    |               | EST COST (\$)                               |                |
| TOTAL CONSULTANTS                                                                                                                                                                   |  |                                                                                                    |               |                                             |                |
| 9. OTHER DIRECT COSTS (Itemize on Exhibit A)                                                                                                                                        |  |                                                                                                    |               |                                             |                |
| TOTAL DIRECT COST AND OVERHEAD                                                                                                                                                      |  |                                                                                                    |               | 60,192                                      |                |
| 10. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element No. 1)                                                                                                               |  |                                                                                                    |               |                                             |                |
| 11. ROYALTIES                                                                                                                                                                       |  |                                                                                                    |               |                                             |                |
| TOTAL ESTIMATED COST                                                                                                                                                                |  |                                                                                                    |               | 74,036                                      |                |
| 14. FEE OR PROFIT 6%                                                                                                                                                                |  |                                                                                                    |               | 4,442                                       |                |
| TOTAL ESTIMATED COST AND FEE OR PROFIT                                                                                                                                              |  |                                                                                                    |               | 78,478                                      |                |
| This proposal is submitted for use in connection with and in response to (Describe RFP, etc.)                                                                                       |  |                                                                                                    |               |                                             |                |
| As per Hudson Institute Proposal #852                                                                                                                                               |  |                                                                                                    |               |                                             |                |
| and reflects our best estimates as of this date, in accordance with the instructions to offerors and the footnotes which follow.                                                    |  |                                                                                                    |               |                                             |                |
| TYPED NAME AND TITLE<br>Paul W. Berger, Treasurer                                                                                                                                   |  | SIGNATURE<br> |               |                                             |                |
| NAME OF FIRM<br>Hudson Institute, Inc.                                                                                                                                              |  | DATE OF SUBMISSION<br>August 21, 1979                                                              |               |                                             |                |

DD FORM 633-4

REPLACES EDITION OF 1 JAN 67, WHICH IS OBSOLETE.

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