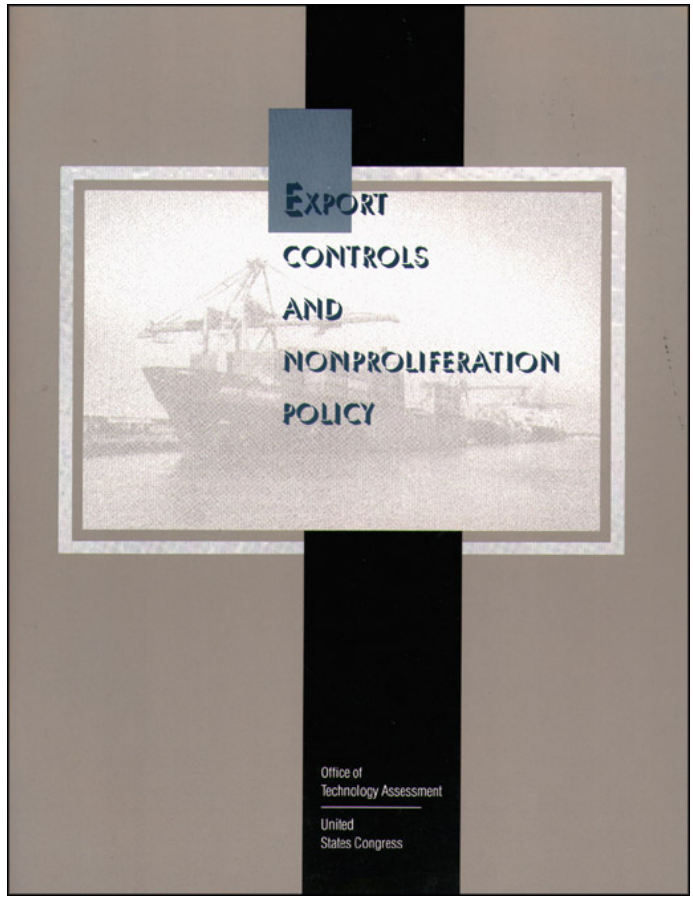
Export Controls and Nonproliferation Policy

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Foreword

Export controls on dual-use goods, technology, and software will continue to be one useful tool in U.S. efforts to stem the proliferation of weapons of mass destruction and missiles that can deliver them. Export controls cannot completely block such proliferation. However, they make a proliferant's task harder; by increasing the cost and the difficulty of weapon programs, they can buy valuable time for broader nonproliferation efforts to take effect.

The benefits of export controls, and their ultimate effectiveness, are hard to measure. They depend on several factors, most importantly the degree to which nations capable of supplying key weapon technologies cooperate in controlling their supply. Controls also impose costs, which—like the benefits—are difficult to quantify. These costs are borne primarily by companies producing controlled goods

The difficult task for both Congress and the executive branch is to design an export control system that serves U.S. security interests but also takes due account of economic interests and fairness to regulated exporters.

The primary purpose of this report is to identify options for enhancing the effectiveness of export controls in slowing or preventing the spread of capabilities to develop and produce weapons of mass destruction. Nevertheless, reducing the burdens of export regulation on U.S. exporters has been a major focus of discussions about revising the Export Administration Act. Therefore, the report also examines policy options directed mainly toward the goal of reducing these burdens, but with special emphasis on their implications for nonproliferation policy.

OTA prepared this report as part of an assessment on the proliferation of weapons of mass destruction, which was requested by the Senate Committee on Foreign Relations and the Senate Committee on Governmental Affairs, and endorsed by the House Permanent Select Committee on Intelligence, the House Committee on Foreign Affairs, the Senate Committee on Banking, Housing, and Urban Affairs, and the House Committee on Armed Services.



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Summary 1

Export controls on dual-use goods, technology, and software will continue to be one useful tool in U.S. efforts to stem the proliferation of weapons of mass destruction and missiles that can deliver them. The effectiveness of export controls in slowing proliferate ion will vary with the characteristics of the weapons of concern, the capabilities of the target countries and programs, the controllability of the designated commodities and technology, the degree of international cooperation, and the quality of enforcement. In some circumstances, they may do 1ittle to stem proliferation; in others, they may impose significant obstacles and delays in acquiring such weapons. Thus, they may buy important time during which policy makers may bring other nonproliferation tools to bear.

The overall benefits to national security of applying export controls come at a price to the companies and industries whose products are controlled. The difficult task for both Congress and the executive branch is to design an export control system that serves U.S. security interests but also takes due account of economic interests and fairness to regulated exporters. The task is made more difficult by the inherent problems in trying to estimate both the benefits and the costs of export controls.

The difficult task for both Congress and the executive branch is to design an export control system that serves U.S. security interests but also takes due account of economic interests and fairness to regulated exporters.

This report is a product of OTA's project on the proliferation of weapons of mass destruction. As such, its primary purpose is to identify opt ions for enhancing the effectiveness of export controls in slowing or preventing the spread of capabilities to develop and produce those weapons. Nevertheless, reducing the burdens of export regulation on U.S. exporters has been a major focus of discussions about revising the Export Administration Act. Therefore, the report also examines policy options directed mainly at

the latter goal, but with special emphasis on their implications for nonproliferation policy.

BOTTOM LINES

1. Several options are available for improving the effectiveness of nonproliferation export controls:
   - some of the options require increased resources and priority for nonproliferation objectives,
   - some would require considerable institutional change within the U.S. government,
   - some would require substantial changes in international attitudes toward nonproliferation export controls, and
   - none of the enhancement options is a "*magic bullet" that will dramatically alter the prospects for stemming proliferation.
2. Formulating better export control policies requires that the U.S. government **gather and analyze better and more complete information about the actual economic costs of maintaining export controls.**
3. Assessment of effectiveness and costs of nonproliferation controls should be separated from that for controls established for other purposes.
4. Industry concerns about the burdens imposed by export controls could be addressed by the imposition of rigid rules limiting U.S. unilateral imposition of controls; however, from the point of view of nonproliferation policy, it would be preferable to leave the executive branch enough discretion to adapt to specific exceptional situations, coupled with:
   - a general presumption against unilateral controls *and*
   - extensive reporting to, and oversight by, Congress on policy rationale, outcomes, and costs.

OPTIONS FOR ENHANCING EXPORT CONTROL EFFECTIVENESS

I List-Making

Issue: What measures might improve the ability of the U.S. government to identify the export items, buyers, and end-users that pose proliferation risks?

Several U.S. agencies are involved in setting U.S. export control policies. For various reasons (bureaucratic as well as technical) information is not shared as systematically among them as it might be.

Option: Develop shared and improved database.

Newer computers, with higher speed and more memory, allow consideration of new techniques for distributing, sifting, and analyzing information on proliferation problems. Applying such techniques within the government, however, would require some changes in bureaucratic procedures as well as some additional resources.

| Licensing Administration

Issue: What measures might allow the officers reviewing export application licenses to bring the best and most complete information to bear on their judgments?

Option: Modernize the license-processing database.

The computer technologies alluded to in the section on list-making could be even more usefully applied to improve the license application review process. Ideally, the interagency computer system would allow analysts in all reviewing agencies to extract in real time: data about other previous or current applications, technical background data on the proposed exports, and current intelligence or other data about the parties to the proposed transaction.

Issue: How can the external accountability of the nonproliferation export licensing process be improved?

Option: Publish nonproprietary licensing data.

Post-licensing publication of data summarizing dual-use license approvals would enhance unclassified research by nongovernmental investigators of export-import patterns that might identify previously undetected weapon programs or supply networks (see below, in the section on improving multilateral export controls, for the benefits of strengthening unclassified analytic efforts). Second, publishing licensing information

might set a precedent for helping to persuade other nations to release comparable information, thus easing the task of both governments and non-governmental groups in identifying possible avenues of proliferation.

Undertaking this policy would require special care in protecting legitimate proprietary data from access by exporters' competitors.

Issue: How can the broadest possible range of substantive, technical, and policy judgment be brought to bear on licensing decisions?

Referrals of license applications by the Department of Commerce for review by other agencies now takes place according to rules agreed on among the agencies of jurisdiction. Critics of past licensing decisions have argued that, in practice, Commerce inappropriately approved licenses that other agencies would have blocked if given the chance. Others point out that Commerce acted within the laws and higher level policy guidance of the times.

Option: Formalize interagency review processes for licenses involving proliferation-controlled items.

Various advocates have proposed that all military-relevant license applications be routinely referred to the Defense Department or the Arms Control and Disarmament Agency, or that all nuclear-related applications be referred directly to a legislatively (not just administratively) established Subgroup on Nuclear Export Coordination.

A related issue is the degree of independent power to be assigned to individual agencies and to interagency committees. Should each agency have a veto over license applications, should interagency committees vote by majority rule, or should Commerce have the power of decision *unless* another agency invokes escalation processes to appeal the majority or Commerce's decision?

Proponents of the strictest possible enforcement of export controls argue that the more review. the greater the chance of blocking inappropriate exports. Proponents of a streamlined review process argue that too much bureaucracy can delay license decisions to death, even when their rejection is not justified.

Two additional considerations might be weighed in this debate. The first is that thorough, multi agency reviews within reasonable periods of time are feasible if agencies are required to make a decision either by action or by default within a specified period and if they are given sufficient manpower and technical resources for license reviews. Second, attempting to stack the deck in licensing decisions by granting one agency or another primary jurisdiction is not necessarily a permanent solution to perceived problems. For example, the Defense Department in previous administrations has been less willing to approve some exports than other departments; in the fall of 1993, however, it seems to have been in full agreement with the Commerce Department that current thresholds of performance for controlled computers were unrealistically low.

I Enforcement of Regulations

Issue: How can the government help exporters make better evaluations of prospective customers?

Option: Distribute more information on suspect buyers, users, and programs.

One legislative proposal is for the government to publish a regular bulletin to better inform exporters about the risks of proliferation and what exporters can do to help reduce those risks. U.S. companies have in the past provided the government with important leads about illegitimate buyers; increased sharing of government information with exporters might enhance the latter abilities to help. Dissemination of information by the government may sometimes imperil intelligence sources and methods or risk undermining ongoing investigations. It also risks the embarrassment, and possibly the injustice, of publication of suspicions that turn out to be incorrect. The potential payoff from more active industry cooperation would have to be weighed against such risks.

Issue: How can verification and enforcement activities be made more effective?

Option: Improve pre-license and post-shipment checks.

Commerce Department pre-license checks of potential buyers (and post-shipment checks on approved licenses) can help identify suspicious customers. Resources for these checking activities have been limited, and the checks conducted have been poorly planned and executed. Additional resources and top-level attention to developing systematic strategies could make checks a more useful tool (although their utility will remain limited for many types of exports). Additional resources for Export Administration and Customs enforcement activities could also be considered.

Option: Improve Bureau of Export Administration Enforcement Office data resources.

Enforcement officials at Commerce's Bureau of Export Administration (BXA) have been studying various sources of data beyond those available from intelligence and law enforcement agencies to see if they might help reveal suspicious export patterns. For example, U.S. Census data on all the types and quantities of items going to a particular country might reveal purchasing patterns that suggest diversion of imports to a proliferant weapon program. Thus far, however, Commerce has not had the resources to put this sort of analysis into the context of a larger, more encompassing database, of the type described above.

Option: Fully utilize sanction authorities.

Current legislation gives the executive branch a range of economic sanctions (including the imposition of further, noneconomic, sanctions) to apply to foreign "persons" who aid proliferation through the sale or transfer of items on U.S. control lists. (The Clinton administration draft Export Administration Act (EAA) of 1994 would harmonize sanctions for chemical, biological, and missile weapons proliferation, now authorized in other pieces of legislation; the pending State Department authorization act for fiscal year 1995 institutes similar sanctions for nuclear proliferation.) The actual application of sanctions is left to considerable executive branch discretion. One option would be to leave the president less discretion in choosing, deferring, or waiving sanctions. Rigid requirements, however, risk forcing the president's hand in cases where more subtle action might have a greater effect on nonproliferation goals. Too much discretion, on the other hand, risks avoiding diffilcult choices and sending inappropriate messages to those who foster proliferation.

A compromise option would be to permit the flexibility requested in the Clinton administration draft EAA, but to accompany it with more explicit provisions for accountability to Congress about the costs and effectiveness of sanctions imposed or the reasoning behind deferring or waiving them.

Multilateral Control Arrangements

Since there are very few technologies useful to proliferant weapons programs that the United States produces uniquely, international cooperation among potential suppliers or transshippers is essential to effective export controls.

Issue: How can the United States keep a low level of international consensus on the transfer of *conventional* military technologies from undermining current agreements on nonproliferation of weapons of mass destruction?

With the end of the Cold War, the membership, targets, and listed technologies for the Coordinating Committee on Export Controls (COCOM, formerly a Western arrangement for denying technology to Communist nations) are undergoing significant changes that must be multilateral y negotiated. With technologies applicable to weapons of mass destruction already addressed in other multilateral export control regimes, the COCOM successor regime will most likely attempt to regulate the transfer of technologies for developing or making conventional weapons. Consensus will be difficult to reach, both within the United States and among the international participants, about what technologies should be controlled, and for what reasons.

Option: Separate COCOM succession from regimes for nonproliferation of weapons of mass destruction.

The nonproliferation regimes dealing with weapons of mass destruction (and missiles), for which considerable consensus has already been

painstakingly built, should not be mixed into controversies over revisions of lists formerly controlled by COCOM for other purposes.

Issue: How can coordination among members of multinational nonproliferation export control regimes be enhanced?

Option: Promote an information sharing network.

Communications and information tools cannot subsitute for a genuine willingness to cooperate among adherents to export control regimes. Given such willingness, however, they could make it easier to implement cooperation. The United States has instituted a pilot program for a shared computer network among Nuclear Suppliers' Group (NSG) members (the NSG is a group of nations that has agreed to common export control policies for nuclear technologies and dual-use technologies applicable to nuclear programs). Such a network would offer a variety of opportunities for increased coordination among the nuclear suppliers. In agreeing to multilateral controls on dual-use technologies, the NSG members also agreed to avoid undercutting each other's decisions by informing one another when they deny export license applications for the listed items. Timely dissemination of this information would allow each supplier to consider its own export decisions in the light of those made by any of the others. Once refused an export license in one country, a potential buyer would not have a chance to find another supplier in another country even if that country did not have independent reason for suspicion about him. License denial information, as well as some of the other kinds of information described below, could be especially useful to governments without the extensive export control infrastructure and intelligence resources of some of the larger members of the NSG.

Option: Extend the NSG database network idea to the other export control regimes.

Such a network could be extended to members of the Australia Group (chemical and biological weapons) and Missile Technology Control Regime (MTCR) as well, since there is already a large overlap in membership among those groups and the NSG. This step would be most useful in combination with agreements in those regimes to report export denials, as the NSG members do. Such agreements, however, will not be easy to obtain.

Option: Expand international reporting to approvals as well as denials.

With this wider range of data about exports with weapon program potential, all NSG (or other regime) members would have a better chance of discerning trade patterns that might help identify suspicious end-users or possible diversion paths. Because of fears of revealing proprietary data of use to competitors, however, regime members may resist revelation of their approved licenses. [1] Should the United States decide to seek such reporting, it may need to test that resistance through the leadership both of exhortation and of its own example. Even the expenditure of considerable diplomatic capital with other regime members may not be enough to bring about this degree of cooperation.

Option: Increase intelligence sharing.

Whether by means of a networked database or through other means of communication, **sharing intelligence data about unscrupulous suppliers, buying and financing operations, questionable agents, and suspicious end-users is an important means by which supplier groups can coordinate their export controls.** Shared intelligence could, for example, help members of the NSG make better informed licensing judgments by giving them more information about how prospective buyers measure up against the criteria that the NSG has agreed to take into account in licensing decisions.

1AS noted above, some firms might be fearful that Confidential (but still legitimate market information might he revealed to c(~nlw'titers if all sales were reported. Even If the supplier-group(mp data were not in the public domain, there w (mid be the possibility that participating governments would leak in formation to their ow n country's firms.

In some situations, national intelligence agencies having trusted relationships with one another may be able to share secret information. Amongst the large and diverse sets of nations making up the nonproliferation supplier groups, however, the continuous, direct sharing of classified information seems unlikely. What seems more feasible is the production and dissemination of analyses based on open sources. It may also be possible to develop open-source evidence for facts that might originally have been indicated or discovered by secret means.

An option to consider is to provide government support for nongovernmental, open-source database and analytic projects. One means of support for such efforts is to contribute grants or award research contracts to the private institutions carrying on such projects. Whether the information shared multilaterally comes direct] y from the U .S. government, or whether it comes from private U.S. institutions, there is some risk that it will be perceived as a U.S. tool for manipulating international opinion and decisions to serve unilateral U.S. interests. This risk imposes a need for considerable tact and diplomacy in the ways in which the United States attempts to persuade other nations to act on the information provided.

Option: Support development of former Soviet Union states' administration of export controls.

The effectiveness of global export controls will be greatly weakened unless Russia and the other former Soviet states join and effectively participate in the full set of western nonproliferation control regimes: NSG, Australia Group, and MTCR. Some progress has been made in this direction with Russia already in the NSG, vowing to become a de facto member of the MTCR, and promising to adhere to Australia Group guidelines. The other newly independent states should also be brought into the nonproliferation regimes. These nations also need to develop effective export control systems. The United States has offered several million dollars in Nunn-Lugar funds for that purpose to each of the four republics retaining Soviet nuclear weapons, but has reached agreement on spending the money only with Belarus. Other republics could probably also make use of financial assistance. U.S. agencies have also been offering technical assistance in export controls to the former Soviet states.

At the Moscow summit in January 1994 Presidents Clinton and Yeltsin signed a joint "Memorandum of Intent" on "Cooperation in the Area of Export Control," saying their governments intended to cooperate in "any or all" of six areas intended to improve nonproliferation export controls and that they "may" establish expert working groups to carry out their intent. At this writing, it is too soon to tell whether these actions will be taken or whether they will result in concrete improvements in the Russian control system.

Option: Seek greater cooperation from developing countries.

Newly industrializing countries that are not members of the established export control groups are also becoming possible sources for proliferant weapon programs.

In its draft for the EAA of 1994, the Clinton administration proposed that (individual validated) license-free exports of controlled items could be permitted to and among members of a multilateral regime. More convenient access to dual-use technology items might serve as an incentive for some developing nations to join supplier regimes. On the other hand, were these nations so well-behaved in the first place, license approvals probably would have been forthcoming anyway. A disadvantage to removing validated license requirements is that the United States would lose the opportunity to judge on a case-by-case basis whether the recipient country's own export controls were strong enough to prevent retransfer of some items. Instead, it would have to arrive at a general judgment to that effect. Of even greater concern is that, if the emerging supplier is itself a proliferation threat, it might acquire easier access to items needed for its own weapon programs, even as it helped control supplies to others.

Other steps aimed at bringing more nations into export control cooperation have been proposed. While worth exploring, they may be difficult to sell to some developing nations, who have per-

ceived export controls more as a means of economic discrimination than as a nonproliferation tool. In attempting to better inform developing nations about the purposes and effects of export controls, the industrialized countries would have to take care to avoid the appearance of simply dictating their own views of the proliferation problem and how to deal with it.

OPTIONS FOR AMELIORATING INDUSTRY BURDENS

From the point of view of the effectiveness of export controls, it is desirable to have exporting companies see the system as fair and just, so that they will have every incentive to help make the controls effective—for example, by reporting possible illicit purchase attempts. From the point of view of U.S. competitiveness in international markets, it is desirable to place the least constraints consistent with national security on exporting firms.

I List Making

Issue: How can the United States protect its exporters from competition from firms in countries with less stringent export controls?

Option: Promptly remove controls from items that are availablefrom other countries in similar quality and quantities.

A policy of attempting to control only items that were not available from other sources would lead to a shorter list and might result in fewer losses of business from U.S. companies to foreign competitors. Proponents of unilateral export controls argue that this is tantamount to knowingly selling a gun to a criminal just because he may have been able to buy it from someone else. Some exporters may feel that they should not be denied licenses to sell to such users, on the ground that someone else will anyway. Most, however, would not wish to do business with users trying to build weapons of mass destruction. It is not the loss of these relatively rare sales that exporters fear, but rather that the export licensing process itself causes them to lose *legitimate* business to foreign competitors at the same time that it fails to keep the proscribed items out of the hands of proliferants.

Other countries may be more willing to control new items (or exports of currently controlled items to newly identified end-users) if the United States demonstrates its own will to do so first. Thus, proposals to limit U.S. export controls to multilaterally controlled items have included provisions for at least temporary impositions of unilateral controls to allow attempts to reach multilateral consensus. Putting a legislative limit on the length of time for which unilateral controls can be imposed does carry a risk: other nations whom the United States is trying to persuade to follow suit can just stall negotiations until the statutory limit on the U.S. controls runs out.

Those in favor of retaining some discretion for the government to maintain some unilateral controls argue that in some cases the United States should set a standard of leadership behavior, whatever else some other nations might be doing. In taking a principled stand against assisting the spread of weapons of mass destruction, the United States may help bolster international norms against such proliferation, protect U.S. companies from the embarrassment of being identified with proliferation activities, and possibly win over other supplying nations to its position.

Option: Reduce the size of the export control list to narrow the scope of its purposes.

After the initial reforms of COCOM controls with the end of the Cold War, the Department of Commerce (DOC) Office of Export Licensing went from handling over 100,000-125,000 export license applications a year to about 24,000 in 1992 and 25,000 in 1993. Many of the remaining license applications concern items controlled for purposes other than the nonproliferation of weapons of mass destruction. Most of the items remaining on the (formerly COCOM) “national security” control lists relate to possible conventional military applications. **Items controlled because they may be used in making weapons of mass destruction or missiles are largely the subject of**

negotiated international supplier agreements; the option of narrowing the scope of controls does not have much applicability to this area.

The COCOM lists were designed primarily to slow Soviet progress in a broad range of military technologies. The fact that they might also slow the development of the Soviet civilian economy was seen as, if anything, an additional national security benefit of the regime. COCOM'S original purposes became largely (though perhaps not entirely) obsolete with the breakup of the Soviet Union.

A new set of goals for controls over dual-use technologies related to conventional weapons has not yet emerged. Late in 1993, COCOM members agreed to abolish the organization at the end of March 1994 and to replace it with a successor regime. As COCOM formally ended, however, the goals and procedures of that successor regime remained unclear. Some have proposed that the United States initiate an explicit new nonproliferation regime aimed at limiting the spread of advanced conventional weapon technologies. Such a policy, aimed at keeping particular types of conventional weapons out of reach of many nations, would require a different export control strategy than one directed at maintaining a Western military advantage by restraining the technical development of a single large military-industrial complex. In the absence of clear-cut opposing blocks of allies, there is bound to be less consensus about who should be the targets of such a strategy.[2] It is therefore likely to be more difficult to sell the strategy multilaterally than it was to persuade states to participate in the original COCOM regime.

Issue: How can uncertainties and costs stemming from "EPCI" rules be reduced?

The Bush administration's Enhanced Proliferation Control Initiative (EPCI) and certain subsequent legislation led to Export Administration Regulations requiring individual validated licenses (IVLs)[3] for almost any items that the exporter "knows" or "is informed" might be used in any way in a chemical, biological, or missile weapon program. In December 1993 the Commerce Department issued further guidance specifying that the rule would apply to items destined to be directly *employed* in such a program. For nuclear weapon programs, the rule is stronger: a license is required for *any* item that the exporter '*knows *or has **reason** to know"* will be used directly or *indirectly* in such a program.

Industry representatives, at least prior to the December 1993 clarifications, argued that the EPCI rule unnecessarily hinders their economic performance by:

- requiring virtually all exporters to establish costly programs to find out whether their customers are involved in a proscribed activity,
- imposing unilateral controls on U.S. exports of items that are likely to be available to proliferant programs from foreign sources anyway,
- burdening honest exporters with regulations, when illicit exporters will not apply for licenses anyway, and
- because of uneven information among exporting firms, giving honest exporters who are nonetheless ignorant of export control requirements an unfair economic advantage over their better informed competitors.

Option: Eliminate the EPCI rule

The Congress could eliminate the EPCI rule by legally requiring the DOC to consolidate its dual-use or "commercial" export controls into a single list that fully enumerates all the products for which an export license is required and all the countries and specific end-users as well. This would greatly simplify the exporting companies'

[2]There is more international consensus about restraining the general spread of weapons of mass destruction than there is about maintaining the military superiority in conventional weapon technologies of the advanced industrial nations.

[3]To obtain an IVL, the exporter must file an application with the Department of Commerce stating the items to be shipped, their value, the buyer, and the end-user.

job in deciding whether a license application was necessary and whether it was likely to be approved.

Elements of this proposal exist in the current regimes. The NSG, the Australia Group, and the MTCR all center on agreed, published lists of commodities. On the other hand, the regimes do not require the members to agree in advance on who all the controlled countries and end-users may be. Instead, they provide agreed criteria for deciding whether an export should go forward.

Publishing lists of all suspect buyers and users has drawbacks, including risking the compromise of intelli.gence and law enforcement data. It also eliminates the government ability to control exports that pose an imminent proliferation threat even though they are not on a published control list. These drawbacks must be weighed against the advantages of having better informed legitimate exporters.

Option: Maintain the EPCI rule, while attempting to assure its fair application.

Defenders of the "knows or has reason to know" rules argue that exporters who may be trading with a proliferant end-user find it too easy to look the other way, or to fail to report what they know, as long as their own particular export is not on a specific control list. More important, the rule gives the government a safety net by allowing the application of export controls when it learns about a pending transaction that risks helping a weapon program, but which is not explicitly covered by the current Commerce Control List. Finally, many companies would themselves prefer not to deal with end-users developing weapons of mass destruction, whether their products are critical to those programs or not. Procedures for the government to inform them of the character of their buyers may well save them from public embarrassment later on.

The DOC'S December 1993 guidance should assure U.S. exporting firms that they do not have to worry that they will be subjected to extraordinary demands to probe deeply into the character of end-users of relative] y innocuous products. Advocates of a "knows or is informed rule" point out that the stronger form of the rule ("has reason to know") has existed for some time for nuclear exports and in other legal areas. The judicial system has not generally permitted unreasonable interpretations of what constitutes a "reason to know." In practice, no firms have been penalized for having failed to apply for a license for something that they are alleged to have known would be used in a banned project. On the other hand, questionable sales have been prevented by the government informing exporters that transactions with certain buyers would require an IVL.

Option: Change the "knows or is informed" rule to just an "is informed" rule.

Under this option, the government would not expect companies to "know their customers" and apply for licenses in dubious cases. It would, however, retain the legal ability to stop risky transactions about which it had obtained intelligence by informing the exporter of a license requirement, even if it could not expect companies to report the "red flags" that may indicate suspicious customers.

Option: Maintain the rule, but publish a specific list of controllable items.

The government would generate a separate control list of products or technologies that, although not listed as requiring export licenses, could be "directly used" in proliferant programs. The exporting companies would then be responsible only for knowing or having reason to know whether recipients of those particular items were engaged in illicit activities. The firms, if in doubt, could ask the government for advisory opinions on prospective buyers. The government could also make the companies' job easier by publishing those advisory opinions about particular end users so that other firms could be forewarned. This latter measure would carry some risk of alerting illicit procurement agents the the U.S. government Was aware of their activities.

I Licensing Administration

Issue: How can exporters be given licensing decisions in time to avoid losing sales?

Option: Place statutory limits on licensing processing times.

The Clinton administration's draft EAA proposes assuring that nearly all license applications would either be resolved or referred to the President within 90 days of filing. For reviewing agencies, the default decision is approval if the deadlines for objections are not met. There seems to be no reason why, with sufficient resources, current license decision deadlines could not be shortened to the times proposed in the Administration bill, or even less, without diminishing the quality of analysis and review that the license applications receive. Doing so, however, is likely to cost additional funds that the executive branch has not recently been willing to allocate to export control management.

Issue: How can the economic costs of export controls be given appropriate weight in policy and licensing decisions?

Some U.S. exporters have argued that the government imposes export controls without adequate consideration of the costs they will impose on U.S. industries. They have proposed, therefore, that assessment of the costs of controls should be made an integral part of the export control process. Costs may include:

- resource and opportunity costs to the government,
- sales forgone or denied because of controls,
- exporters' administrative costs in complying with regulations, and
- business lost because of licensing delays or customer perceptions of supplier unreliability.

Current data about the actual costs, direct or indirect, imposed by export controls on specific U.S. industrial sectors and on individual firms is not generally available. Estimates used in public discourse are either anecdotal or based on data sets not well-designed to provide the needed information.

Option: Require regular economic impact statements for export control policies.

The Clinton administration's draft EAA states as U.S. policy:

> . . . to ensure that U.S. economic interests play a key role in decisions on export controls and to take immediate action to increase the rigor of economic analysis and data available in the decisionmaking process.

Such a policy could be reinforced by a requirement for regular "economic impact" statements to Congress attempting to estimate the overall costs of controls to the U.S. economy as well as their more specific costs to certain industries. Such estimates should help enlighten a debate now featuring many claims and counter-claims, but 1ittle real data.

As desirable as such costs estimates may be, however, it is important to recognize that gathering usable data will require overhaul of the current DOC license-processing computer system and expenditures on economic research and extensive exporter surveys. Even after these efforts are made, the nature of this particular estimating problem will dictate that many uncertainties still remain.

2 Introduction

Less-developed nations seeking to produce weapons of mass destruction (or missiles for delivering them) usually need to import certain equipment, materials, and technologies. The United States and other countries have instituted export controls on such commodities as a tool of nonproliferation policy. OTA's report on *The Proliferation of Weapons of Mass Destruction: Assessing the Risks*[1] concluded that **export controls will continue to be a useful nonproliferation tool.** They are unlikely to stop a determined proliferant in the long run, but nevertheless may buy important time in the shorter term—time that may be used to bring other nonproliferation tools to bear.

The Export Administration Act (EAA) provides the legislative basis for U.S. export controls on dual-use items—goods and services with civilian applications that could in principle be used for military purposes.[2] In 1994 the EAA, temporarily renewed in 1992, will expire and Congress must reauthorize it. Virtually everyone involved in export control matters agrees that a new EAA is overdue. There is less agreement about what the most urgent problems are and what the best solutions may be. **Moreover, the core issues are likely to remain in contention well beyond passage of a new export control bill.**

The initial report of this OTA assessment pointed out that there are tensions between the goals of effective nonproliferation ex-

... export controls are unlikely to stop a determined proliferant in the long run, but nevertheless may buy important time in the shorter term.

[1] U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559 (Washington, DC: U.S. Government Printing Office, August 1993).

[2] The Nuclear Non-Proliferation Act of 1978, however, establishes the basis for control of nuclear-related dual-use items.

port controls on the one hand and enhanced export competitiveness on the other. When it comes to specific proposed reforms of the EAA, however, the tradeoffs are not completely clear-cut and direct. **Some proposed changes in export control laws and regulations are aimed primarily at improving their effectiveness. Proponents of other changes are seeking mainly to reduce the burdens to industry of export controls and to reduce barriers to legitimate exports. These** two objectives are not necessarily contradictory: any given change intended for one purpose may hinder, have no effect on, or even help pursuit of the other.

The most desirable export control measures would contribute to one or both goals (effectiveness and economic competitiveness) and detract from neither. For example, increasing the resources available to review export license applications might assure both that the applications are screened in greater detail (possibly increasing the chances that dangerous exports will be stopped) *and* that the review process is sped up (reducing the waiting time for exporters and their potential customers). If an option does detract from one goal while contributing to another, policy makers will, ideally, evaluate the tradeoff and choose the more valued goal.

Unfortunately, as will be shown below, this evaluation does not always lend itself to a clear-cut analysis. As a result, the revision of the EAA is likely to become a focus of strong political controversy both in the Congress and in the executive branch.

NONPROLIFERATION EMPHASIS

Those whose foremost objective is strengthening the nonproliferation regimes tend to stress the benefits of export controls. Citing Pakistan, Iraq, and others, they point out that in the past, ineffectiveness of export controls has resulted not just from the inherent deficiencies of the tool, but from failures by the United States and other nations to apply it rigorously. They argue that, given the horrendous consequences of the spread of weapons of mass destruction, even partially effective controls may help avoid catastrophic future costs. (Some would also argue that we have a moral imperative not to contribute to proliferation, whatever others might be doing.) They also point out that controls serve some purposes beyond limiting access to potentially dangerous goods and technology. By creating a record of what is sold to whom, controls provide information to help monitor proliferation. They also serve to indicate a government's determination to oppose proliferation: a state that decries the spread of weapons of mass destruction, but does nothing to prevent its own citizen from helping those who seek to acquire them, loses credibility.

Those stressing the benefits of controls, then, argue that some economic sacrifices (in the form of reduced exports) are worth the price. They say that if exporters are burdened by controls, the burdens should be seen as part of the price of doing business with potentially dangerous commodities. Moreover, some nonproliferation advocates question whether the business lost because of nonproliferation-related controls is in fact very significant to the U.S. economy: few solid figures are available to prove that it is. Presented with proposals to ease the burdens to industry imposed by export controls, these advocates are more likely than others to perceive dangers that those proposals will decrease effectiveness of controls.

Within the school of thought emphasizing the benefits of export controls, there is some division between those who would apply nonproliferation controls uniformly toward all potential proliferants and those who advocate singling out "rogue nations" that are perceived to pose the greatest immediate threats to international stability. Those favoring a more universal policy argue that weapons of mass destruction are dangerous no matter which states are acquiring them. Therefore, proliferation on the part of states considered friendly to the United States should be opposed as vigorously as that by states thought to be more hostile. First, the international consensus needed to fight proliferation is much harder to mobilize in a world of double standards, in which proliferation is tolerated in some states but not in others. Second,

states are not likely to agree on which states should be considered particularly unfit to possess weapons of mass destruction, making it hard to reach consensus on measures that should be imposed against regime violators. One state's ally may well be another state's "rogue." Third, as was shown in the case of Iran in the late 1970s, or Iraq in the late 1980s, today's friends can turn into tomorrow's adversaries. Arsenals amassed when bilateral relationships are favorable may pose serious diplomatic and military problems should the political situation change.

In contrast with those favoring a universal approach to nonproliferation strategy, others stress that such weapons become a concern primarily when they are acquired by 'brogue" or "outlaw" states that are particularly hostile towards the United States or to international security. In this view, "weapons don't kill, nations do": it is more important to deal with the particular dangers posed by such nations than it is to enforce global nonproliferation norms. From a United States' point of view, today's "rogue'* states include Iran, Iraq, Libya, and North Korea (but not India, Pakistan, or Israel).[3]

Since these states generally already have strained relations with Washington, little would be lost by applying highly coercive policies—such as more restrictive export controls and stronger economic sanctions—that threaten to further disrupt ties to the United States. As with the universal nonproliferation approach described above, this approach views preventing the proliferation of weapons of mass destruction, at least to rogue states, to be one of the highest national priorities. Unlike the universal approach, however, this approach would devote less attention to nonproliferation efforts targeted against friendly states.

Table 2-1 contrasts the export control policies implied by these two approaches as well as a third approach, emphasizing enhancement of exports, described below. The views here do not, of course, encompass every individual with a role in the export control debate. Other positions between the ones starkly differentiated here are also possible and likely.

EXPORT ENHANCEMENT EMPHASIS

Those who worry most about the economic costs of export controls tend to emphasize the ineffectiveness of unilateral controls and the spreading availability of dual-use technologies. They are likely to give less credence to arguments about the utility of partially effective controls and the value of the United States' continuing to set an example of more stringent controls when other suppliers fail to cooperate quickly. They are more likely to perceive measures reducing the burdens to industry of export controls as increasing the effectiveness of controls as well. But when a tradeoff does seem necessary, they argue, the government should make explicit evaluations of not only the foreign policy benefits of controls, but also of their economic costs.[4] For further discussion of the arguments about the costs and benefits of nonproliferation export controls, see chapter 4 and appendix A of this report.

Table 2-2 lists the criteria that a policy satisfying proponents of the contrasting approaches to export controls would have to meet-criteria that

[3] President clinton's Assistant for National Security Affairs refers to "backlash states," naming Cuba as well as North korea, Iran, Iraq, and Libya. See Anthony Lake, "Confronting Backlash States," *Foreign Affairs, vol.* 73, N(). 2, March/Apr]l 1994, pp. 45-55.

4 Analysts from the Brookings Institution have expressed a third point of view: export controls are increasingly ineffective and should be drastically reduced, but in their place the United States should try to build an international consensus on achieving greatly increased *tran.sparen-(y* in international trade and in national industrial activities. This might mean that reduced exp)rt *contro/s* would be replaced by increased export *reporting requirements,* plus intensified governmental and other monitoring aimed at exposing proliferant programs to international sanctions. See testimony of Janne Nolan and John Steinbruner before the Subcommittee on Economic Policy, Trade, and Environment of the House Committee on Foreign Affairs, on June 9, 1993 and June 23, 1993, respectively. However, beyond those two short presentations, further analysis of this approach does not appear to have been carried out or published.

TABLE 2–1: Differing Approaches to Dual-Use Export Control Policy

Policy issue	Nonproliferation emphasis	"Rogue Nation" nonproliferation emphasis	Export enhancement emphasis
Priority to nonprolifefation policies	Few If any foreign policy priorities should be higher	Nonproliferatio is the highest priority regarding "rogue nations" that threaten regional or global stability: other goals may rank higher with friendly nations	Nonproiferation needs to be weighed against other national objectives, particularly global economic competitiveness
Universality of nonproliferation policies	Apply universal rules to all potential proliferants, whatever their current politlcal stance, today's "safe" nation may become tomorrow's "rogue"	Focus nonproliferation policies (and export controls) on rogue nations	May favor either a universalIst or a "rogue" approach, as long as near complete cooperation among suppliers exists
Unilateral U.S. export controls	Are acceptable, even when not effective in blocking proliferation " ▪ Nuclear Nonproliferation Act requires U.S. not to contribute to proliferant nuclear weapon programs, whether other supplier nations door not, • U S leadership often necessary to win export control cooperation from other nations	Same as nonproliferation emphasis, but to be applied selectively to rogue nations and their suppliers	Unilateral controls are lneffective, economically costly, and should be avoided, exceptions may be made If embargo against target nations ıs complete, not partial
Using export controls as economic sanctions	When any dual-use items (including those not normally controlled for proliferation reasons) exported to a given country have potential to be diverted to weapon programs, all such transfers should be denied, the economic handicap borne by the target nation may help persuade It to end weapon-of-mass-destruction programs	Silmilar to nonproliferation emphasis, but to be applied only to rogue nations, such as those Identified by the United States as supporters of International terrorism	Broad-based export controls intended to punish or coerce a state are generally ineffective but if applied should be as part of an expicit complete embargo of the target nation's economy, export control laws should be applied only for their explicitly authorized purposes, not as ad hoc sanctions

SOURCE : Office of Technology Assessment, 1994

would maximize both control effectiveness and ease of compliance. Although the criteria do not appear to be logically incompatible, finding the appropriate tradeoffs among them is a difficult policymaking task.

The primary focus of this report discussion of policy options is on measures that might increase the effectiveness of U.S. export controls. Where relevant, however, the possible consequences for exporting companies are also considered. An additional set of options deals with reducing the burdens export controls may place on exporting companies.

Chapter 3 of this report discusses the U.S. export control regime as it was configured early in 1994. This configuration was the baseline from which Congress would revise the Export Administration Act, which governs U.S. export controls on dual-use commodities.

Chapter 4 discusses the problem of assessing the benefits and costs of export control measures. It outlines the factors that determine how effective

TABLE 2–2: Criteria for an "Ideal" Export Control Regime

Regime goal	Criterion
Effective control lists	▪ Timely and thorough I[st-construction process identifies the right goods, technology, and users for controls ▪ Policy makers have flexibility to adjust to changing circumstances ▪ Licensing process feeds back Information about buyer behavior that would be useful to the list-making process
Effective licensing administration	▪ Licensing decisions based on adequate information • Licensing decisions based on the best available judgment • Licensing offices have adequate resources ▪ Licensing process IS run efficiently • Exporters kept well informed of suspect end-users
Effective enforcement	• Adequate investigation and prosecution of exporting violators • Regular monitoring of end-uses
High degree of multilateral support	• Agreement among major suppliers on controlled commodities and users • No undercutting of license denials by other governments ▪ Effective enforcement
Minimum burden on exporters	▪ Policies explicitly balance nonproliferation goals and economic competitiveness goals ▪ Commodities controlled kept to a minimum ▪ Foreign competitors do not undercut controls ▪ Applicants have access to lists of controlled items, countries, and end-users ▪ Licensing decisions are rapid ▪ End-user controls are not so onerous as to deter legitimate buyers ▪ Licensing decisions are consistent, fair, and subject to adequate appeals process • Licensing process protects proprietary Information that could be useful to competitors

SOURCE Off Ice of Technology Assessment 1994

particular export controls may or may not be. OTA has previously observed that the effectiveness of export controls in slowing proliferation will vary with the characteristics of the weapons of concern, the capabilities of the target countries and programs, the controllability of the designated commodities and technology, the degree of international cooperation, and the quality of enforcement. **In some circumstances, they may do little to stem proliferation; in others, they may impose significant obstacles and delays.**

Chapter 4 of this report also describes the potential costs of imposing export controls and points out the difficulty of reliably quantifying those costs. OTA also pointed out in its earlier report that, besides the costs to the government of administering an export control system, the affected exporting companies must bear the burdens of complying with regulations and the possible loss of legitimate business to competitors who are less strictly regulated. However, data to reliably quantify such losses are difficult to find.

Chapter 5 analyzes policy options aimed at making nonproliferation export controls more effective. **The chapter does not attempt to provide a single set of recommendations reflecting one coherent approach to export control policy. Instead, it analyzes a range of options culled from a variety of sources.** It categorizes those options according to the phase of the regulatory process each would affect most:

- the making of lists of controlled goods and technology as well as target countries and organizations,
- the administration of export control licensing,
- the enforcement of laws and regulations, and
- the engagement of international cooperation in making controls effective.

Chapter 6 reviews some recent proposals for easing the burdens that export control laws and regulations place on exporting companies. Of particular interest for this report are the possible consequences (positive or negative) of such measures for nonproliferation efforts.

Current United States Nonproliferation Export Controls

3

Slowing the proliferation of weapons of mass destruction is only one of many purposes for which the United States has established a system of export controls. Table 3-1 shows the range of U.S. agencies administering export controls, the major legislation underpinning those controls, and the variety of purposes intended for them (as of early spring, 1994).1 This report focuses on the most controversial type of export controls, those over dual-use items. The Department of Commerce administers export licensing of dual-use items under authority of the Export Administration Act.

Figure 3-1, presenting the sub-categories on the (Department of) Commerce Control List (CCL), shows the range of dual-use export controls falling under the EAA of 1979.2 The EAA contains two broad categories of dual-use item control: "national security" (established by Section 5 of the Act) and "foreign policy" (Section 6). National security controls are primarily those placed on items formerly in the COCOM[3] Industrial List, originally intended to preserve Western technological superiority by reducing the flow of advanced dual-use technologies from Western industrial nations to the Soviet bloc and other Communist nations.

Despite their obvious national security implications, controls over items that might be used to make weapons of mass destruc-

Slowing the proliferation of weapons of mass destruction is only one of many purposes for which the United States has established a system of export controls.

1 For additional descriptions of the establishing laws, see the first report of this OTA assessment, *proliferation of Weapons of Mass Destruction: Assessing the Risks,* OTA-[SC-559 (washington, DC: U.S. Government Printing Office, August 1993).

2 In 1992, this law was extended for 18 months, to end in June, 1994.

3 COCOM was the Coordinating Committee on Multilateral Export controls. It was abolished in the spring of 1994, probably to be succeeded by another, substantially changed, multilateral export control arrangement.

TABLE 3-1: Agencies Administering U.S. Export Control Laws

Agency	Legislation	Items or countries
Department of Commerce:		
Bureau of Export Administration	Export Administration Act	National Security Controls (COCOM)
	Nuclear Non-Proliferation Act	Nuclear Referral List
	Trading With the Enemy Act	Embargoed countries
	International Emergency Economic Powers Act	
	National Defense AuthorizationAct	Iran / Iraq, MTCR
Department of Defense	Arms Export Control Act	Defense articles and services
Department of Energy	Atomic Energy Act	Nuclear technical assistance and subsequent arrangements
	Nuclear Non-Proliferation Act	Nuclear-related dual-use items
Department of State: Center for Defense Trade	Arms Export Control Act	U.S. Munitions List defense articles and services
		Nuclear weapon and design equipment
		Chemical weapon agents
		Biological weapon agents
	National Defense Authorization Act	MTCR
Department of Treasury:	Trading With the Enemy Act	Various prohibited transactions
Off Ice of Foreign Assets Control	International Emergency Economic Powers Act	
Nuclear Regulatory Commission	Atomic Energy Act	Nuclear power generation, nuclear material, and fuel cycle equipment and technology
	Nuclear Non-Proliferation Act	

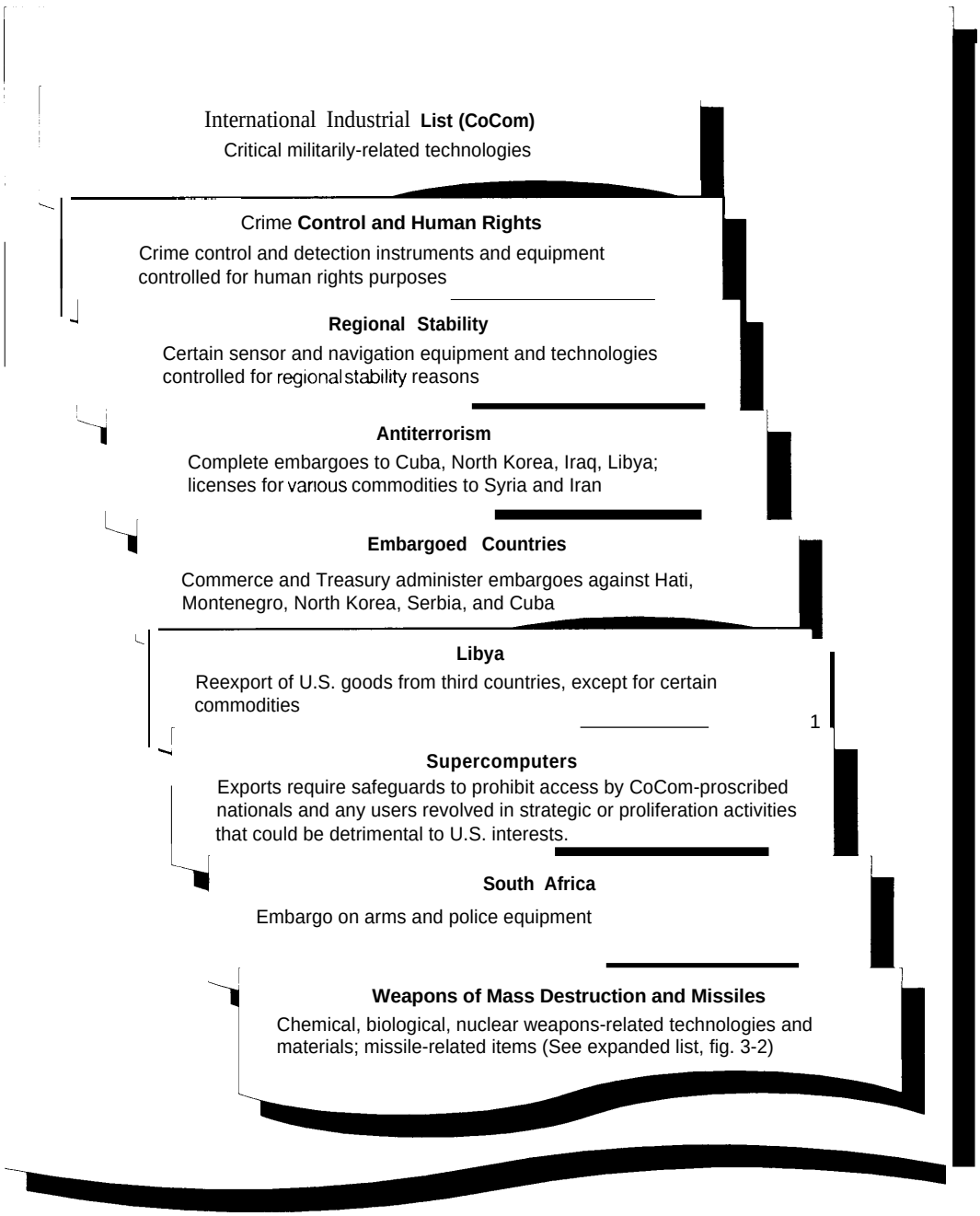
Note that this table only identifies the major departments with legislated responsibilities for administering the export control licensing. It does not list all the many bureaus and interagency groups that play a variety of jurisdictions and roles in managing the whole export control process

SOURCE Office of Technology Assessment, 1994

tion were grouped in the EAA in the Section 6 "foreign policy" category. Controlled in this latter group are the items on the Australia Group (chemical and biological weapons) and Missile Technology Control Regime (MTCR) lists.[4] Nuclear exports are controlled under authority both of the EAA and of the Nuclear Non-Proliferation Act of 1978. (See figure 3-2 for further detail on nonproliferation portions of the CCL.) **Miscellaneous other controls, not directly related to proliferation, fall under the rubric of foreign policy. Many industry complaints about the economic burdens of export controls have arisen from cases concerning these other foreign policy controls, as well as COCOM controls, rather than nonproliferation controls.**

[4]The MTCR began as an informal agreement among coordinating countries to control goods relevant m missile manufacture; the United States implemented these controls administratively. Amendments in 1990 to the EAA, made in a section of the National Defense Authorization Act for that year, provided a specific U.S. legislative basis for missile technology controls.

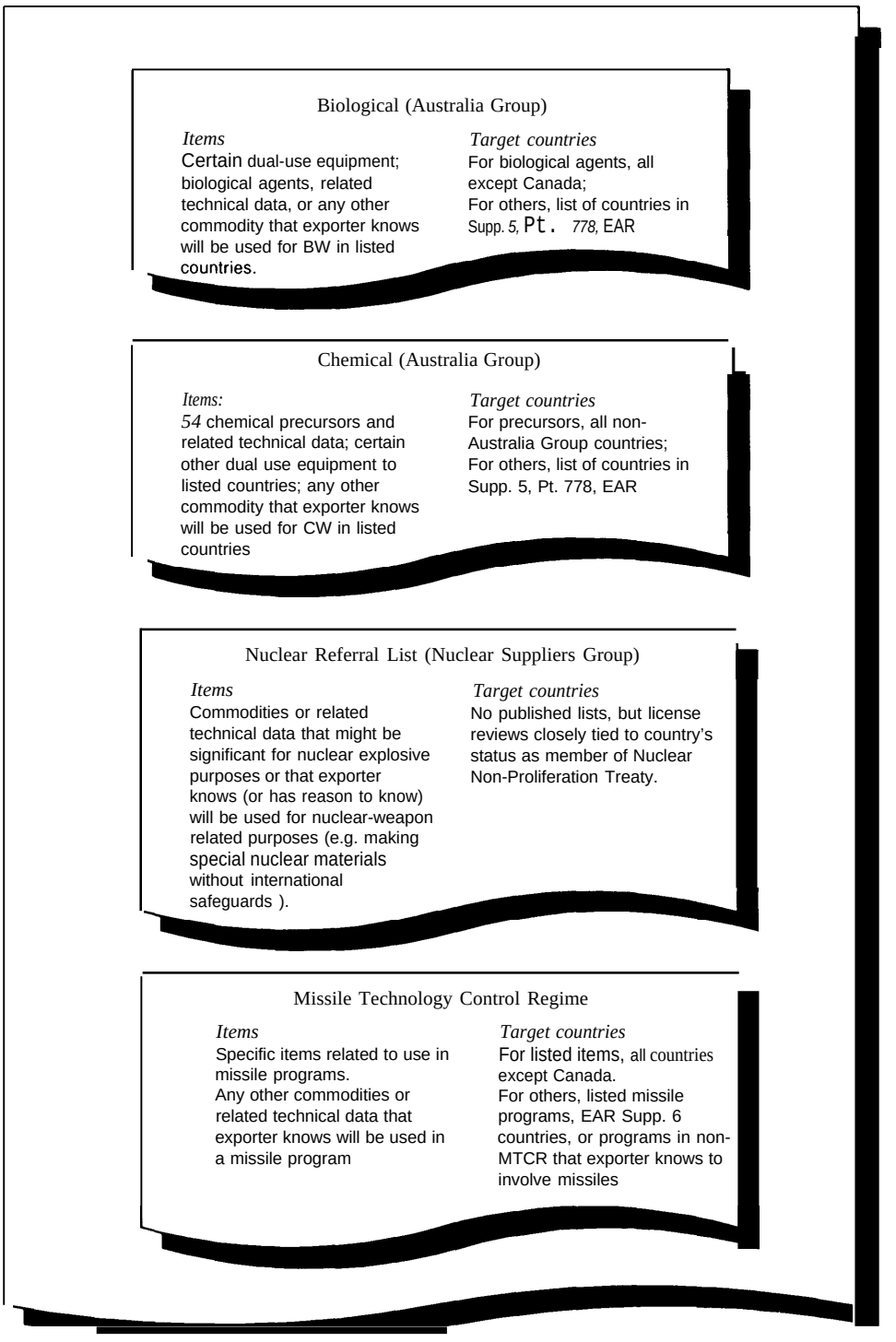
FIGURE 3–1: Dual–Use Export Controls



The Department of Commerce administers a variety of dual use commodity, technology, and software export controls, on/y some of which relate directly to weapons of mass destruction The Commerce Control List (CCL) IS categorized by some 430 Export Control Classifications Numbers (ECCNS). The ECCNS do not correspond one for one to sing/e commodity technology or software items m some cases an *ECCN covers on/y a sing/e narrow/y defined item, but in many cases multlple related items fall under the same ECCN. The reason for control of each ECCN category may be single or multlple (e g , for both National Security and Nuclear Proliferation) but the reason(s) /@cd may m fact apply on/y to some subset of iterns within the category*

SOURCE Off Ice of Technology Assessment 1994

FIGURE 3–2: Nonproliferation Controls on the Commerce Control List



SOURCE office of Technology Assessment, 1994

Weighing Benefits and Costs

4

As the first report of this OTA assessment pointed out, the risks attached to the proliferation of weapons of mass destruction are considerable. Advocates of strong export controls point out that the costs of proliferation may include thousands or millions of lives, billions of dollars of property destroyed, or, at a minimum, billions of dollars paid for military preparations to deter or do battle against owners of such weapons. Therefore, if export controls could be shown to be effective in preventing proliferation, they might be judged well worth the economic burdens they might place on the national economy or individual exporters.

ASSESSING BENEFITS

The great majority of the world's nations have signed agreements[1] recognizing that the further spread of nuclear, chemical, and biological weapons would be dangerous to international security, and should be opposed. The signatories to these treaties have also agreed that those possessing the wherewithal to produce such weapons should not help other nations do so. The majority of nations able to supply goods and technology needed for producing the weapons have agreed to control exports from their territories as a nonproliferation measure. **Implicit in these agreements is the belief that export controls on at least some items are a useful nonproliferation tool.**

The majority of nations able to supply goods and technology needed for producing the weapons have agreed to control exports from their territories as a nonproliferation measure.

In a world where all the materials, tools, and technology needed to develop and produce weapons of mass destruction (or mis-

[1] I. e., the Nuclear Non-Proliferation Treaty (NPT), the Biological Weapons Convention (BWC), and the Chemical Weapons Convention (CWC).

siles to deliver them) were readily traded, acquiring the weapons would be cheaper and the time to get or develop them shorter. But how much cheaper and how much shorter? The answer to that question varies widely from country to country, as well as from one type of weapon to another. As noted above, **several key factors affect export control effectiveness:**[2]

- the nature and level of technical sophistication of the weapon sought,
- the state of industrial and technical development of the target countries,
- the controllability (or degree of general availability) of dual-use items (those with both civilian and military applications),
- the degree of cooperation among all the relevant exporting nations, and
- the degree of success in monitoring and enforcing of controls by each cooperating nation.

The Technology Variables

The ability of export controls to block access to needed goods and technology depends strongly on the type of weapon being pursued. So too, does the proliferant's ability to develop alternatives or "work-arounds" to the items it cannot purchase abroad. In evaluating the effectiveness of export controls, therefore, it is important not to lump all weapons of mass destruction together. [3]

Nuclear Weapons

Export controls have the best chance of effectiveness against nuclear weapon proliferation (compared to that of other types) because the processes for producing weapon-usable fissionable materials are difficult and costly. Pakistan, for example, had to abandon efforts to produce plutonium when external assistance ended; its uranium enrichment program relied heavily on theft, smuggling, and black market transactions, frequently in violation of export control laws.[4] South Africa, on the other hand, devised a method of uranium enrichment that relied less on imports (but still received clandestine foreign assistance).[5] Although it is easier to design and build a primitive bomb once fissionable material has been acquired than it is to produce the material, more advanced designs (improving on size, weight, and explosive yield) require additional infusions of technology.

Chemical Weapons

Export controls can increase the cost and difficulty of producing large quantities of high-quality nerve agents under safe conditions. They may also help keep advanced delivery technologies (e.g., chemical cluster bomb designs) out of the hands of some nations. **Nevertheless, controls are unlikely to block a nation determined to produce chemical weapons.** As industrialization spreads to more countries, so will civilian chemical technologies that can be applied to weapon-agent production. Moreover, with environmental, health, and safety standards rising around the world, modem chemical facilities are increasing] y adopting the type of production technology that formerly had been used only for the most toxic compounds.

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[2]For further discussion of key technologies for each type of weapon, see U.S. Congress, office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing (he Risks, OTA-lSC-559* (Washington, DC': U.S. Government Printing Office, August 1993) and *Technologies Underlying Weapons of Mass Destruction,* OTA-BP-ISC- I I 5 (Washington, DC: U.S. Government Printing Office, December I 993).

[3]Ibid.

[4]See Leonard S. Spector With Jacqueline R. Smith, */V///(/ear Ambitions: The Spread of Nuclear weapons, 1989-) 990* (Boulder, CO: Westview Press, I 990), pp. 90-91.

[5]1 bid., pp. 270-271.

To a certain extent, the Chemical Weapons Convention (CWC) will compensate for the declining utility of export controls: the Convention's verification measures will constitute a kind of "post-shipment end-user check" for trade in precursor chemicals and chemical manufacturing equipment, since suspicious locations will be subject to challenge inspections. (The Treaty will also ban the transfer of chemical weapon precursor chemicals to non-CWC parties.)

Biological Weapons

The basic equipment and raw materials needed to grow biological warfare agents are in widespread use for commercial food processing and pharmaceutical purposes. As knowledge of biotechnology spreads, so will the ability to produce large amounts of agent in small facilities. **Export controls are unlikely to be a strong bar to the acquisition of biological weapons.**

Missiles

Successful missile export controls will not prevent the countries now suspected of having weapon-of-mass-destruction programs from finding ways to deliver such weapons. These nations have combat aircraft that could do the job. Some of them already have relatively short-range ballistic missiles. Any of them could also utilize less conventional means of delivery. In addition, most could probably derive at least simple cruise missiles from small airplanes or unmanned aerial vehicles. Nevertheless, **missile export controls can help limit the spread of such advanced missile technologies as precision guidance, staged long-range ballistic missiles, advanced reentry vehicles, and long-range cruise missiles.** A frequently cited case of successful export control action is the blockage of "Condor'* solid-fueled missile technology from Argentina to the Iraqi "Badr 2000" missile program.

The Cooperation and Enforcement Variables

Only since 1984 for chemical weapons, and 1992 for nuclear and biological weapons, have international groups of supplier nations agreed on a multilateral basis to control the exports of specified dual-use commodities that might be used to produce those weapons. These groups include most, but not all, of the major potential suppliers of the items in question. (A significant exception for all three groups is China.) An important immediate task is to gain the cooperation of the newly independent states of the former Soviet Union.[b] As industrialization spreads, more countries become potential suppliers and, therefore, potential candidates for membership in the supplier groups. This can be a complicated problem when one of the targets of an export control regime is also a potential supplier.[7]

Supplier-group export controls can be useful even if all possible suppliers do not adhere fully to them. First, most nations and companies do not wish to contribute to the proliferation of weapons of mass destruction. The information shared by multilateral export control groups helps their members identify potential misusers of their products, and thereby lets them avoid inadvertent involvement in such programs. Second, in an environment of broad international consensus that certain kinds of exports should be controlled, there is a greater chance that pressure of various kinds can be brought to bear on the few nonparticipants to limit or end their offensive behavior.

Even with nominal international agreement on export controls, however, there has been wide variation in how the controls are interpreted and enforced by each nation. First, the

[6]See forthcoming OTA report on proliferation issues and the former Soviet Union.

[7]See ch. 5 for further discussion of emerging suppliers among developing nations.

criteria for withholding export licenses are subject to the judgment of each state's licensing authorities.[8] For example, Russia, although not a member of the Missile Technology Control Regime (MTCR), had agreed to abide by its restrictions on the transfer of rocket-related technology. At the same time, it planned to sell both hardware and production technology for cryogenic rocket motors to India. India and Russia argued that this was technology suitable only for space-launch vehicles and not applicable to military missiles. The United States, however, argued that the terms of the MTCR forbade the transfer of such technology to a country such as India with a military missile program.[9] Implementation of the Nuclear Suppliers' Group (NSG) dual-use export control guidelines (see below) is also up to the discretion of each member, but the members do undertake not to undercut transfers refused by other states.

Even if interpretations of export control agreements among the participants were always in harmony, the related laws, implementing regulation, and administrative practices are unlikely to be uniform. National export control systems vary widely in:

- the degree of detail in legislation and regulations,
- the administrative resources for managing the system,
- the information available to the licensing officials,
- the numbers and skills of customs officials,
- the degree or lack of corruption in administration and enforcement,
- the resources devoted to enforcement operations, and
- the legal sanctions available for punishing violators of export control regulations.

Weaknesses in one or more of these factors offer opportunities for proliferant organizations to circumvent export controls and smuggle out or divert at least some of the commodities they want. Even so, from the standpoint of the potential buyer of controlled commodities, controls that are only partially enforced still present difficulties. First, the buyer has to go to the trouble and expense of finding a sufficiently unscrupulous seller. Second, even if some items are available in small numbers from such sellers, the buyer may need larger quantities than backdoor deals can supply. Third, he may not be able to obtain the necessary technical services and spare parts to keep his diverted equipment running. Fourth, he may have to resort to costlier methods of production than if he had full access to international markets. Fifth, discovery of one or more illicit transactions may tip off exporting states about the program for which the purchase is being made, and thence lead to counteractions.

Much of Eurasia now poses new problems in the harmonization of export control practices. First, in the European Union (EU, formerly the European Economic Communities), the emergence of a truly common market in which most controls may not be applied to intra-Union trade will mean that the strength of export control enforcement will depend on the weakest links. That is, if goods or technology move freely within the Union from countries with strong export control machinery to other countries with weaker enforcement, they may leak out of the region to potential proliferants. As EU negotiations on export controls have proceeded, Germany (with the strictest current export control regime) had argued for

[8] In the COCOM regime, members referred proposed exports of listed items to an administrative headquarters, and any member could veto a license approval.

[9] U.S policymakers were more concerned over the potential military utility of some of the technology being transferred to India than they were over the cryogenic I iquid-fueled motors themselves. In July 1993, Russia agreed to adhere completely with the U.S. interpretation of MTCR requirements and to withhold the further transfer of rocket motor production technology to the Indian space program. However, much documentation had previously been shipped. The Russians would also proceed with the sale to India of four of the rocket motors themselves.

common regulations as strict as its own; apparently losing that struggle, it has promoted a rule allowing individual EU members to enforce controls that are stronger than the Union's regulations. [10]

Meanwhile, to the east, most of the republics of the former Soviet Union still lack effective customs controls over their borders. let alone stringent export control policies for dual-use technologies. This means that commodities that the nonproliferation supplier groups are trying to control may leak not only from one former Soviet republic to another, but beyond the former Soviet boundaries as well. [11]

In sum, many variables conspire to weaken the effects of export controls on programs to make weapons of mass destruction. But to say that export controls are sometimes ineffective is also to say that they are sometimes effective. Although some would-be proliferant nations may be able to work around many supplier controls, others may lack the resources to do so. **Even if it is not possible to estimate the deterrent effect that export controls may have on the calculations of some nations deciding whether to pursue weapons of mass destruction, it is logical to assume that there is such an effect.**

For those states that pursue weapons of mass destruction in spite of controls, the costs and delays may be important. For example, without export controls on nuclear-weapon related commodities, one can easily imagine that South Africa could have built dozens of nuclear weapons rather than 6, and that it might have then been more reluctant to eliminate its arsenal and join the NPT. To take another example, without the barrier, such as it was, of export controls, Iraq might have built nuclear weapons before it invaded Kuwait, dramatically changing the context for operations Desert Shield and Desert Storm. Denials of foreign technology probably helped slow the Argentine and Brazilian nuclear programs until those countries were ready to join the nonproliferation regime. In short, export controls on some items, even if imperfect, may help buy time that makes a crucial difference.

The cost and delay that export controls impose on proliferants is probably impossible to quantify, or even to estimate qualitatively. **Thus policymakers confront a dilemma as they contemplate how to enact and administer an export control regime: the benefits, while potentially great, are essentially intangible and long-term, and accrue to the nation as a whole; the costs, however, are more palpable and immediate, and are unevenly imposed across a few firms and industries.**

ESTIMATING COSTS

Like any regulatory regime, export controls impose costs both on the government and on the industries regulated, and those costs can be both direct and indirect. For the U.S. government, the direct costs are those born by the administering agencies (see table 3-1). Since some officials only handle export control issues as part of their work, even the direct costs of export controls to the government are hard to estimate. Moreover, **since limiting the spread of weapons of mass destruction and missiles is only one of many objectives of the U.S. export control regime, estimating the cost of nonproliferation controls alone is also difficult. The** indirect costs of export controls to the government may include the following:

- time and attention of high-level officials drawn away from other nonproliferation and foreign policy issues,

[10] See H. Müller et. al., *From Black Sheep to White Angel? The New German Export Control Policy, PRIF Reports No. 32* (Frankfurt am Mare, Germany: Peace Research Institute Frankfurt, January 1994), p. 56. The authors point out, however, that pressures from German businesses claiming unfair disadvantages relative to their EU competitors will result in weakening of German regulations as well.

[11] See forthcoming OTA report on the proliferation implications of the breakup of the former Soviet Union

- diplomatic or economic concessions made in bargaining with other nations for cooperation on export controls, and
- damage to diplomatic or economic relations ensuing from imposition of export controls on foreign nations or of sanctions against foreign violators of U.S. export regulations.

As will be pointed out below in the section on "Strengthening Multilateral Controls" (ch. 5), some policy options for increasing multilateral cooperation are likely to meet considerable resistance from other members, or from prospective members, of the international export control regimes. Pursuit of these measures might cost the United States considerable geopolitical capital, and might require that other U.S. goals in dealing with those nations (e.g., promoting human rights in China) be subordinated to the nonproliferation goal.

Officials and journalists from some developing nations have expressed the view that export controls are aimed less at preventing proliferation than at blocking the diffusion of advanced civil i an technology from industrialized nations to new competitors.[12] A biological weapons expert involved in international activities related to the Biological Weapons Convention (B WC) argues that this view may become a major obstacle to winning developing nations' cooperation in possible efforts to add verification measures to that agreement.[13]

In economic terms, the heaviest price for export controls is paid by the exporting firms whose products are subject to regulation. **Industry representatives testifying before Congress and elsewhere have complained that current U.S. export controls hamper their companies' export competitiveness in several ways.**

First are direct costs. The most obvious direct cost is the loss of business that would have been permitted in the absence of controls. The government tells companies that they may not make certain sales because doing so would in some way harm the national interest. The value of export license applications denied gives some measure of this lost business. There are presumably many other sales, however, that companies do not bother to try to make because they have reason to believe that an export license would be denied.

Another direct cost of export controls is administrative: tracking massive and complex U.S. export regulations and then assuring company compliance imposes time, money, and personnel costs. In part, the regulations are so complex because they spell out so many exceptions to the general rules. Nevertheless, exporting companies need to track the rules and exceptions. In some cases, smaller companies may find the burdens so great that they forgo exports entirely.

Company compliance problems may be complicated by the de facto absence of public identification of all controlled commodities and end-users. A "knows or is informed" regulation requires individual validated licenses (IVLS) for any exports that might be "directly employed in" the design, development, acquisition, or use of missiles or chemical or biological weapons in a country listed in one of the supplements to the Export Administration Regulations. An exporter who has even "reason to know" that items or data might be used *directly or indirectly* in a *nuclear* program must also apply for a license. Such rules at least to some extent shift regulatory and intelligence-gathering burdens onto exporting companies.

However, the Department of Commerce (DOC) also offers guidance about what an export-

[12] Although this perception may exist, it does not appear to be born out by the facts. In 1992, for example, the DOC approved 1,483 licenses, representing potential exports valued at $319.5 million, for the export of items controlled for chemical or biological weapon proliferation reasons; it denied only 24 such licenses, valued at $7.4 million.

[13] Barbara Hatch Rosenberg, personal communication, Mar. 24, 1994. At present, the BWC has no verification provisions. Several nations have proposed that a regime of compliance monitoring be added to the Convention.

er can reasonably be expected to do to avoid customers who may be engaged in inappropriate end-uses. Before December 1993, the "know" rule seemed to apply to *any* items going to a proliferant end-user. In that month, however, the DOC issued a Guidance statement intended to ease exporter concerns that the rules might be arbitrarily enforced. [14] It should be pointed out that no company before or since that guidance was issued has actuall y been penalized for failing to apply for an IVL while knowing or having reason to know that the end-user was a suspected proliferant.[15]

It now remains to be seen whether corporate concerns about the "know" rule will be assuaged by the new guidance or not. In the past, companies have also argued that the "is informed" part of the rule was unfairly applied, with some companies being informed that certain buyers were unacceptable and others not being informed; those not informed were then left able to make sales from which their competitors were unfairly barred. Commerce officials have acknowledged this problem of uneven information and said they are addressing it.

An IVL entitles the exporter to ship a specified quantity of licensed items to a particular destination for a period of up to 2 years. For some items and destinations, a company may be able to avoid applying for an IVL by obtaining a "distribution license"

> . . . that authorizes exports of certain commodities under an international marketing program, generally to three or more consignees that have been approved in advance as foreign distributors or users. This procedure is a special privilege reserved for firms with a thorough knowledge of and cxpericncc with the Export Administration Rcgulations, and an internal control mechanism to assure strict compliance with the requirements of the license. [16]

Although this program may relieve the exporter of the need to apply for IVLS in many cases, it does require the license holder to monitor more closely the behavior of its buyers and of its own compliance with regulations. On the other hand, DOC officials report that some exporters say their competitive abilities have actually been strengthened by the additional information that internal control mechanisms provide to their decision makers. **For the purposes of this report, note that distribution licenses, with very few exceptions, do not apply to nonproliferation items; therefore, whatever the cost burdens-or benefit-of distribution licenses, they cannot be attributed to nonproliferation controls.**

A complete accounting of the direct costs to U.S. industry of compliance with export control regulations is not available, but some information is. A 1992 industry-sponsored survey of 42 large exporters found that 30 to 40 percent of their exports required IVLS, and that these companies averaged 24 employees and $1.3 million a year each on licensing and compliance. [17] One large U.S. exporting firm with $14 billion in annual sales and $4 to $5 billion in annual exports in the early 1990s reportedly maintained a 100-person export licensing department costing several tens of millions of dollars per year. [18]

Unfortunate] y, the study's sponsor, the National Association of Manufacturers (NAM), did not release any details about the study, such as which firms were surveyed and what fractions of their business costs were attributable to export control compliance. With 30 to 40 percent of their exports requiring licenses, it is clear that these firms were

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[14] 58 *Federal Register* 68029-68031 (Dec. 23, 1993).

[15] For further discussion of the "know" and "reason to know" rules, see below, chs. 5 and 6.

[16] Export Administration Regulations, 15 CFR § 773.3 (Jan. 1, 1993).

[17] National Association of Manufacturers survey as reported in *International Trade Reporter*, Aug. 26, 1992, p. 490 and cited by J. David Richardson, *Sizing Up U.S. Export Disincentives* (Washington: Institute for International Economics, 1993), p. 38, footnote 16.

[18] Richardson, ibid., p. 37; the firm was not named.

TABLE 4–1: Value of Exports Requiring Validated Licenses Is a Relatively Small Percentage of Total Exports, 1992

Type of exports	Total exported	Approved ($17.8 B)	Returned w/o action ($5.3 B)	Denied ($0.812 B)	All applications ($23.9 B)
All goods and services	$640.5 B	2.8%	0.8%	0,1 %	3 7%
Industrial supplies and capital goods	$282.1 B	6.3%	1.9%	0370	8 5%
Advanced technology	$107.1 B	16.6%	4.9%	0 8%	22 3%

NOTE Many license applications returned without action may have been refiled later and been counted again in the "Approved" column The "Industrial supplies and capital goods and the "Advanced technology" categories are separately derived and probably contain considerable overlap

SOURCE Department of Commerce and John Sullivan Wilson, "The U S 1982-93 Performance in Advanced Technology Trade", percentages by Office of Technology Assessment

not representative of U.S. exporters as whole, since a much smaller fraction of all exports is subject to licensing (see table 4-l). In addition, as with the few other studies in this field, there is no way to determine what portion of the license activity and its costs could be attributed to nonproliferation export controls as opposed to other kinds.

Finally, **even in the absence of export controls, companies may find it worthwhile to monitor the character of their buyers: most companies would prefer not to contribute to the violation of U.S. and international nonproliferation norms,** and they certainly do not want the bad press that can come from revelations that they have done so.

More difficult to measure are the indirect costs of lost business attributable to export controls. In at least some cases, the export license review and approval process seems to have taken so long that potential buyers have sought other suppliers in other countries who could deliver orders more promptly. In other cases, the Office of Export Licensing approves export only with conditions intended to assure that the items will be used for stated purposes at stated places. One such condition is the requirement for a reexport 1icense: the buyer must agree to apply to the U. S. government if he wishes to transfer the commodity to a third country. Another condition is sometimes that the end-user must agree to accept inspections by U.S. personnel to assure that the items are being used for the stated purpose.

Rather than accept these conditions, buyers may seek other suppliers in other countries that do not impose them. Again, in the case of nonproliferation controls, other members of the multilateral export control groups also require permission to reexport. Finally, when buyers either are deterred from ordering in the first place or cancel orders because of licensing delays, the would-be exporter may lose not only the initial deal, buy any follow-on orders that might have succeeded it. Although it is logical that export losses result from these factors, direct, or even indirect, statistical evidence is hard to come by.

Whatever the burdens of the export control system on industry, it is important to keep in mind, as noted at several points above, that only some export controls are imposed for nonproliferation reasons (see next section). **Several of the most prominent industry problems have not been with controls directly related to the means of producing weapons of mass destruction, but**

[19]For the results of one effort to detect U.S. export shortfalls to other COCOM members, see Richardson, ibid., pp. 102- I 03. The author concluded that his research findings did not support the hypothesis that trade with COCOM partners was adversely affected.

with controls imposed for other purposes. In these instances, the industry objections have been not just to the burdens of the licensing process, but to specific license denials. For example, high-speed telecommunications switching equipment is on the "national security" list of items requiring IVLS. Until the end of March 1994, the U.S. government blocked the sale of such equipment to China on unspecified national security grounds. Manufacturers argued that they were losing millions of dollars in sales of equipment that the Chinese would either buy elsewhere or end up making for themselves, thereby frustrating the U.S. export denial purpose anyway.[20]

The most ambitious attempt at estimating the losses attributable to export controls estimated that national security export controls on dual-use items to Communist countries cost between $4.5 and $20 bill ion in lost exports in 1989, while trade sanctions against several other countries cost between $2.4 and $3.1 billion.[21] The author of that study later estimated that for 1993, these controls may have cost $20 billion, and perhaps as much as $30 billion, in U.S. exports a year.[22] However, there are many uncertainties in such an analysis; moreover, projecting the findings of that study into the future seems questionable, given the end of the Cold War, the decline in Coordinating Committee for Multilateral Export Controls (COCOM), the relaxation of controls on computers and telecommunications equipment, and the collapse in buying power of the former Communist countries. This method also prov ides no direct way of disaggregating the effects of different *types* of export controls on the larger economic picture. For further illustration of the difficulties of estimating the economic impact of nonproliferation export controls, see appendix A.

Beyond the immediate effects on individual company profits, reduced (or constrained) exports can mean a worsened balance of international payments for the U.S. economy. In terms of dollar volume of exports, however, the potential impact of export controls appears to be relatively small—and declining. Table 4-1 shows that in 1992, the total value of U.S. exports for which applications for IVLS were received ($23.9 billion) amounted to about 3.7 percent of all 1992 exports of goods and services, about 8.5 percent of exports of industrial supplies and capital goods, and about 22.3 percent of those of one analyst's estimate of advanced technology exports. (Note that IVLS are generally valid for 2 years, so the value of the items in a license applied for in a given year does not necessarily y correspond to the value of the shipments the exporter intends to make during that year. On the other hand, other exports, approved in the prior year, may be shipped during that year.) The dollar value of license applications either denied or returned to the applicant without action[23] in 1992 represented only about 1 percent of total U.S. exports in that year, while the value of licenses actually denied amounted to about one-tenth of 1 percent.

Figure 4-1 shows that both the number of transactions for which an IVL was required, as well as the value of the items represented, has declined dramatically since 1989. This decline is due mainly to the relaxation of COCOM controls (see be-

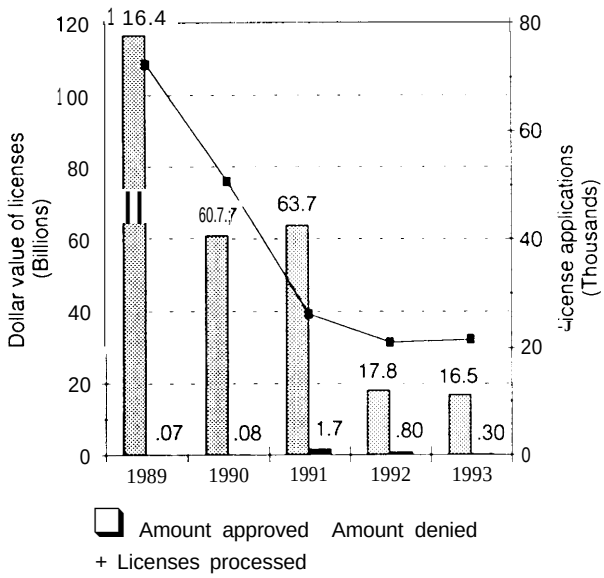
[20]Some also argue that denial of U.S.-made items may cause a country to develop indigenously the technology that they could not buy abroad, having some potential for creating or fuel ing foreign competitors for U.S. exporters of those items.

[21]Richardson op. cit., footnote 17, pp. 96-97. Amongst countries of proliferation concern on the latter list, Iran accounted for the largest export shortfalls, estimated between $1.3 and $1.8 bill ion.

[22]Richardson, "Economic Costs of US Export Controls." Statement before the Subcommittee on Economic Policy, Trade, and Environment, Committee on Foreign Affairs, U.S. House of Representatives, Nov. 18, 1993.

[23]Applications may be returned to the applicant without action because they are incorrectly or incompletely filled out, or because the DOC requires additional information to make a decision. As the DOC tal lies licensing act ivities, resubmitted applications, if approved or denied, are counted again under those categories. Therefore, one should not assume that a license returned without action represents an export that is never approved.

FIGURE 4-1: Value of Individual Licenses Declining



The bars in this graph indicate the values of Individual Validated Licenses approved or denied by the Department of Commerce m the years shown, whale the line markers (see right-hand scale) show the combined numbers of licenses approved or denied. Many license applications each year are '"Returned Without Act/on" (RWA) because they are improperly filled out or because more informatlon is needed Of the applications RWA, some may not be refiled while others may be, the latter are then considered to be new applications and may enter the counts of those approved or denied Note that license approvals are 2-year authorizations to export, and that exporters do not report to the Commerce Department whether the licenses are fully utilized or not. Therefore, the dollar amounts approved for export do not represent actual values of goods shipped in any given year.

SOURCE Department of Commerce, 1993, and Off Ice of Technology Assessment 1994

low), which is likely to continue, whatever COCOM-successor arrangements are negotiated. In the fall of 1993, the DOC announced easing of controls on computers, which would mean a further decline in licensing, since computers accounted for about $8 billion in individual licenses in 1993 (see app. B on computer export controls). At the end of March, 1994, as COCOM was abolished, the DOC announced further relaxation of controls on telecommunications and computing equipment. It estimated that the number of IVLS required annually would drop to half of the 1993 level.

By the nature of the commodities, technology, and software controlled, the burdens of export controls do fall more heavily on certain high-technology industries (see app. A). To the extent that the controls of these industries' exports lead to loss of business, they lead also to the loss of higher paying jobs and of tax revenues.[24] In addition, if some U.S. high-technology industries were to decline, the U.S. military might lose the benefits of their research and products. In explaining a Clinton administration relaxation of export controls on computers, then-Deputy Secretary of Defense William J. Perry said:

> We're an important customer [of the computer industry], but we're no longer a dominant customer. Basically, our strategy today in computers is to get on the shoulder of the computer industry and take advantage of the developments which are taking place .25

That is, the Defense Department's ability to embed advanced computer technology in its weapon systems depends increasingly on advances made first in the commercial sector. Thus Secretary Perry argued that the relaxation of control levels was justified in part because of the strategic benefit of reducing the burden on the industry and enhancing its exports.

[24] John Sullivan Wilson points out that

> Workers employed in *high-technology industries* receive higher levels of compensation than all other goods-producing businesses, and the premium paid these workers is growing . . it is clear that, to the extent the United States continues to pursue a trade policy that is focused on the opening of global markets and trade expansion, this will provide for greater employment opportunities in relatively better-paying, high-technology jobs.

See "The U.S. 1982-93 Performance in Advanced Technology Trade," *Challenge*, January-February 1994, p. 16. Wilson also points out that although available data indicate that the United States has been doing well in high-technology exports, trade and technology policy makers need better data sets than those now collected.

[25] William J. Perry, transcript of Breakfast with Reporters, Oct. 15, 1993 (venue not stated).

Options for Enhancing Export Controls

5

Policy options for enhancing the effectiveness of nonproliferation export controls include measures to improve:

- processes for making lists of controlled items and buyers,
- the administration of export license application evaluations and the enforcement of regulations,
- the enforcement of laws and regulations, and
- the degree of international cooperation on multilateral export controls.

IMPROVED EXPORT CONTROL LIST-MAKING

I Improve Information and Analysis

Formulating and reviewing the contents of export control lists involves identifying goods and technologies that could contribute to weapon programs as well as identifying programs and countries of concern.

Maintaining and strengthening intelligence collection and analysis capabilities are important to identify and track proliferation activities. The U.S. intelligence community has established an office for this purpose. To be most effective, however, intelligence analysts make full use of information available from other U.S. government agencies and from open sources. At the same time, a diverse array of officials and experts outside the intelligence community also plays a role in producing the export control lists of goods and target countries. The fullest possible cooperation among these players is essential for the government as a whole to develop the most effective policies. No **technical fixes can substitute for such cooperation,** but, if it exists, several options are available for bettering communication among policy-

Since there are very *few technologies useful to proliferant weapons programs that the United States produces uniquely, international/ cooperation among potential suppliers or transshippers is essential to effective export controls.*

makers and improving the base of information and analysis from which they arrive at their decisions.

One option is to create a common database through which all the involved analysts share the widest possible range of information available. The Department of Energy (DOE) is creating what might be a prototype for such a system in its "Proliferation Information Networked System" (PINS). PINS is intended first to assist DOE in carrying out its nuclear nonproliferation responsibilities within the government (both in policymaking and export license application reviews), but in principle the idea could be expanded beyond DOE and beyond a focus on nuclear nonproliferation alone. This classified computer network would permit full-text searches and retrievals of information and analyses about current and past export license actions, nuclear-weapon-related technologies, foreign countries and end users, national policies of both the United States and other governments, and international agreements and policies. This information should help analysts better identify countries of possible proliferation concern, the types of goods or technology that proliferant organizations may be trying to buy, and the international networks of supply that they may be using. Such analysis would be useful both in developing lists of countries and items to be controlled and in making decisions about whether to approve particular export license applications.

The DOE PINS is being designed to let users get access to multiple databases in multiple on-screen windows, comparing and synthesizing information quickly and easily. **Newer computers, with higher speed and more memory, allow consideration of new techniques for sifting and analyzing information.** For example, the Defense Department's Advanced Research Projects Agency has been sponsoring research on new ways of searching textual databases for all information relating to a particular subject, rather than requiring the user to discover the exact combination of keyword searches that will yield the results he or she wants.]

In another example, Australian economist John Galloway has developed a system called "NETMAP," which lets users integrate and correlate data from many sources into a single graphic environment. It creates visual, color-coded representations of connections and patterns among people, organizations, or transactions.[2] The developer has licensed this technology to various companies for many purposes, but it appears to be particularly well suited to proliferation analysis. For example, data from export license approvals and denials, financial transactions, customs discoveries and investigations, insurance underwritings, the trade press, and intelligence sources might be combined to reveal the kinds of clandestine procurement networks Iraq used to supply its nuclear weapon program. **For such analysis to be most effective, the analysts should have access to the full range of information about all types of proliferation. Several of the countries suspected of trying to acquire one type of weapon of mass destruction also appear to be trying to acquire the others: they may try to use the same procurement systems.**

The technology exists to build an interagency network that would expand beyond the DOE PINS and beyond the nuclear nonproliferation mission. Still, those attempting to do so would have to overcome at least three hurdles. First, the rates of data flow would be high, so the agencies using the system would have to be connected by secure, high-capacity links, probably fiber optic cables. For example, the bandwidth (i.e., the amount of information that can be sent in a given

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[1] For a press account of the ARPA research, see Michael W. Miller, "U.S. Spies Help Scientists pierce Data Jungle,"' *Wall Street Journal*, July 27, 1993, pp. B I and B8.

[2] Citing this system as an example should not be taken as an OTA endorsement. See Clive Davidson, "What Your Database Hides Away," *New Scientist*, Jan. 9, 1993, pp. 28-31. OTA was also briefed by a U.S. firm, ALTA Analytics, Inc., adapting NETMAP to various governmental and commercial tasks.

time) connecting the current experimental PINS sites is not great enough to allow the transmission of much image material from one site to another. The interconnections would not be technically challenging, but might be expensive.

A second hurdle is both bureaucratic and financial: all the involved agencies would have to buy and be prepared to maintain similar computer equipment and software. **Citing different needs and ways of operating, different agencies often resist such coordination. Multiple agencies are already developing their own, unique proliferation databases for internal use.**

Third, although an interagency network could handle classified information, there are good reasons to keep certain categories of data compartmented (available only to certain classes of users) as well as classified. The Atomic Energy Act requires DOE to protect Restricted Data having to do with nuclear weapons; within that category, some subcategories of information are dispensed only to those with a particular "need to know" and, for some types of information, whose terminals are located in specially secured areas. Therefore, great care will have to be taken in finding the level of detail about nuclear technology to put in the database that will be useful to all the participants but at the same time does not put nuclear weapon design information at undue risk.

The other category of specially protected information relevant to a nonproliferation network is intelligence. Ideally, the database would contain all the necessary intelligence *findings* about potential proliferant programs without revealing the sources and methods behind those findings. In practice, this can be difficult: the very fact that the government possesses some information can sometimes indicate where that information must have come from.

Computer networks can be designed to allow various levels of access to information, depending on the clearance level of the user or the terminal. This should not bean insurmountable problem for the PINS or some extended version of it. The larger problem is deciding what levels of information users need to do their jobs properly.

MORE EFFECTIVE LICENSING ADMINISTRATION

Building lists of controlled items, countries, and end-users is just the first step in the administration of an export control system. The next, equally important, step is the administration of the licensing process. Several measures arguably have potential for increasing the effectiveness of the licensing process.

Improved U.S. Government Computer Systems for License Evaluation

The Department of Commerce (DOC) now has a computer system, installed in 1985, that tracks export control license applications.[3] License applicants can submit applications directly by computer; alternatively, the Office of Export Licensing (OEL) will digitally scan paper applications into the system. From then on, the license application, with the supporting information supplied by the applicant, can be routed electronically through the OEL and to other agencies to which the application might be referred for review.

There are things that the current system *cannot* do that might both speed up and bring better information and judgment to bear on licensing decisions:

- allow reviewing analysts of any agency to which licenses are referred to extract, in real time (i.e., as the analyst sits at his desk considering an application) data about previous relevant decisions or other current applications dealing with the same types of commodities, sellers, buyers, or proposed end-users and end-uses;
- supply, on the same computer screen at the same time, technical background information,

[3]The system is called the "Export Control Automated Support System," or ECASS

current intelligence, or other information about parties to the proposed transaction; and
permit access to all potentially relevant information among all participants (in whatever agency) in the license review process.

The computer technologies described above in the section on improving the list-building process could be even more usefully applied to bring these features to the licensing process. Indeed, as the DOE envisages for its PIN system, the same computer network could serve both activities at once. The hurdles to installing such a system that are also described above would still apply.

Increase Public Accountability of Licensing Decisions

Today, DOC issues an annual list of licenses granted for commodities to restricted nations, with summary data about the number of licenses granted for each type of commodity and the dollar value for each type going to each nation. Recent legislation proposed in the Congress would require that within 6 months after issuance of a license to export any *nuclear* dual-use item, the Secretary of Commerce would publish the commodity description, the country destination. the end-use and end-user, the quantity, the date of approval, and the date and method of shipment.[4] Speaking in support of this legislation, Senator Glenn said:

> The present system of nondisclosure has led, especially in the case of goods sent to Iraq, to a crisis in public confidence that America has its own export control house in order. The best way to restore that confidence and to ensure more effective oversight and accountability is to permit greater public scrutiny of the nonproprietary licensing data.[5]

Some analysts have advocated that exporting companies should be identified as well:

> Congress should now require the Commerce Department to publish quarterly summaries of all dual-use licensing actions . . . The list would only cover licensing actions that have been completed. Pending sales would not be reported.[b]

Advocates of transparency in licensing decisions have been interested primarily in public accountability:

> Pushing export licensing into the light of day would encourage the exporters to be honest, encourage the government to be careful, and allow the public to find out whether U.S. exports are undermining national security.[7]

There are other possible benefits from making the information openly available. First, it would enhance unclassified analyses by non-governmental investigators of export-import patterns that might identify previously undetected weapon programs or supply networks (see below, in the section on improving multilateral export controls, for the benefits of strengthening unclassified analytic efforts). Second, it might set a precedent for helping to persuade other nations to release comparable information, thus easing the task of both governments and nongovernmental groups in identifying possible avenues of proliferation. Third, one critic of the current system has argued that revealing all licensing decisions (including denials and returns without action) would increase the fairness of the system by letting all sellers know what types of exports had previously been approved. This information, he says, would allow any firm both to predict better whether its own license application is likely to be approved and to give it a basis for appeal of what it believes to be an unfair decision. If, as this author argues, licensing

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[4]The "Nuclear Export Reorganization Act of 1993," bill S. 1055 introduced May 27, 1993, Sec. 3 10; the corresponding House bill was H.R. *2359.*

[5]John Glenn, *Congressional Record* (May 27, 1993), Daily ed., S6773.

[6]Gary Milhollin "Licensing Mass Destruction: U.S. Exports to Iraq, 1985- 1990, " manuscript, Wisconsin Project on Nuclear Arms Control, June 1991, p. 14.

'Ibid.

decisions are to be subjected to judicial, as well as administrative, appeals, such information becomes all the more necessary.[8] Commerce Department officials, however, say that each license application is judged on its own merits under the particular circumstances; therefore, the experience of previous applicants would not tell the exporter much about how his own application would fare, either in administrative or judicial review.

There are some objections to this level of transparency in the licensing process. First, companies submitting license applications worry about the revelation of proprietary data that would compromise competitive advantages. Although some advocates of releasing licensing information argue that companies have no reason to conceal legitimate sales, the question is somewhat more complex.[9] For some goods or technologies, the fact that certain companies have found (entirely legitimate) buyers for particular products could tip off competitors to explore markets previously only known to the company applying for the license. In such cases, the biggest losers could be the most successful firms: information about their customer bases would be revealed to competitors who had not yet penetrated the market as well.

In addition, license applicants sometimes supply a considerable amount of detailed data about their products to support their applications; exposure of that data and of pricing information could give advantages to their competitors for legitimate sales. On the other hand, it should be possible to exclude these more detailed proprietary data from the public domain. Finally, since license approvals are good for 2 years, an approved license may not correspond to a completed sales agreement; therefore, means would have to be found for protecting exporters from competitors' exploitation of information about uncompleted sales. One option would be to require exporters not only to apply for licenses, but to report to the government when and to what extent the shipments licensed actually took place. This would have the additional benefit of providing more complete information about international trade patterns in sensitive technology.

Publishing licensing data would permit more external oversight of governmental decisions. It would also expose those decisions to the possibility of politicized second guessing. Outside observers will question both individual decisions and the overall pattern of decisions—that is the point of public accountability. Those criticisms may often be justified; at other times, they will not. In either case, they will not be made with the full range of classified and proprietary information available to the decision makers. Depending on the prevailing political atmosphere, the anticipation of external criticisms (including those from Capitol Hill) could lead licensing officers either to be hesitant to approve exports (thus restraining legitimate business) or reluctant to deny them (thus increasing proliferation risks).

Strengthen Interagency Review Processes

Procedures for referring export license applications to other agencies outside the DOC are meant to assure that those agencies can bring to bear:

- a broader range of substantive and technical knowledge and judgment than is available in any single agency, and

[8] Howard N. Fenton, "Reforming the Procedures of the Export Administration Act. A Call for Openness and Administrative Due Process," *Texas International Law Journal*, vol. 27, winter 1992, p. 61.

[9] See, e.g., Kenneth R. Timmerman, "Time for a Non-Proliferation Agenda." *Eye on Supply*, winter 1993, p. 78. Similarly, Milhollin argues:

> If a company is ashamed of having sold one of its products to a developing country, the company should not have made the sale in the first place. Reputable companies do not object to telling the truth about their business. If the sales are legitimate, and satisfy the export criteria, there is no reason to keep them hidden.

op. cit., footnote 6, p. 14.

- the other agencies jurisdictional perspectives on U.S. national security and foreign policy interests.

It is also possible that additional analysis by more than one agency could catch problems that only a single-pass review might miss. **Some critics of the current administrative arrangements for reviewing applications have proposed changes intended to increase assurances that the referral process will block inappropriate license approvals.**

For example, one proposal is that all proliferation-relevant applications be automatically referred to the Defense Department, which would manage further referrals and make the final 1icens - ing decision.[10] The basis for this proposal is the author's judgment that in the 1980s the Commerce Department issued numerous export licenses for Iraq without referring them to the proper external agencies. In this author's view, the reason for these failures is the "conflict between the Commerce Department's duty to promote exports and its duty to regulate them."[11] It should also be recalled, however, that during the 1980s, high-level U.S. policy was tilting toward Iraq in its war against Iran, and it may have been Administration political judgments—rather than Commerce Department zeal for export promotion—that led to questionable license approvals. Commerce officials say that during this period, the Department referred applications to the Defense Department according to mutually agreed-upon procedures.

Another proposal has been to give the Arms Control and Disarmament Agency (ACDA) a stronger role in the export licensing process. Senate Foreign Relations Committee legislation proposing this step in 1993 was put on hold at the Administration's request until the Administration could prepare its proposed revision of the Export Administration Act (EAA). In exchange for the delay, Administration officials offered the Committee assurances that in the meanwhile the ACDA role in dual-use export control review and decision making would be strengthened.[12]

However, **attempting to produce policy shifts by legislating structural changes may not always produce the desired effects.** For example, although in the past the Defense Department favored the strictest of export controls, officials at the highest levels of DOD strongly supported the Clinton Administration's raising of control thresholds for computers in the fall of 1993.

Another proposal for increasing participation of other agencies is to require the DOC to send information copies to one or more other agencies of the licenses it intends to approve but does not intend to refer formally to those agencies. Such a procedure might have two benefits. First, it would give the other agencies additional information to use in their own analysis of international trade patterns relevant to proliferation. Second, depending on how long before actual license approval the information came in, it would give the other agencies the opportunity to make the case with DOC that they should have the opportunity to review certain applications. Even though DOC may be making a good-faith judgment that its referral policies were consistent with interagency understandings, differences of interpretation might arise in particular instances.

Short of removing export licensing management from the DOC, the interagency review process for certain types of referral could be further formalized, with greater authority given to interagency groups. Under current procedures, DOC refers Nuclear Referral List items (as well as transactions involving known nuclear end-users) to DOE, and to other agencies, according to rules agreed on between DOC and those agencies.

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[10] Milhollin, op. cit., pp. 12-13.

[11] Ibid.

[12] U.S. Congress, Senate, Committee on Foreign Relations, *The Arms Control and Nonproliferation Act of 1993*, Report 103-172, Nov. 5, I 993.

If either DOC or DOE believes either that the application should be denied, or that it should undergo further review, then it is referred to the interagency Subgroup on Nuclear Export Coordination (SNEC, representing the Departments of Defense, Commerce, State, and Energy, as well as the Arms Control and Disarmament Agency and the Nuclear Regulatory Commission). In calendar year 1993. 740 applications were so referred. The SNEC either provides its unanimous information and advice to DOC or sends the application for higher level review. The proposed Nuclear Export Reorganization Act of 1993 would have legislatively established the SNEC within the National Security Council, required it to review applications to export any item on the Nuclear Referral List, and give it deciding (rather than just advisory) authority over licenses.[13] The group would also have been responsible for maintaining the Nuclear Referral List itself. The purpose of such a role for the SNEC would be to assure that the full panoply of information and expertise available in the government would be brought to bear on every Iicensing decision.

Formalizing the interagency review process in this way would probably impose the costs of creating a new bureaucratic unit, complete with staff and administrative support. It would also require a new computer system able to manage records of discussions and decisions for both Iicensing processing and export control targeting purposes. On the other hand. such a computer system would probably be useful whether a new bureaucratic unit were created or not. If the new unit were created, the agency personnel already performing the licensing review and 1ist-construction functions could be assigned to the SNEC full-time rather than part-time, so the net additional cost might not be high. Another benefit of having a formalized, routine, and well-staffed interagency review process could be to shorten the time that licensing decisions now take. That might help answer one of the major industry complaints about the current process (see below, ch. 6, p. 64).

I Increase Export Control Awareness Among Exporters

Through the Federal Register and through publications of its own, the DOC informs exporters of export control regulations and of countries and end-users of particular concern. One proposal is that the SNEC publish a regular bulletin that would expand on such efforts to include information on

> . . . regulations, international agreements, and other relevant developments [to inform] exporters and the general public about the risks of proliferation and efforts to reduce or eliminate such risks. [14]

Such a publication could also cover other types of proliferation besides nuclear. Extensive publication of government information on suspect programs would be one way of enabling exporters to cooperate with nonproliferation efforts. According to the U.S. Customs Service, industry is its best source of information about illegal acquisition attempts. **Thus, it is important not only that companies comply with export regulations themselves, but that they report approaches from buyers who may be trying to evade the regulations.** (The Commerce Department and the Customs Service already have publicity programs aimed at informing exporters of possible indications of illegal exports.)

To encourage cooperation by U.S. companies, the United States could permit firms to petition for investigation of, and possibly sanctions on, foreign companies that they suspect are undercutting internationally agreed export controls. [15] This

[13] S. 1055, op. cit., footnote 4, Section 102(b).

[14] Ibid.

[15] Also a feature of the proposed Nuclear Export Reorganization Act, loc. cit. footnote 4.

process might both help assure U.S. firms that they would not have to face unfair competition and help provide the government with more information on possible avenues of proliferation.

IMPROVED ENFORCEMENT

I Increase Enforcement Resources

The DOC Bureau of Export Administration, cooperating with U.S. diplomatic posts abroad, the U.S. Customs Service, and foreign governments, sometimes conducts pre-license checks and post-shipment verifications on the end-users named in export license applications. The resources now avail able for conducting these checks are extremely limited. Nor, according to a 1993 report by the DOC Inspector General, have they always been administered systematically, efficiently, or according to established guidelines. In particular, random checks lacked a strategic plan, with stated purposes and priorities. In fiscal year 1992, commercial officers at foreign posts conducted 568 pre-license checks and 177 post-shipment verifications, of these, 65 to 75 percent were random checks, while the remainder resulted from derogatory information.[16]

Checks and verifications could, first, be systematized. More effective sharing of data and analysis (as might occur with other options discussed in this report) could help the DOC and other agencies plan a more coherent checking strategy. Second, checks could be increased annually on a stepped basis, with each increment of checking activity weighed against the number of undesirable buyers that it revealed. If the checks were effective, one would expect to see an initial jump in such discoveries, followed in a few years by a decline as the threat of discovery deterred more objectionable buyers. The trick would be to find the point of declining marginal returns-the increment of expense in checking that did not produce a commensurate increment of deterrence.

Both checks and verifications are best seen as means of gathering evidence about the credibility of buyers before a new or additional license is granted (or before additional shipments are made under an existing license). Checks may help weed out obvious front-company buyers and firms or agencies that have clearly misrepresented their functions. However, unless an item has actually been removed from its intended site, post-shipment checks may not easily detect whether items are being used for their stated purposes. If someone is misusing a controlled item at the declared site for its legitimate employment, that user is probably capable of concealing the fact from the U.S. Foreign Commercial Service officers who usually do the checking. If the item has been diverted elsewhere, little information (except that the buyer is untrustworthy) has been obtained; retrieving the transferred item is unlikely to be an option.

In addition to pre-license and end-user checks, Commerce Export Administration and Customs enforcement officials conduct investigations, gather evidence, and make arrests. Resources for these more traditional law-enforcement activities could be increased.

I Reinforce the "Know" Rule

Current regulations require companies to obtain Individual Validated Licenses (IVLS) for exports of any items, listed in the Commerce Control List or not, that they know (or are informed) are destined to be "directly employed in" the design, development, acquisition, or use of missiles or chemical or biological weapons in a country listed in one of the supplements to the Export Administration Regulations (EAR). The Department also offers guidance about what an exporter can reasonably be expected to do to avoid customers who may be engaged in inappropriate end-uses. An exporter who has even "reason to know" that

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[16] Offices of Inspector General at the U.S. Departments of Commerce, Defense, Energy, and State, "The Federal Government's Export Licensing Processes for Munitions and Dual-Use Commodities: Special Interagency Review," September 1993, pp. A 13-A 17.

[17] 58 *Federal Register*, 68029-68031, Dec. 23, 1993.

items or data might be used in a *nuclear* program must also apply for a license. [18]

Exporting industries have argued strongly against maintaining this rule; its pros and cons are discussed further in chapter 6, on options for reducing industry burdens. Should it be retained, however, the kind of bulletin described in the section above could help assure that exporters have sufficient reason to know about risky exports to be held accountable. The Commerce Department already encourages companies to request advisory opinions from the government as to whether a contemplated export would subject them to legal sanctions.

Expand Computer Network Resources

The same sort of computer network, discussed above, that could enhance list-making and licensing could also assist enforcement personnel in identifying suspicious transactions. Enforcement officials at Commerce Bureau of Export Administration (BXA) have been studying various sources of data beyond those available from intelligence and law enforcement agencies to see if they might help reveal suspicious export patterns. For example, U.S. Census data on all the types and quantities of items going to a particular country might reveal patterns of imports suggesting diversion to a proliferant weapon program. Thus far, however, Commerce has not had the resources to put this sort of analysis into the context of a larger, more encompassing database of the type described above.

I Extend Sanctions

U.S. laws provide for penalties against U.S. persons (individuals or firms) who violate U.S. export regulations. In recent years, Congress has attempted to bring sanctions to bear on others who aid proliferation as well. In 1991, Congress extended sanctions *to foreign* persons whose exports materially contribute to either chemical or biological weapon programs. The sanctions are bans on U.S. government procurement from those persons and on any United States imports from them. A 1990 law also imposes various sanctions on foreign persons who violate the Missile Technology Control Regime (MTCR), including a ban on U.S. imports from those whose exports have substantially contributed to a non-MTCR adherent missile program. Similar sanctions could be instituted for those engaging in illicit nuclear exports.

The Administration draft EAA attempts to consolidate the sanctions provisions of the current laws on chemical and biological weapons proliferation and use and on missile technology control. The sanctions section of this draft bill is summarized in table 5-1.

The subject of sanctions in export controls is a confusing one because of the circular relationship between the two: **sometimes sanctions are tools to enforce export controls, and sometimes export controls themselves *are* the sanctions.** Moreover, export controls adopted for one purpose are applied as sanctions for another purpose. It is important, therefore, to make judgments about controls and sanctions in the context of their purposes. In particular, from the standpoint of nonproliferation policy, the utility of export controls intended primarily to deny access to items that directly contribute to proliferation should not be judged on the basis of their effectiveness or cost in efforts to punish some nations for their support of international terrorism.

When economic sanctions are applied for any purpose, they usually pose dilemmas for policy makers. First, they impose costs on the United States as well as on the target of the sanctions: export bans cost sales to U.S. firms; import bans keep out things that U.S. consumers may want or

[18]For further discussion of the "know" and "reason to know" rules, see ch. 6.

[19]As the Nuclear Export Reorganization bill, op. cit., footnote 4, proposes to do.

TABLE 5-1: Sanctions in the Administration Draft EAA of 1994

Action	Chemical, Biological Weapon (CBW) or Missile Proliferation	Chemical, Biological Weapon Use
Presidential determination	Any foreign person has knowingly, or with reason to know, contributed materially to the efforts of any government, group, entity, or project to use, design, develop, produce, stockpile, or otherwise acquire chemical or biological weapons (or missiles) ▪ through the export or transfer of any chemicals, biological agents or equipment which may contribute to a chemical or biological weapons program such as those listed by the Australia Group (or items listed in the Missile Technology Control Regime annex) whether or not of U.S.-origin, or ▪ by participating in any financial transaction related to the described activity or • by facilitating the described activity	1) The government of a foreign country has used chemical or biological weapons in violation of international law or used lethal chemical or biological weapons against its own nationals, 2) Within 3 months of the above determination, violation government has not ▪ ceased use, ▪ provided reliable assurances of non-use in the future, and ▪ agreed to on-site inspections to verify non-use
Mandatory sanctions	Denial of exports of items controlled by the Australia group (or the MTCR annex) Imports of such items from such entities prohibited	All of the sanctions listed below as Mandatory for CBW use
Discretionary sanctions	In event of CBW proliferation, President may choose any of the 11 actions listed as mandatory or discretionary for use of CBW (see rows below), such sanctions shall be proportionate to the harm the sanctioned behavior has caused to the national security or nonproliferation interests of the United States	If President makes second determination above, he must impose at least 3 of the following 6 listed below as Discretionary for CBW use
Mandatory sanctions for CBW use	1) No U S Government procurement for a minimum of 2 years of any kind from or produced by CB-using country 2) Termination of U S foreign assistance (except urgent humanitarian aid and agricultural products) 3) Termination of U.S. arms sales 4) Denial of U.S. Government credit or other financial aid 5) Denial of national-security sensitive EAA-controlled exports	
Discretionary sanctions for CBW use	1) Oppose loans or other aid by international financial institutions 2) Prohibit any U S bank from making loans or credit except for agricultural products 3) Prohibit U.S. exports to the country of all items except agricultural products 4) Restrict Importation of articles that are the growth, product, or manufacture of the country 5) Downgrade or suspend diplomatic relations with the country 6) Suspend country's air carriers from engaging in foreign air transportation to or from the U S.	

TABLE 5–1: Sanctions in the Administration Draft EAA of 1994 (cont'd.)

Deferrals	1 President may delay determinations (above) or sanctions to protect ongoing criminal investigations or sensitive Intelligence sources being used to gather further Information on proliferation 2 President may delay sanctions for up to 180 days if the U S IS engaged in diplomatic efforts to curtail the sanctioned conduct or obtain sanctions against the person from the government of jurisdiction over that person If these efforts succeed, U.S. sanctions not required
Exceptions	Sanctions not required in cases of ▪ export or transfer authorized by, or exports to, a country adhering to the Australia Group or a signatory to the Chemical Weapons Convention ▪ defense procurement under existing contracts, if the defense articles or services are not readily available elsewhere, or they are essential to national security under defense co-production agreements ▪ other Imports under existing contracts, spare parts component parts, information, or technology essential to U S products or production, routine servicing of products not otherwise readily available, medical or other humanitarian items ▪ any transactions subject to the reporting requirements of the National Security Act of 1947 ▪ performance of prior contracts when barring it not necessary to achieve U S national security or nonproliferation objects and would be contrary to the national interest
Waivers of application of sanctions	President may waive sanctions if he or she determines that a waiver is Important to the national interests of the U S and notifies Congress not less than 20 days before waiver takes effect

SOURCE Department of Commerce and Off Ice of Technology Assessment, 1994

that U.S. producers may need.[20] Second, they risk achieving so much distance between the U.S. and the target state that the latter decides to simply defy the sanctions and resist all further U.S. influence. Third, if the United States is too far ahead of the rest of the international community in imposing sanctions, its efforts are likely to be undercut by other nations.

The Administration draft EAA attempts to take account of these dilemmas by granting the president nearly total discretion in imposing sanctions; essentially, the draft authorizes a wide range of sanctions, extending up to complete embargo, then adds sufficient deferrals, exceptions, and waivers to allow him to do nothing if he so decides. Broadly speaking, one of two other legislative policies could be adopted:

- first, 1imit the president ability to defer or waive one or more sanctions (i.e. mandate them or narrow the exceptions); or
- second, limit the president's authority to impose sanctions, either in kinds or in duration.

Each of these three legislative approaches—flexibility, mandate, or restriction-has its drawbacks. Granting great flexibility risks that a president will do nothing when the Congress might wish that he would do something, or vice-versa. Unconditionally mandating sanctions risks forcing the president to take actions in unforeseen circumstances that may be costly but either ineffective or actually detrimental to nonproliferation goals. Restricting sanctions risks making them

[20]Not (rely do sanctions impose costs on the side imposing the sanctions, but the> fall unevenly on its citizens. Firms that depend on the export of controlled items have more to lose than those that do not; firms that depend on imports from the targeted party have more to lose than those who import from elsewhere. Even in a total embargo of the target party, particularly if it is an entire nation, some U.S. exporters and importers would lose more than others, depending on the prior patterns of trade betw een the two countries.

unavailable in circumstances where they might be effective.

A compromise option would be to permit the flexibility requested in the Administration draft EAA, but to accompany it with more explicit provisions for accountability to Congress about the costs and effectiveness of sanctions imposed. The Administration bill already would require assessments of economic costs and qualitative estimates of effectiveness for export controls; presumably, these required reports to Congress would have to be made when export controls were used as sanctions as well as when they were used for their primary purposes of denial. The same kinds of assessments could also be required for the other types of sanctions listed in table 5-1. Such reports (if their quality were maintained by the demands of watchful congressional oversight committees) would permit the legislative branch to make independent judgments on whether executive branch decisions on the costs and benefits of sanctions were serving the national interest.

STRENGTHENING MULTILATERAL CONTROLS

Since there are very few technologies useful to proliferant weapons programs that the United States produces uniquely, international cooperation among potential suppliers or transshippers is essential to effective export controls. The United States has played a key role in the establishment and operation of the existing multilateral supplier groups: the Nuclear Suppliers Groups (NSG), the Australia Group, the MTCR, the Coordinating Committee on Multilateral Export (COCOM), and the COCOM successor. Recent successes include leading the NSG in 1992 to agree to adopt multilateral controls on certain dual-use technologies (see box 5-1 for description of NSG guidelines) and getting Russia in 1993 to promise full compliance with the terms of the MTCR.[21] Additional steps to strengthen multilateral controls are possible.

Keep Conventional and Mass-Destruction Weapons on Separate Tracks

The oldest, most highly coordinated, but also the most contentious, of the supplier-group regimes for dual-use items was COCOM. COCOM dual-use controls (the "Industrial List") were intended primarily to keep advanced conventional military technologies out of the hands of potential adversaries of the United States and its allies.[22] Differing interpretations of COCOM requirements led to some disputes between the United States and its European allies. The administration of national security (i.e., COCOM) controls also led to the greatest complaints of unfairness from U.S. industry.[23]

With the end of the Cold War, the membership, targets, and listed technologies for any successor arrangement to COCOM (former] y a Western arrangement for denying technology to Communist nations, terminated at the end of March 1994) ***are*** undergoing significant changes that must be multilaterally negotiated. With technologies applicable to weapons of mass destruction already addressed in other multilateral export control regimes, the COCOM successor regime, if created, will most likely attempt to regulate the transfer of technologies for developing or making conventional weapons. Consensus will be difficult to reach, both within the United States and

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[21] When it adopted new guidelines on dual-use technology transfers, the NSG also adopted a rule, long advocated by the United States, that the transfer of certain nuclear-related "trigger list" technologies would be conditioned on acceptance by the recipient of IAEA safeguards on any other facilities in the country of the same type to which the technology was being transferred.

[22] COCOM also had a list of nuclear-related technologies, but apparently these had little consequence for U.S. export administration because the other nuclear-supplier agreements are more comprehensive. In addition, there was a COCOM list of mil itary equipment, controlled in the United States under the Arms Export Control Act.

[23] See, for example, Thomas T. Connelly, "Statement on Behalf of AMT—The Association for Manufacturing Technology-bef(we the Subcommittee on Economic Policy, Trade, and Environment of the House Committee on Foreign Affairs," Nov. 18, 1993, pp. 6-7.

BOX 5–1: Nuclear Suppliers' Group Guidelines on Dual–Use Technology Licensing Procedures

Supplier should establish export licensing procedures for the transfer of equipment, material, and related technology identified in the Annex These procedures should include enforcement measures for violations. In considering whether to authorize such transfers, suppliers should exercise prudence in order to carry out the Basic Principle and should take relevant factors into account, including

a whether the recipient state is a party to the Nuclear Non- Proliferation Treaty (NPT) or to the Treaty for the Prohiblion of Nuclear Weapons in Latin America (Treaty of Tlatelolco), or to a similar International legally-binding nuclear nonproliferation agreement, and has an IAEA safeguards agreement in force applicable to all its peaceful nuclear activties,

b whether any recipient state that is not party to [the treaties named above] has any [nuclear fuel-cycle facili - ties] that are operational or being designed or constructed that are not, or will not be subject to IAEA safe-guards,

c whether the [item] to be transferred is appropriate for the stated end-use and whether that stated end-use is appropriate for the end-user,

d whether the [item] to be transferred is to be used in research on, or development, design, manufacture, construction operation or maintenance of any reprocessing or enrichment facility;

e whether government actions, statements, and policies of the recipient state are supportive of nuclear non-proliferation and whether the recipient state is in compliance with its international obligations in the field of nonproliferation

f whether the recipients have been engaged in clandestine or Illegal procurement activities and

9. whether a transfer has not been authorized to the end-user or whether the end-user has diverted for purposes inconsistent with the Guidelines any transfer previously authorized

SOURCE International Atomic Energy Agency INFCIRC/254Rev .1 Part 2 July 1992

among the international participants, about what technologies should be controlled and for what reasons .24 **Therefore, the nonproliferation regimes dealing with weapons of mass destruction (and missiles), for which considerable consensus has already been painstakingly built, should not be mixed into controversies over COCOM revisions of technologies controlled for other purposes.** Administration officials have spoken of moving the emphasis in a successor arrangement from maintaining the West military technology edge over Communist countries to limiting the proliferation of technologies enabling production of advanced conventional weapons to some states not now possessing them. See table 5-2 for a comparison of the COCOM and weapons of mass destruction regimes.

A National Academy of Sciences study on export controls proposed either an additional nonproliferation category and regime for conventional weapons technology, or incorporation of conventional technologies into one of the existing regimes. [25] The above argument favors a separate negotiating forum for conventional weapon technologies. Insofar as those overlap with nu-

[24] For example, some nat ions resist cooperation with nonproliferation export control regimes on the grounds that the United States is seeking such controls primarily to protect itself from economic competition; although this is not true, the argument for it is easier to make in the case of export controls intended to block the transfer of technologies that might be usable for a broad range of conventional m i l itary applications, not just weapons of mass destruction.

[25] Panel on the Future Design and Implementation of U.S. National Security Export Controls, Find/n.q *Common Ground: U. S. Export Controls in a Changed Global Environment* (Washington, DC: National Academy Press. 199 I), p. 131.

TABLE 5–2: COCOM and WMD Regimes Compared

Regime	COCOM	NSG, AG, MTCR	COCOM successor?
Purpose	Maintain Western military-technological advantage over target states	Prevent or slow the spread to target programs of capabilities to develop or produce nuclear, chemical, or biological weapons, or missiles	Prevent or slow the spread to target programs of capabilities to develop or produce advanced conventional weapons
Targets	States under the control of Communist regimes, buyers who might divert items to such states	Activities and facilities to develop, produce, or otherwise acquire weapons of mass destruction or missiles, buyers who might divert items to such activities	Rogue nations falling short of some standards of international behavior
Scope of controls	Wide range of dual-use commodities, technology, and software, including those relevant to modern industrial development as well as those specifically applicable to developing or producing advanced conventional weapons in addition to weapons of mass destruction	Narrower range of dual-use items applicable to developing or producing banned weapons	Similar to COCOM items
Rationale for international consensus	Deterrence of Communist aggression by maintain technological superiority of allied over Communist military forces	Prevention of threats to international peace and security from possession of weapons of mass destruction by those not already having them	Containment of threats to regional or global security posed by "rogue" or "backlash" nations
Principle of operation	Consensus all members must agree to sale of controlled items	National discretion guidance and control lists mutually negotiated, but licensing decisions remain at national level	Probably national discretion

SOURCE Office of Technology Assessment, 1994

clear or missile technologies, they should be covered under the latter regimes anyway.

Enhancing Nuclear Suppliers' Group Coordination

In March 1992, the NSG agreed to adopt common export controls on a list of nuclear-related dual-use materials, equipment, and technologies. They agreed to the "Basic Principle" that suppliers should not authorize transfers of the listed items:

- for use in a non-nuclear-weapon state in a nuclear explosive activity or an unsafeguarded nuclear fuel cycle activity, or
- in general, when there is an unacceptable risk of diversion to such an activity, or when the transfers are contrary to the objective of averting the proliferation of nuclear weapons .26

[26]International Atomic Energy Agency, INFCIRC/254/Rev.1/Part 1, July 1992, "Communications Received From Certain Member States Regarding Guidelines for the Export of Nuclear Material, Equipment and Technology:Nuclear-Related Dual-Use Transfers," Annex Attachment, p. 2.

The NSG agreed that decisions to approve exports of the items on this list would take into account several relevant factors in deciding whether transfers were acceptable (see box 5-1). One of those factors was to be whether a transfer has been refused by someone else (i.e., a ""no-undercut" guideline).

One observer has expressed concern about the actual results of this agreement:

> The NSG members have agreed to exchange information on non-NSG states' nuclear programs and dual-technology purchasing activitics, and to meet for consultations at least once a year. So long as these arrangements remain loosely specified and relatively uncoordinated, they may not substantially improve the overall quality of the intelligence available to NSG mcmbcrs.[27]

This author proposes that the United States

> ... should systematically communicate information and share intelligence assessments with other NSG members in order to ensure that multilateral restrictions on sensitive dual-technologies arc effectively implemented and lists of restricted technologies are properly kept up to date.[28]

Modern telecommunications and computing technology make it possible to convey much of this information almost instantaneously. The Department of Energy Office of Arms Control is sponsoring a project on International Export Information Sharing, centering on computerization of information sharing for the NSG agreement on controlling exports of dual-use technologies. The types of information to be included in this database are:

- export 1icense denials;
- reference data useful to Nuclear Suppliers Group members:
- documents and information related to NSG guide l ines on specifically nuclear-related equipment, materials. and technologies: and
- documents and information related to NSG guidelines on nuclear-related dual-use equipment, materials, and technologies.

The database would reside on an international computer network, with each member state having an inexpensive terminal linking it to the system. Besides giving the members access to a common database, the system would also allow them to exchange electronic mail on NSG export control matters. Thus far, 20 NSG members have agreed to install test terminals for this system, and 8 have been emplaced.

Such a network would offer a variety of opportunities for increased coordination among the Nuclear Suppliers. In agreeing to multilateral controls on dual-use technologies, the NSG members also agreed to inform one another when they deny export license applications for the listed items. Timely dissemination of this information would allow each supplier to consider its own export decisions in the light of those made by any of the others. Once refused an export license in one country, a potential buyer would not have a chance to find another supplier in another country even if that country did not have independent reason for suspicion about him. **License denial information, as well as some of the other kinds of information described below, could be especially useful to governments without the extensive export control infrastructure and intelligence resources of some of the larger members of the NSG.**

The reference data, documents, and other information in the database would include:

- official documents. key officials and contact persons, and various types of supporting information including International Atomic Energy Agency (IAEA) information circulars and data on related international agreements;

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[27]Owen Greene, "US Export Control Policy and Stren, bei the Nonproliferation Regime," *Eye on Supply*, winter 1993, p. 80.

[28]Ibid.

- copies of other nuclear-proliferation-relevant agreements (e.g., the Nuclear Non-Proliferation Treaty [NPT]) and membership lists;
- guides to the nuclear fuel cycle, to help ascertain the significance of specific equipment or technologies; and
- the latest information on the control of "Trigger List" items—those directly nuclear-related items whose export requires that the buyer submit his facilities that either use, or could use, the items to IAEA safeguards.

Not only would the database provide immediate posting of all denials of 1icenses for transfers of dual-use materials, equipment, and technology, but it would also constitute a cumulative record of the items, suppliers, and proposed buyers in the denied transactions. Such an organized record could help the member governments better identify and act on particular proliferation risks.

In addition to license denial information, the database would include other information on potentially risky end-users, such as those with unsafeguarded nuclear activities, or those on various members' lists of suspected proliferants. **It could also serve as a funnel for some of the contributions of national intelligence services to the multilateral group.** On some occasions, it may be possible to enter information into such a relatively open forum by developing unclassified sources to cite for facts first detected by classified means. (See section below on the utility of supporting open-source proliferation analyses.) A possible drawback to permitting such contributions to a database would be the risk that inaccurate information (intentionally or unintentionally placed) would accumulate and be difficult to remove.

The NSG sharing scheme in principle could be expanded by including export license approvals as well as denials. With this wider range of data about exports with nuclear-weapon program potential, all members would have a better chance of discerning trade patterns that might help identify suspicious end-users or possible diversion paths. For the reasons cited above with respect to the option of the U.S. Commerce Department publicly reporting license approvals, other members of the NSG may resist revelation of theirs.[29] Should the United States decide to seek such reporting, it may need to test that resistance through the leadership both of exhortation and of its own example. Even the expenditure of considerable diplomatic capital with other regime members may not be enough to bring about this degree of cooperation.

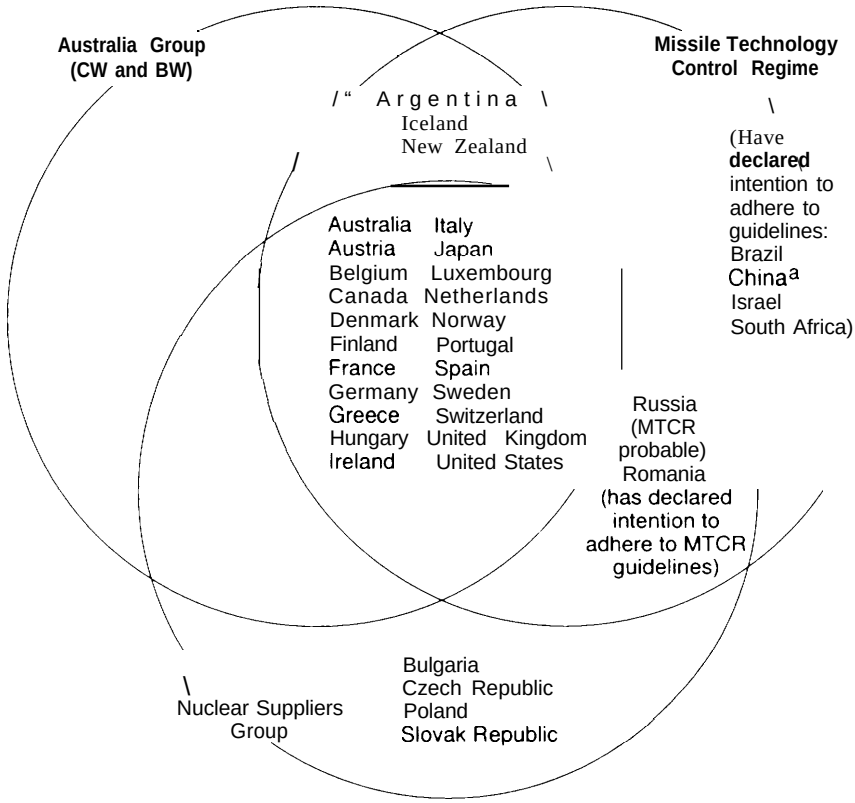
On a separate track, the IAEA has had discussions about maintaining a register of all nuclear-related transfers. The most recent agreement was for the purely voluntary reporting only of fissile material transfers and specially designed nuclear equipment—not dual-use technologies. IAEA officials reported to OTA that compliance even with that limited agreement has been uneven.

Expanding the NSG Database Idea

The reference information in the proposed Nuclear Suppliers Group database would also include the export guidelines of the MTCR and the control list of the Australia Group. Other than furnishing up-to-date details about those regimes, the database as now proposed would play no further role in coordinating the suppliers. Nevertheless, **the basic mechanisms of the proposed NSG database could be extended to the Australia Group and the MTCR.** This step would be most useful in combination with agreements in those regimes to report export denials, as the NSG members do. Such agreements, however, will not be easy to obtain. Nevertheless, if the political difficulties could be overcome, a single proliferation export-control database seems technically feasible, since there is a high degree of overlapping

[29] As noted above, some firms might be fearful that confidential (but still legitimate) market information might be revealed to competitors if all sales were reported. Even if the supplier-group data were not in the pub] ic domain, there would be the possibility that participating governments would leak information to their own country's firms.

FIGURE 5–1: Overlapping Membership Among Nonproliferation Export Control Regimes



[a]China promised 10 adhere to guidelines in 1991, but has not said it would adhere to revised guidlines of 1993

There is a considerable overlap among the memberships of the three major nonproliferation export control groups.

SOURCE Office of Technology Assessment, 1994

membership among these groups (see figure 5-1).[30] Even if perfect overlap were not achieved among the three suppliers groups, levels of access to the system could be differentiated by group membership. Alternatively, separate databases could be set up for each group.

Aside from the supplier groups, there are two other international groupings whose export control systems would benefit from shared data networks: the European Union (EU) and the newly independent states of the former Soviet Union. In 1992 the European Community (EC) Commission reported to the EC Council on a review of the export control systems of the member states. It found important discrepancies among the states. At the end of August 1992, the Commission drafted an export-control guideline for adoption by the Council. This draft included a proposal for:

> . . . a system of information transmission and exchange, to include all orders and transactions of dual-use items, before actual transfers take place. An electronic data network is envisioned to build on the insights and information of national agencies and to inform all licensing agen-

[30]See Leonard S. Spector and Virginia Foran, "Preventing Weapons Proliferation: Should the Regimes be Combined'?"' (Muscatine, 1A: The Stanley Foundation, 1992).

> to build on the insights and information of national agencies and to inform all licensing agencies immediately about the refusal of license applications. Thus, a binding exclusion of refused licenses, in effect in all EC member states, would be in force.[31]

It now appears that the EU will not adopt such measures in the near future. Should it ever undertake to do so, U.S. experience in developing its own networks could position it to cooperate in the establishment of a European Union network. That network might, in turn, become a basis for assistance to other states or groups of states in establishing their own systems. For example, in the summer of 1993, Russia, Ukraine, and Belarus discussed creation of an economic union; one proposal discussed was a common customs and export control system for the group. (See below for further discussion of the export control situation in the former Soviet republics.)

Increase Intelligence Sharing

Whether by means of a networked database or through other means of communication, **sharing intelligence data about unscrupulous suppliers, buying and financing operations, questionable agents, and suspicious end-users is an important means by which supplier groups can coordinate their export controls.** Shared intelligence could, for example, help members of the NSG make better informed licensing judgments by giving them more information about how prospective buyers measure up against the criteria that they have agreed to take into account in licensing decisions (see above, box 5-1).

The greatest obstacle to sharing intelligence data is the risk that revealing *what* an intelligence agency knows might also reveal *how* it found out: that sources and methods will be compromised. Recognizing this problem, the CIA's Non-Proliferation Center is placing increased emphasis on "actionable" intelligence—information that can be safely revealed when necessary to move against proliferation activities. Enforcement officials at Commerce's BXA have begun a proliferation database based on open sources, but purely for internal use. In principle, such data could be used to help explain to exporters why licenses are being denied, to inform companies about what potential customers to avoid, or to alert other countries to possible proliferation risks.

In some situations, national intelligence agencies having trusted relationships with one another may be able to share secret information. Amongst the large and diverse sets of nations making up the nonproliferation supplier groups, continuous, direct sharing of classified information seems unlikely.[32] What seems more feasible is the production and dissemination of analyses based on open sources. It may also be possible to develop open-source evidence for facts that might originally have been indicated or discovered by secret means.

All information sharing need not take the form of current intelligence. When the supplier groups (NSG, Australia, MTCR) meet, their governments could take the opportunity to send experienced export control officials, not just temporarily assigned diplomats. These officials could be encouraged to examine comparable problems, exchange ideas about methods, and discuss actual case examples that might hold lessons for their counterparts.

To increase opportunities for multilateral information sharing, one option to consider is to provide government support for non-governmental, open-source database and analytic projects. Examples of such projects are the Monitoring Proliferation Threats Project at the Monterey Institute of International Studies and the data-

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[31] Harald Müller, "The Export Controls Debate In the 'New' European Community," *Arms Control Today*, March 1993, p. 12.

[32] The United States reportedly did find ways of sharing intelligence information about Iraq with the United Nations Special Commission on Iraq, but this could be made a more routine practice. For a discussion of possible national intelligence contributions to United Nations activities, see Garret Jones, "Intelligence Support to United Nations Activities," U.S. Army War College Study Project, Apr. 15, 1993.

base of the Wisconsin Project on Nuclear Arms Control, in Washington. One means of support for such efforts is to contribute grants or award research contracts to the private institutions carrying on such projects. Another would be to share information with them informally: perhaps giving opinions as to which open sources are more or less reliable, which analyses are more or less consonant with government analyses. One analyst suggests:

> More "'cross-cultural" communication between the governmental and non-governmental non-pro] iteration communities would be beneficial. With no access to classified information but a suspicious attitude toward bureaucratic assessments, non-governmental analysts have the potential to reach fundamentally incorrect conclusions. Perhaps the non-governmental community should become more tentative in its conclusions as it demonstrates greater skepticism about the reliability of sources. On the other hand, the governmental community may also be too quick to dismiss public sources. Assigning an individual in the higher echelons of govcrnment to sanitize classified information for public release without revealing sources and methods would facilitate cross-cultural communication between these two communities.[33]

Whether the information shared multilaterally comes directly from the U.S. government, or whether it comes from private U.S. institutions, there is some risk that it will be perceived as a U.S. too] for manipulating international opinion and decisions to serve unilateral U.S. interests. This risk imposes a need for considerable tact and diplomacy in the ways in which the United States attempts to persuade other nations to act on the information provided. Another way to reduce the risk might be to help create and sponsor *international* nongovernmental organizations to monitor and analyze proliferation problems. The goal would be to minimize the perceived control or influence of any one national government, with the hope that many governments would both contribute help to and utilize the products of such organizations.

The immediate goal of increased intelligence and other information sharing among governments would be to enhance their export controls. At the same time, greater public information about proliferation activities could help mobilize international support for the whole range of nonproliferation policies surveyed in the first report of this OTA assessment: not only coercive actions against violators of nonproliferation norms, but internal and external pressures on governments to renounce weapons of mass destruction and adhere to the nonproliferation regimes.

Support Development of FSU Administration of Export Controls

The effectiveness of global export controls will be great] y weakened unless Russia and the other former Soviet states join the full set of western nonproliferation control regimes: NSG, Australia Group, and MTCR. Some progress has been made in this direction with Russia already in the NSG, vowing to become a de facto member of the MTCR, and promising to adhere to Australia Group guidelines. The other newly independent states should also be brought into the nonproliferation regimes. These nations also need to develop effective export control systems. The United States has offered several million in Nunn-Lugar funds for this purpose to each of the four republics retaining Soviet nuclear weapons, but has reached agreement on spending the money only with Belarus. Other republics could probably also make use of financial assistance. In addition to funding, U.S. agencies have also been offering technical assistance in export controls to the former Soviet states.

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[33]Mark G, McDonoua", "Nuclear Non-Proliferation Project, Conference on Strengthening the Non-Proliferation Regime: Selected Analyses, Fred] ngs, and Recommendations," manuscript, Carnegie Endowment for International Peace. Mar. 18-19, 1992, p. 12. For a discussion of the issues raised by the prospect of sharing intelligence information with an international organization, see Garret Jones, op. cit., footnote 32.

A report containing views of both U.S. and Russian experts observed that Russia has yet to develop an effective export control system. Overall, the need is for:

> . . . a competent civil authority with the will and capabilities to enforce the laws, decrees, operation regulation, licensing procedures, and enforcement practices recently adopted by the Government of the Russian Federation.[34]

Specifically, the problems include:

> . . . 1) creating an adequate legislative and executive basis for the structure as a whole and each of its institutional bodies; 2) overcoming the lack of transparency and openness in the administrative and other non-classified activities of enterprises and scientific institutes; 3) installing an effective licensing system in the Russian Federation regarding its rights in both the internal and international arenas, including protection for intellectual property rights; 4) overcoming the present ability of Russian enterprises and institutions to conclude contracts with foreign buyers, including contracts for dual use technologies and armaments, which circumvent national authorities in respect to export authorization, registration, and licensing; 5) instituting customs controls and bringing them up to a sufficient level of effectiveness, particularly at borders with the neighboring states of the former republics of the USSR.[35]

Moreover, not only in Russia, but elsewhere as well:

> . . . the establishment of sovereignty in the new states of the former USSR is unfortunately being accompanied by the weakening of legislative, executive, and judicial powers, a rise in crime, and the formation of organized crime syndicates which include civil servants. The problem of non-proliferation is also exacerbated by the unification of organized crime structures on an international level .36

Members of the NAS-RAS group argued that the United States and Russia should work to harmonize and refine their export control lists. They proposed that Russian and American scientists and engineers work together to identify chokepoints for the unwanted export or internal transfer of technologies.[37] They suggested that the two countries could establish a bilateral laboratory group that would work to identify and agree upon dangerous dual-use technologies.[38] The two countries might also:

> . . . establish a joint data bank group which would establish joint lists of restricted technologies and enterprises or "'projects of concern" to which certain technologies should not be internally transferred or exported.[39]

At the Moscow summit in January 1994, Presidents Clinton and Yeltsin signed a joint "Memorandum of Intent" on "Cooperation in the Area of Export Control," saying their governments intended to cooperate in "any or all" of six areas intended to improve nonproliferation export con-

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[34] U.S. National Academy of Sciences and Russian Academy of Sciences, " Dual Use Technologies and Export Administration in the Post Cold War Era" (Washington, DC: National Academy of Sciences, Apr. 1, 1993), p. 9.

[35] Ibid., p. 14.

[36] 1 bid., p. 10.

[37] 1 bid., p. 17.

[38] 1 bid., p. 17.

[39] 1 bid., p. 20.

trols and that they '*may" establish expert working groups to carry out their intent.[40] At this writing, it is too soon to tell whether these actions will be taken or whether they will result in concrete improvements in the Russian control system.

I Seek Greater Cooperation From Developing Countries

The newly independent states of the former Soviet Union are not the only emerging source of commodities that could contribute to the spread of weapons of mass destruction. Newly industrializing countries that are not members of the established export control groups are also becoming possible suppliers to proliferant weapon programs.[41] *invo]ving such nations* in multilateral export control arrangements could have two benefits. First, should they establish reasonably effective export control systems, the new suppliers would be less likely to contribute to proliferation. Second, their very membership in the international groups could undermine assertions that the nonproliferation regimes are discriminatory and intended to preserve the economic and military advantages of the more prosperous nations. On the other hand, if the emerging supplier is itself a proliferation threat, it might acquire easier access to items it needed for its own weapon programs, even as it helped control supplies to others.

India in particular—but other nations as well—has long argued that the Nuclear Non-Proliferation Treat y discriminates unfairly against non-nuclear states. Part of its argument is that until all states give up nuclear weapons, the other states should not be forced to give up the nuclear option. But another part of its argument can be summarized as follows:

> . . . technology export barriers erected on the grounds of national security are also aimed at retention of Western industrial supremacy and control of the global technology markets.[42]

When the United States persuaded Russia to stop the transfer of cryogenic rocket motor technology to India in 1993, a frequent theme in the Indian press was that the "real" reason for the U.S. action was to prevent commercial competition from the Indian space program.

The Clinton Administration's proposed changes in the Missile Technology Control Regime are designed in part to respond to such arguments. The President announced in his United Nations speech on September 27, 1993:

> Now, we will seek to strengthen the principles of the Missile Technology Control Regime by transforming it from an agreement on technology transfer among just 23 nations to a set of rules that can command universal adherence.[43]

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[40] The six areas were:

A. Conducting bilateral and multilateral discussions at the political and technical level on matters relating to the enhancement of export control sy stems;

B, Conducting bilateral consultations at the expert and government levels on obligations relating to mm-use of export controlled items for unapproved purposes;

C. Conducting bilateral consultations on specific multilateral export control regimes and their implementation and on the technical parameters of the items and technologies covered by them;

D. Participating in seminars, conferences, and other multilateral meetings devoted to considering export control issues,

E. Discussing opportunities to train personnel involved with export control, the work of licensing and customs agencies, and

F. Joint efforts to expand cooperation in the area of export control.

'.' Text' of Memorandum on Export Controls," FBIS-SOV-94-010, Jan. 141994, p. 20.

[41] See William C. Potter, cd *International Nuclear Trade and Nonproliferation: The Challenge of the Emerging Suppliers* (Lexington, MA: Lexington Books, 1990) and *The International Missile Bazaar: The New Suppliers Network* (Boulder, CO Westview Press, 1994).

[42] Brahma Chellaney in *The Global Diffusion o/ Military Technology: The Proceedings (!/ a Workshop held at the University of Wisconsin, Madison, December 6-8, 199/* (Madison, WI: Center for International Cooperation and Security Studies, University of Wisconsin), p. 19.

[43] President Bill Clinton, "A& ddress to the 48th Session of the United Nations General Assembly,.' New York, NY, Sept. 27, 1993.

A White House fact sheet explained the proposed bargain with developing nations seeking to import space launch vehicle technology:

> We will support prudent expansion of the MTCR'S membership to include additional countries that **subscribe to international** nonproliferation standards, enforce effective export controls and abandon offensive ballistic missile programs . . . We will continue to retain a strong presumption of denial against exports to any country of complete space launch vehicles or major components . . . For MTCR member countries, we will not encourage new space launch vehicle programs, which raise questions on both nonproliferation and economic viability grounds.
>
> The United States will, however, consider exports of MTCR-controlled items to MTCR member countries for peaceful space launch programs on a case-by-case basis. We will review whether additional constraints or safeguards could reduce the risk of misuse of space launch technology .44

Critics of this new policy stress the risks, arguing (as the Administration's statement acknowledged) that space launch technology is in some ways analogous to plutonium reprocessing technology: it is economically unsound and carries inherent proliferation risks. First, the nations that do manufacture and launch space launch vehicles all lose money doing so.[45] Second, space launch rocket technology is eminently transferable to ballistic missile programs. A nation that is complying with nonproliferation norms today could change its mind tomorrow, and still be in possession of missile technology; no plausible safeguards are likely to change that potential. Therefore (from this point of view), in the interests both of fostering the economic welfare of developing nations and of limiting missile proliferation, the transfer of rocket technology should not be used as an incentive to adhere to nonproliferation regimes (for a supporting example, see box 5-2).

A contrasting view is that the Administration's changes on missile export policy do not go far enough. As one analyst has pointed out, NASA is not "economically viable," but the United States still supports its own space launch program for other motives. Countries with fledgling space programs are unlikely to be persuaded that these motives are legitimate for the United States (or Russia, China, France, and Japan) but not for themselves. Nor will they all accept the concept that they must forswear missile programs for themselves while the existing members of the MTCR are entitled to keep theirs.[46] Given the modest benefits proposed ("case-by-case" consideration) and the major concessions asked for (full adherence to nonproliferation norms), it is not clear that in practice there will be many takers for the new Administration Policy on the MTCR.

In its draft for the EAA of 1994, the Clinton Administration proposed providing for (individual validated) license-free exports of controlled items to and among members of a multilateral regime. In addition, under this draft law, nonmembers could be granted adjustments in access to controlled items depending on their adherence to U.S. export control policies. This more convenient access (under either provision) to dual-use technology items might serve as an incentive for some developing

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[44]Office of the Press Secretary, The White House, "Fact Sheet: Nonproliferation and Export Control Policy," Sept. 27, 1993.

[45]However, selling launch services to foreign or domestic commercial firms may help defray the costs of fulfilling other governmental purposes, such as national autonomy in space-launch capabilities. In the case of Russia, it could be that space launch services could profit because of the sunk costs in space launch infrastructure and vehicles already produced primarily for military purposes.

[46]See statement by Lora Lumpe in "The Administration's Non-Proliferation and Export Control Policy, ''Arms *Control Today*, vol. 23, No. 9, November 1993, pp. 12-13.

BOX 5–2: Indian Satellite Launch Vehicles: Business or Boondoggle?

The September 20, 1993, launch failure of the Indian Polar Satellite Launch Vehicle (PSLV) can be Interpreted to support the arguments for using export controls to deny launch vehicle technology to new entrants Although this rocket was to place an Earth remote sensing satellite into a sun-synchronous polar orbit, It could also be used as an Intercontinental ballistic missile The Indian Space Research Organization (ISRO) obtained key technology for the second stage, liquid-fueled rocket motor from the French Societe Europeene de Propulsion In the face of export controls, India developed other key technologies Indigenously—e.g., maraging steel and solild propellant (HTPB) for the first stage motor An Indian journalist concluded before the launch failure that

> It is these and other Instances of organization foresight which saved the launch vehicle program when the U S embargoed all sales to the ISRO These very same qualities Will have to be revived in the ISRO if the launch vehicle program is to survive the trials ahead [1]

These efforts to work around missile technology export controls apparently have not yet been fully successful On its maiden launch, the PSLV suffered a mishap after separation of the second stage (of four) that resulted in the rest of the vehicle reaching too low an altitude to reach orbit ISRO officials reportedly concluded that the next PSLV launch would have to be put back 2 years

ISRO officials had reportedly hoped to sell as many as 9 satellite launches on the vehicle between 1996 and 2000, thus brlnglng$100 milllon in business However since the PSLV development program had already cost $144 milllon over 12 years, and since ISRO had said that it could produce the launchersatacostof$15 milllon each, it is not clear when if ever, the project would have produced profits [2]Now that the program has been set back another 2 years arguments that the space launch business lsan economic loser for developing countries seem even stronger

[1] Gopal Raj *The Hindu* (Madras) Sept 11 1993 p 8 JPRS-TND-9035 Nov 10 1993 p 32

[2] For reports on the launch failure and on cost estimates see K S Jayaraman, Launch Failure Dents Indias Space Plans *Nature*, vol .365 (Sept 30 1993) p 382 and Tim Furniss PSLV Failure Delays Indian Space Plans *Flight International*, Sept 29 1993 p 23

nations to adhere to supplier-regime guide] ines. On the other hand, were these nations so well-behaved in the first place, license approvals probably would have been fort hcoming an yway.[47] The removal of IVL requirements would probably be welcomed by U.S. exporters who feel that current regulations are too burdensome. The disadvantage to removing validated license requirements is that the United States would lose the opportunity to judge on a case-by-case basis whether the recipient country's own export controls were strong enough to prevent retransfer of some items. Instead, it would have to arrive at a general judgment to that effect.

Bringing new suppliers or transshippers into the established groups controlling exports is a goal that could contribute to nonproliferation, even if it may be difficult to accomplish in some cases. One analyst has suggested that at the 1995 NPT renewal conference, the parties to the treaty could formally acknowledge the obligation of all of them, not just the nuclear weapon states, to re-

[47] Rocket technology is a somewhat different story, as discussed above; the question there is not whether the exported items will be diverted from one application to another, but whether the application (rocketry) will be diverted from space launch to missile purposes.

frain from assisting other states to manufacture or acquire nuclear weapons. The Conference could then endorse specific guidelines for national export control laws and procedures.[48]

One analyst has proposed additional measures for fostering increased cooperation from the developing world:

1. the members of the supplier groups could provide statistics on license approvals and denials to counter perceptions that export controls are designed or function to impede economic development;
2. supplier groups could meet regularly with developing countries that adhere to nonproliferation norms to explain the reasons for nonproliferation export control policies and answer complaints;
3. more ambitiously, the supplier groups could establish a global forum on international technology transfers and export restraints, seeking a "North-South" consensus on how proliferation could be constrained while civil development is fostered; and
4. supplier nations could bias their development aid in favor of nations that comply with nonproliferation and export control regimes.[49]

In attempting to better inform developing nations about the purposes and effects of export controls, the industrialized countries would have to take care to avoid the appearance of simply dictating their own views of the proliferation problem and how to deal with it. As noted earlier in this chapter, some nations perceive economic discrimination even when the facts suggest otherwise. Considerable diplomacy may be required to gain an open-minded hearing for factual presentations.

Formally conditioning development aid on nonproliferation compliance could also offend developing nations' sensitivities. International development assistance programs might have a difficult time politically in deciding what degrees and kinds of proliferation or nonproliferation behavior by what nations should lead to larger or smaller aid allocations.[50]

The United States, for its part, might have difficulty reconciling its other foreign aid objectives with the nonproliferation objective. It is one thing to reduce assistance as a sanction for certain proliferation behavior; it would be another to reallocate aid given to some nation for one purpose (say, supporting Israel and Egypt to bolster Middle East stability) to some other nation as a reward for cooperation on nonproliferation.

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[48]Lewis Dunn in Harald Müller and Lew *is A,* Dunn, *Nuclear Export Controls and Supply Side Restraints: Options for Reform* (Southampton, UK: Programme for Promoting Nuclear Nonproliferation, Study Number Four, October 1993), p. 28.

[49]Harald Müller, ibid., pp. 15-16.

[50]For a discussion of attaching policy conditions to foreign assistance, see Nicole Ball, "Levers for Plowshares: Using Aid To Encourage Military Reform," *Arms Control Today,* vol. *22,* No. *9,* November 1992, pp. 11-17.

Reducing the Burdens on Industry

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The current U.S. export control system has come under strong criticism from some U.S. industrial associations and companies. As noted in chapter 4, in the section on estimating the costs of the system, they complain that many U.S. export controls both fail to produce any meaningful results and place unfair burdens on U.S. exporters. **From the point of view of the effectiveness of export controls, it is desirable to have exporting companies see the system as fair and just, so that they will have every incentive to help make the controls effective-for example, by reporting possible illicit buying attempts.** From the point of view of U.S. competitiveness in international markets, it is desirable to place the least constraints consistent with national security on exporting firms.

Some measures for reducing the burdens of the system on exporters could be carried out without impairing the effectiveness of controls, and it can be argued that some of those measures would even enhance effectiveness. There is inevitable controversy, however, over whether some burden-reducing measures would help or hinder the effectiveness of controls in slowing proliferation.

There is inevitable controversy. over whether some burden-reducing measures would help or hinder the effectiveness of controls in slowing proliferation.

REDUCE THE NUMBERS AND PURPOSES OF CONTROLS

Exporting industries have been the strongest advocates of severely reducing the numbers of commodities on the Commerce Control List (CCL). The companies in these industries are understandably concerned about the burdens the export control system places on them compared to companies from other countries. **There is a case to be made that limiting controls to a relatively few key technologies could enhance their effectiveness.** The

benefits of a much smaller export control list might include the following:

- feeling less burdened by the system, exporting companies might be more enthusiastically cooperative in helping to see that the remaining controlled items do not fall into the wrong hands;
- with the United States arguing for a much smaller range of controlled items and a smaller range of reasons for controlling them, cooperation of other nations in export controls might be easier to obtain;
- the range of U.S. controls is broad enough that other countries sometimes suspect commercial motives to be behind U.S. attempts to enforce controls; that reason for resistance could be reduced with a smaller list; and
- government administrative and enforcement efforts might be released from nonproductive attempts to block exports that the buyers will still find elsewhere.

These arguments are most persuasive when applied to the items controlled by the Coordinating Committee on Multilateral Export Controls (COCOM) industrial list, which is being phased out (but which may be replaced in some form by a successor agreement). **Most U.S. nonproliferation controls coincide with those already winnowed by negotiation in the multilateral nonproliferation export control regimes. Thus, controls** over items related to weapons of mass destruction and missiles are the strongest candidates for continuation if controls overall are reduced.

I Foreign Availability

Exporters have argued that if a commodity is available from foreign sources that do not have comparable export controls, U.S. export controls are useless, since objectionable users can obtain the items elsewhere and continue unhindered with their weapon programs. ' Proponents of unilateral export controls argue that this argument is tantamount to condoning selling a gun to a criminal just because he may have been able to buy it from someone else. Some exporters may feel that they should not be denied licenses to sell to such users, on the ground that someone else will anyway. Most, however, would not wish to do business with users trying to build weapons of mass destruction. It is not the loss of these relatively rare sales that exporters fear, but rather that the export licensing process itself causes them to lose *legitimate* business to foreign competitors at the same time that it fails to keep the proscribed items out of the hands of proliferants. Industry representatives cited as an example of this problem the case of high-performance computers, which have been controlled both because of conventional military-related applications and because of their potential use in nuclear weapon and missile programs. The Clinton administration announced in September, 1993, that it agreed computers no longer could or should be controlled at previous levels (see below).

In the case of such ● 'national security" controls (as opposed to the "foreign policy" controls, which include items of proliferation concern), the Export Administration Act (EAA) requires the government to remove items from the list when investigation shows that they are readily available from foreign sources. In this context, "availability" means that it is possible to buy the item in quantities and of quality comparable to that available in the United States.

One proposal for export control reform, then, is to make timely employment of the test

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I For example, see Frederick P. Waite and M. Roy Goldberg, "Responsible Export Controls or 'Nets to Catch the wind'?: The Commerce Department's New U.S. Controls on Exports of Chemical Precursors, Equipment and Technical Data Intended to Prevent Development of Chemical and Biological Weapons," *California Western International Law Journal*, vol. *22*, 1991 *-1992: 193-208.*

of foreign availability to all items retained on the CCL.* The Department of Commerce (DOC) would be required to conduct frequent reviews of foreign availability, without exporters having to request such reviews formally. The United States would remove unilaterally controlled items from the CCL. It might propose removal of items from multilaterally agreed export control lists if its review finds them available from outside the multilateral regime. An item might be found to be *un*-available abroad for one of two reasons. First, the U.S. producer might be the only source of supply, and items that could substitute for the controlled item could not be purchased elsewhere. Second, all, or nearly all, of the principal suppliers might have agreed to control their exports of the item in the same way. A policy of attempting to control only items that were not available from other sources would lead to a shorter list and to fewer losses of business from U.S. companies to foreign competitors.

A policy of decontrolling goods or technology that are available from other countries without controls could lead to a vicious circle. Achieving multilateral controls has usually required leadership by one nation, most often the United States. Other countries may be more willing to control new items (or exports of currently controlled items to newly identified end-users) if the United States demonstrates its own will to do so first. Thus, proposals to limit U.S. export controls to multilaterally controlled items have included provisions for at least temporary impositions of unilateral controls to allow attempts to reach multilateral consensuse[5] Putting a legislative limit on the term of unilateral controls does carry a risk: other nations whom the United States is trying to persuade to follow suit can just stall negotiations until the statutory limit on the U.S. controls runs out. Negotiating multilateral controls might then become more difficult in the absence of U.S. leadership by example.

Another objection to the strict foreign availability requirement is that in some situations the United States, for moral reasons, does not want its citizens to contribute to another nation's program to acquire weapons of mass destruction, whether that prohibition would significantly delay the weapon program or not. **Requiring effective multilateral export controls as a condition of U.S. export controls removes the option of setting a unilateral standard for U.S. nationals.**

Eliminating, or even putting a short time limit on, unilateral controls could also inhibit the use of export controls as an indirect form of sanctions aimed at controlling weapon proliferation. In the currently most publicized example, the United States is denying high-technology exports to Iran as a way of punishing Iran for its apparent pursuit of weapons of mass destruction and its support of international terrorism. Some of the denied exports-most notably jet transport aircraft that Boeing wanted to sell the Iranian airline—are nominally controlled as a sanction in punishment of Iran's support for international terrorism. But U.S. Secretary of State Warren Christopher has explained the actual intent of the U.S. controls is to make Iran

> . . . understand that it cannot have normal commercial relations and acquire dual-use technologies on the one hand, while trying to develop weapons of mass destruction on the other.[4]

[2] Congressional testimony and a draft revision of the Export Administration Act by the National Association of Manufacturers stress this idea. See *Export* Control *Reform: A Key to U.S. Export Success; Policy Recommendations* (Washington, DC: National Association of Manufacturers, June 1993).

[3] Ibid.

[4] Warren Christopher, at a press conference in Luxembourg, June 9, 1993, quoted by Elaine Sciolino, "U.S. Asks Europe to Ban Arms-Linked Sales to Iran," *New York Times,* June 10, 1993, p. A-5.

Other countries have shown little inclination to go along with this policy, and the aircraft sale seems likely to go eventually to the European Airbus Industrie consortium.[5]

Even when the focus is on control of items that could be used for weapons of mass destruction, there is a further disadvantage to a strict requirement that the items be under rigorous multilateral control. There is an inherent fuzziness in the workings of export controls; as noted above, their effectiveness is subject to a wide range of variables. Even when it is not possible to achieve 100% agreement and compliance on multilateral controls among all possible suppliers, **partially effective controls may still be better than none at all, depending on the financial and technical resources of the buyer and the state of progress of his weapon program.** Therefore, although it is reasonable to have a strong presumption against unilateral controls, there may be instances where controls that do not have universal support can still be useful. Decisions for complete decontrol should be informed by the best possible analysis and intelligence data about current countries of proliferation concern.

It maybe possible to persuade key suppliers to withhold particular exports in special instances. But it will be harder for the U.S. government to persuade foreign governments to go along in those instances unless it has a legal and regulatory basis for imposing the same restraints on its own exporters, as well as a consistent policy of denying exports in comparable situations. How long any given control is worth pursuing before being given up as a lost cause is hard to specify in advance. An alternative to a fixed (say, 6 month) term for all unilateral, or less than unanimously multilateral, controls would be to establish an explicit process of accountability by officials entrusted with judging just how long an effort makes sense. Such a process might, for example, include a periodic assessment of foreign availability for all controlled items, coupled with an explicit justification to Congress of the rationale behind continued controls for goods found to be available outside the United States in comparable quantity and quality.

I Alternatives

Besides applying a strict foreign availability criterion, another way to reduce the size of the export control list is to narrow the scope of its purposes. After the initial reforms of COCOM controls with the end of the Cold War, the DOC Office of Export Licensing went from handling over 100,000-125,000 export license applications a year to about 24,000 in 1992 and 25,000 in 1993. With the end of COCOM and the further relaxation of controls on computers and telecommunications technologies in March 1994, the DOC estimated that license applications would decline by nearly half again.[6] Many of the remaining license applications concern items controlled for other purposes than the nonproliferation of weapons of mass destruction. Most of the remaining COCOM or "national security" items relate to possible conventional military applications. The COCOM lists were designed primarily to slow Soviet progress in a broad range of military technologies. The fact that they might also slow the development of the Soviet civilian economy was seen as, if anything, an additional national security benefit of the regime. COCOM'S original purposes became largely (though perhaps not entirely) obsolete with the breakup of the Soviet Union.

But a new set of goals for controls over dual-use technologies related to conventional weapons has not yet emerged. Late in 1993, COCOM members agreed to abolish the organization in the spring of 1994, but to replace it with a successor regime. At this writing, the goals and procedures

[5]U.S reexport controls on certain U.S.-supplied components of Airbus planes may prevent such sales in the short run, but substitution of European components seems likely in the longer run.

[6]Thomas L. Friedman, "U.S. Ending Curbs on High-Tech Gear to Cold War Foes," New *York Times*, Mar. 31, 1994, p. D5.

of that successor regime remain unclear. Some have proposed that the United States initiate an explicit new nonproliferation regime aimed at limiting the spread of advanced conventional weapon technologies. Such a policy, aimed at keeping particular types of weapons out of reach of many nations, would require a different export control strategy than one directed at restraining the technical development of a single large military-industrial complex. In the absence of clear-cut opposing blocks of allies, there is bound to be less consensus about who should be the targets of such a strategy. It is therefore likely to be more difficult to sell the strategy multilaterally than it was to persuade states to participate in the original COCOM regime.

A third way to reduce the size of export control lists would be to partially substitute reporting requirements for licensing requirements as a nonproliferation tool. That is, the government could require firms to report, but not seek a license for, the export of any items from a published list of goods and technologies. This list would be compiled from technical analyses of the overall needs of programs for weapons of mass destruction, not just the most critical items. The objective would be to discover *constellations* of imports that might serve as indicators of weapon programs or clandestine acquisition networks. Although goods that might contribute to proliferation would still be shipped under this approach, national intelligence organizations or multilateral nonproliferation organizations could then utilize this information to take action against specific proliferant programs.

Such an export reporting regime would clearly be most productive if it were multilateral: proliferants seeking to conceal their buying patterns would have less opportunity to find alternative sources. The current multilateral export control regimes (Nuclear Suppliers Group [NSG], Australia Group, Missile Technology Control Regime [MTCR], and the COCOM successor) would provide logical frameworks in which to place export reporting agreements. However, even if the United States, one of the world's larger exporters, were to establish a reporting list unilaterally, that would probably significantly assist proliferation analysts.

An export reporting list would probably be larger than the current export control lists: an item would be subject to reporting not just if it could make a significant *contribution to* a weapon program, but also if it could serve as an *indication of* a weapon program. Although the numbers of manufacturers and transactions would be larger than those now affected by export controls alone, the burdens would be lessened: fewer exports would be subject to complex regulations and licensing delays. On the other hand, as noted earlier, exporters may resist revelation of their approved licenses because of fears of revealing proprietary data of use to competitors.

ELIMINATE THE "KNOWS, IS INFORMED, OR HAS REASON TO KNOW" TESTS

The Bush administration's Enhanced Proliferation Control Initiative and certain legislation led to Export Administration Regulations requiring Individual Validated Licenses (IVLS) for almost any items that the exporter "knows " might be used in any way in a chemical, biological, or missile weapon program.[7] Late in 1993, the Commerce Department issued further guidance specifying that a license is required if the exporter knows or is informed that an item will be *directly employed* in such a program.[8] *for nuclear* weapon programs, the rule is stronger: a license is required for any item that the exporter "knows *or has reason to know'"* will be used in such a program. Industry representatives, at least before the December 1993 clarifications, argued that the effect of this policy is to require virtually all exporters to

[7] The only other countries with a "knowledge test" regardless of the nature of the commodity are Germany and Japan.

[8] 58 *Federal Register* 68029-68031 (Dec. 23, 1993).

establish costly programs to find out whether their customers are involved in a proscribed activity. In this way, they say, companies are forced to perform intelligence services for the government. Moreover, the items exported, if available anyway from uncontrolled suppliers, will not actually affect the outcome of proliferant programs. Meanwhile, government licensing and enforcement efforts go to monitoring exports to impose unilateral controls that do not really make a difference.

Exporting firms opposing this policy have also raised three other objections. First, although honest exporters will be exposed to liability, criminal firms will simply not apply for licenses. Second, many honest exporters are, nevertheless, not aware of the sweeping nature of the "know" rule, and therefore simply do not apply for licenses. This fact puts those firms who do apply for licenses at a competitive disadvantage compared to those who do not. Third, with respect to the '"is informed" part of the rule, firms have also complained that the government has informed only some exporters about bad customers, foreclosing that business for them while leaving other exporters free to trade and profit in ignorance with the same customers. Commerce Department officials have acknowledged that sometimes firms have been informed only selectively about risky customers; they say they are going to improve that situation.

| Advantages of an All-Inclusive List

In its draft revision of the EAA, the National Association of Manufacturers (NAM) proposed barring the "knows or is informed" rule through a requirement that the United States consolidate its dual-use or "commercial" export controls into a single list which full y enumerates *all* the products for which an export license is required and all the countries and specific end-users as well. This would greatly simplify the exporting companies' job in deciding whether a license application was necessary and whether it was likely to be approved.

Such a published list might also help improve international export control coordination. Many countries lack the information and intelligence resources of the United States. **One way of sharing information about potential suppliers and proliferants would be to publish the U.S. lists of target programs. Even in the absence of formal export control coordination mechanisms, the U.S. proscription list could have useful influence.** Foreign governments and companies would be informed that the United States considered certain firms, countries, and end-users to be proliferation risks. The NAM draft bill, however, carries the coordination a step further: the United States would not maintain commodities or users on its own list unless it could gain multilateral agreement among all the significant suppliers to impose equivalent controls, and to do so as effectively as the United States. Under the requirement that all lists be multilateral, publishing the list would be not only beneficial, but essential.[9]

Elements of this proposal exist in the current regimes. The NSG, the Australia Group, and the MTCR all center on agreed, published lists of commodities. On the other hand, the regimes do not require the members to agree in advance on who all the controlled countries and end-users may be. Instead, they provide agreed criteria for deciding whether an export should go forward.

| Drawbacks of an All-Inclusive List

The United States export regulations concerning missile-related technologies do identify some end-user programs to which exports are not permitted. The United States also publishes a Table of Denial Orders listing entities barred from receiving licenses to export controlled items. Nevertheless, publishing the names of all suspect end-

[9] In addition, the NAM bill proposes that no licenses be required for trade among adherents to the multilateral agreements, while a license would always be required for export to a non-member. The Administration draft EAA proposes the *option* for license-free zones, but does not require them.

users could have drawbacks. Using information based on clandestine sources or methods of data collection risks tipping off the observed parties so that they can reduce or eliminate their vulnerabilities to those methods. Moreover, merely identifying front companies or illicit transshippers as suspect may lead them to change names and locations or go out of business and reestablish themselves in another form. Such actions could interfere with ongoing investigations, or prevent break-up or prosecution of illegitimate supply networks. Sharing suspicions about prospective buyers also risks the embarrassment, and possibly the injustice, of dissemination of information that turns out to be incorrect. These risks (of compromising intelligence and of releasing unprovable suspicions), then, must be weighed against the benefits of giving exporters better information about prospective customers. Since these risks are likely to vary with each case, it can be argued that the government should have some discretion in publishing its concerns about buyers.

Another drawback to publishing complete lists of proscribed firms and countries is that at least some are likely to consider their names to have been placed there unfairly. Firms or governments may demand either that proof (which might have been based on classified intelligence sources) be revealed or that they be removed from the list. An unsatisfactory response by the U.S. Government might lead to unnecessarily y strained relations with the objecting foreign governments. Questions might also be raised domestically y or internationally about why some target countries are named while others that should be are not.

On the other hand, when a license is denied, the nominal consignee or end-user implicitly receives information that he is "on the 1ist," whether the list is published or not. (However, if the end-user is in a country with proscribed programs, and the denial is justified on that ground, possibly the particular consignee or end-user may not infer that it is suspect and on the proscribed list.)

Transshipper and end-use data available to export control officials may change rapidly, putting a premium on flexibility and last-minute changes in 1icensing decisions. The NAM draft bill permits '"emergency" unilateral U.S. controls, provided that the list is published. It does not, however, appear to allow for any discretion by licensing officials based on last-minute or classified information.

I Arguments for the "Know" Rule

Defenders of the "knows or has reason to know"' rules argue that exporters who may be trading with a proliferant end-user find it too easy to look the other way, or to fail to report what they know, as long as their own particular export is not on a specific control list. Suppose, for example, that another nuclear proliferant chose to follow the example of Iraq and build calutrons to enrich uranium. When a military research establishment bought parts suitable for use in calutrons, that might be an indicator of a nuclear weapon program; the supplier might realize that, but not feel obligated to inform its own government. The government might feel, however, that a) the supplier should not be aiding a nuclear weapon program (whatever his competitors might do) and b) that it should report its knowledge of the existence of such a program and of the possibility that calutrons might be under construction.

Supporters of the "know" rule or (in the case of nuclear-related items) the "reason to know" rule also argue that in reality U.S. exporting firms do not have to worry that they will be subjected to extraordinary demands to probe deeply into the character of end-users of relatively innocuous products. They point out that the stronger form of the rule ("has reason to know") has existed for some time for nuclear exports and in other legal areas. The judicial system has not generally permitted unreasonable interpretations of what constitutes a '*reason to know. "[10] In practice, no firms appear to

[10]See Sen. John Glenn, "omnibus Nuclear Proliferation Control Act of 1993: A Section-by-Section Description," *Congressional Record* May 27, 1993), Daily ed., S6773.

BOX 6–1: Department of Commerce "Know Your Customer" Guidance

In December 1993, the Department of Commerce provided further guidance to exporters on their responsi - bilities under the "know" and "reason to know" rules governing applications for exports items not on the Commerce Control List that might be going to activities involving design, development, production, stockpiling, or use of missiles or weapons of mass destruction. Here are excerpts from this" 'Know Your Customer' Guidance"

(A.) Decide whether there are "red flags. " Take into account any abonormal circumstances in a transaction that indicate that the export may be destined for an Inappropriate end-user or destination Commerce has developed lists of such red flags that are not all-inclusive but are intended to illustrate the types of circumstances that should cause reasonable suspicion that a transaction WiII violate the EAR [Export Administration Regulations].

(B.) *//there are "red/flags, "require.* absent ''redflags"... there is no affirmative duty upon exporters to Inquire, verify or otherwise "go behind" the customer's representations. However, when "red flags" are raised information that comes to your firm, you have a duty to check out the suspicious circumstances and inquire

(C.) Do not se//-b/red. Do not cut off the flow of information that comes to your firm in the normal course of business An affirmative policy of steps to avoid "bad reformation" would not insulate a company from liabilty Employees need to know how to handle "red flags " Knowledge possessed by an employee of a company can be inmputed to a firm so as to make it liable for a violation This makes it Important for firms to establish clear policies and effective compliance procedures to ensure that such knowledge about transactions can be evaluated by responsible senior officials

(D.) *Reevaluate all the informaftion after the inquiry...* If [the "redflags'' can be explained or justifled] you may proceed with the transaction [Otherwise]... you run the risk of having had "knowledge" that would make your action a violation of the EAR

(E.) Refrain from the transaction disclose the information to BXA[Bureau of Export Administration] and wait... Industry has an important role to play in preventing exports and reexports contrary to the national security and foreign policy interests of the United States BXA WiII continue to work in partnership with industry to make this front line of defense effective, while minimizing the regulatory burden on exporters

As can be seen, the regulations as explained by Commerce do not require firms to initate intelligence operations. At the same time, they do seem to require a thorough understanding of what "red flags" to look for and a systematic program of company compliance policies and procedures. Although companies exporting toilet paper or light bulbs would not have to be concerned about their products being directly employed" in proliferation activites, other companies might have to make intelligent guesses about what combinations of their products and customer red flags should be reported to Commerce.

SOURCE 58 Federal Register 68029-68031 (Dee 23, 1993)

have been penalized for having failed to apply for a license for something that they are alleged to have known would be used in a banned project. In its December 1993 guidance to exporters, the DOC spelled out in greater detail what is expected of exporters under the "know" rules. See box 6-1 for excerpts from that guidance.

There are arguments in favor of maintaining a "know" rule. First, it gives the government a safety net by allowing the application of export controls when it learns about a pending transaction which risks helping a weapon program, but which is not explicitly covered by the current Commerce Control List. Second, it improves the government's ability to obtain information about possible weapons proliferation programs by requiring firms who come into such information, or who encounter a "red flag" (the term in Commerce Department guidance) that should arouse suspicion, to pass the information along to the government. Third, many companies would themselves prefer not to deal with end-users developing weapons of

mass destruction, whether their products are critical to those programs or not. Procedures for the government to inform them of the character of their buyers may well save them from public embarrassment later on.

A weakened alternative to the "knows or is informed" rule would be a simpler '*is informed" rule. Today Germany has a "knows or is informed" rule applying to all its dual-use technology exports, not just those for weapons of mass destruction. In negotiation with other European Union (EU) partners, however, Germany has apparently indicated a willingness to settle for the "is informed" part of the rule for EU regulations, and for that to apply only to goods destined for programs to produce weapons of mass destruction and missiles (i.e., to hold exporters responsible for applying for licenses for unlisted goods only when the government informs them that they may be utilized in such a program). ' If the United States were to establish this rule, then at least the government would retain the legal ability to stop risky transactions about which it had obtained intelligence, even if it could not expect companies to report the "red flags."

Another alternative to subjecting the export of *all* commodities to the "knows or is informed" rule would be for the government to generate a separate control list of products or technologies that, although not listed as requiring export licenses, could be significantly useful in proliferant programs. (A variation on this idea is presented above: there, an expanded list would be subject only to *reporting* requirements, not to licensing.) The exporting companies would then be responsible only for knowing or having reason to know whether recipients of those particular items were engaged in illicit activities. The firms, if in doubt, could ask the government for advisory opinions on prospective buyers. The government could also make the companies' job easier by publishing those advisory opinions about particular end users so that other firms could be forewarned. The government could further supplement its published lists by indirectly assisting private organizations in developing lists of suspect end users from public sources.

END UNILATERAL REEXPORT CONTROLS ON EXPORTS TO COOPERATING COUNTRIES

The United States may require, as a condition of granting an export license, that the receiving party guarantee that it will not reexport the controlled item to a third country. In the past, some Europeans have resented U.S. imposition of reexport controls as attempts at extraterritorial enforcement of U.S. laws. [2] U.S. exporters have argued that when foreign competitors do not require such reexport assurances, they have a better chance of making sales. If the country of the first user is en-

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[11] See H. Müller et. al., *From Black Sheep to White Angel? The New German Export Control Policy, PRIF Reports No. 32* (Frankfurt am Main, Germany: Peace Research Institute Frankfurt, January 1994), p. 54.

[12] In 1990 a National Academy of Sciences study panel delegation reported after a European fact-finding mission:

> Throughout Europe there was a strong adverse reaction to U.S. export control policy, in particular its extraterritorial aspects. The Europeans have major problems with U.S. controls on the reexport by any country of U.S.-origin items. Nearly all the Europeans with whom the delegation met thought their country was doing an adequate job of maintaining of a domestic export control regime. They argued, therefore, that U.S. reexport controls on COCOM items were both unnecessary and an unneeded intrusion. In a sense, such controls were seen as a threat to national sovereignty and as driving a wedge between the United States and Europe.

Panel on the Future Design and Implementation of U.S. National Security Export Controls, *Finding Common Ground: U.S. Export Controls in a Changed Global Environment* (Wash ington, DC: National Academy Press, 199 1), p. 268. See also Jan Hoekema, "The European Perspective on Proliferation Export Controls," in Kathleen Bailey and Robert Rudney, eds., *Proliferation and Export Controls* (Lanharn, MD: University Press of America, 1993).

On the other hand, J. David Richardson, *Sizing Up U.S. Export Disincentives* (Washington: Institute for International Economics, 1993), found no statistical evidence that U.S. exports to COCOM partners fell below what one would have expected without reexport controls. In addition, DOC officials argued to OTA in late 1993 that, although U.S. reexport controls may have led to tensions with COCOM partners in the past, more permissive reexport provisions in the Export Administration Regulations had since largely addressed the partners" concerns.

forcing export controls equivalent to those of the United States, then it should not be necessary for the United States to demand that it be given the right to judge further exports. The problem is greatest when other countries have not agreed to the same rules as the United States (for example, in banning the sales of commercial aircraft to Iran); or when they have agreed to the same controls but are unable or unwilling to enforce them effectively.

For nonproliferation controls, the problem does not appear to be as great. The NSG members, for example, have agreed that they will all require reexport licenses for the nuclear-related dual-use items that they export. This could be another issue, therefore, that is best separated from negotiations over how to revamp COCOM controls.

STREAMLINE THE APPLICATION PROCESS

Industry representatives have complained that the sometimes lengthy decision process for U.S. export controls has placed them at an unfair competitive disadvantage with respect to foreign suppliers. Although average license processing times are short, some license decisions are delayed by the interagency reviews conducted to assure that some applications receive the most thorough scrutiny from all the relevant experts and agency standpoints. Commerce officials point out that although the changes in COCOM requirements have reduced the annual number of license applications from around 125,000 to around 25,000, the remaining 25,000 are the most difficult to analyze. Defense Department officials argue that considerable progress has already been made in shortening license review times. [3]

The Administration EAA draft proposes assuring that nearly all license applications would be either resolved or referred to the President within 90 days of filing with the DOC. If no referral to other agencies were required, the license would be approved, or the applicant notified of DOC'S intent to deny it, within 9 days. If the application were referred to other agencies, they would have to recommend approval or denial within 30 days; if they should fail to act, they would be deemed to have no objection to the export. If the agencies involved disagreed, an interagency committee would review the case and its chairman would make a recommendation to the Secretary of Commerce. If one or more agencies objected to that recommendation, they could appeal it to a higher level interagency process which would either resolve the dispute or refer it to the President—again, all within the 90-day period that began with DOC'S receipt of the application.

There seems to be no reason why, with sufficient resources, current license decision deadlines could not be shortened to the times proposed in the Administration bill, or even less, without diminishing the quality of analysis and review that the license applications receive. This might be accomplished by:

- increasing the personnel needed to process licenses;
- streamlining interagency review processes, perhaps by detailing expert personnel to a central review office where their full-time work would be 1icense review; or
- developing the kinds of computer network resources described earlier in this report.

These measures would, however, cost additional funds that the executive branch has not re-

[3] In calendar year 1993, the average processing time for licenses not referred to other agencies was 10 days; the average for referred licenses was 49 days; the average for all licenses was 31 days. The DOC Inspector General reported in 1993 that from Jan. 1 to Sep. 30, 1992, 9,004 licenses not referred to other agencies took an average of 9 days to process; 8,695 others, referred to other agencies, took an average of 50 days. See Offices of Inspector General at the U.S. Departments of Commerce, Defense, Energy, and State, "The Federal Government's Export Licensing Processes for Munitions and Dual-Use Commodities: Special Interagency Review," September 1993, p. A-5.

cently been willing to allocate to export control management.

ANALYZE AND PUBLISH THE ECONOMIC COSTS

Some U.S. exporters have argued that the government imposes export controls without adequate consideration of the costs they will impose on U.S. industries. They have proposed, therefore, that assessment of the costs of controls should be made an integral part of the export control process. One analyst suggests that the new Export Administration Act:

> . . . should require timely annual reports on the quantitative effects of US export controls on US export competitiveness . . . Such reports should include sectoral and product detail, and should also attempt to size up effects of export controls on US direct investment and alliances abroad and on foreign direct investment and alliances in the United States. [14]

This analyst suggested that the statistical techniques he used to study the question of national security controls on exports to Communist countries could be applied in such reports. They probably can be used, but assessing the economic effects of particular export control measures would require more specific and detailed data than the current export control data management system yields. First, analysts would need to be able to break down license applications into their individual product components and assess the values of each type of component affected. (Under the current system, the values of exports affected can only be reported by the total value of the items falling under various Export Control Classification Numbers, not by the exact descriptions of the items or by the reasons for which they are each controlled).

It would also be desirable to develop a means of comparing the types of products controlled with the categories of products for which the Bureau of the Census collects export data. Second, analysts would need some means of assessing the amounts of business forgone because exporters were deterred by the licensing process from even attempting to make some sales, because the licensing process deterred buyers from carrying through orders, or because buyers went first to suppliers in other countries with less burdensome controls. Estimates on forgone sales would depend heavily on exporting firms' perceptions and judgments; some means would have to be found of compensating for possible biases in their perspectives.] [5]

Analysts making economic impact assessments of national security (COCOM) export controls would also have to conduct surveys of businesses that maintain internal control mechanisms to qualify for distribution licenses (which permit them to avoid applying for IVLS). The report writers would need information on the costs of maintaining such internal mechanisms and estimates of the competitive disadvantages or advantages they may produce. For nonproliferation controls, though, the costs of qualifying for distribution licenses do not apply, since such licenses are rarely granted for those items.

Insofar as export controls help stem proliferation (or achieve other objectives), the costs of *going without* certain export controls should also be given weight in assessing the net benefits and

[14] See J, David Richardson, "Economic Costs of US Export Controls," Statement before the Subcommittee on Economic Policy, Trade, and En\ ironment, Committee on Foreign Affairs, U.S. House of Representatives, Nov. 18, 1993 p. 12. A similar proposal for formal evaluation of the costs of controls is found in Benjamin H. Flowe, Jr., "Testimony before the Subcommittee on Economic Policy, Trade, and Environment of the House Committee on Foreign Affairs," June 9, 1993, pp. 8-9.

[15] An alternative to this direct empirical approach would be to use the method applied by Richardson, *Sizing Up U.S. Export Disincentives*, op. cit. That method involved a) estimating the level of overall exports (or, at best, exports categorized by the broad Standard International Trade Classification system) that the United States should expect to send to other countries depending on their income, population, and geographical distance: and b) estimating the shortfall from those levels of exports to countries subject to controls. Whatever else the advantages or disadvantag,s of this method, it will be difficult to apply specifically to nonproliferation controls until global trade statistics become available for the specific goods controlled.

costs of those controls. That is, the potential costs of proliferation taking place should be weighed in. This kind of assessment, though, as noted in the first section of this report, is an even more difficult task. **The issue is not merely what the costs of proliferation would be, but what the *probability* of hypothesized proliferation events would be with and without the controls in question.**

Some argue further that, at least in the case of nuclear nonproliferation controls, the national obligation under the Nuclear Non-Proliferation Treaty (NPT) to refrain from helping other nations acquire nuclear weapons outweighs any likely economic costs of nuclear-related dual-use export controls; therefore, those costs should not be an important consideration in whether the controls are maintained or not. This interpretation, however, has not been subscribed to either by U.S. administrations or by other NPT members.

On the other hand, a benefit for nonproliferation efforts may result from better U.S. and international data collection on the economic effects of some kinds of export controls. Better information about the actual patterns of trade in proliferation-relevant commodities could lead to a better understanding of the consumption patterns and supply networks of potential proliferants.

The Clinton administration's draft EAA states as U.S. policy:

> . . . to ensure that U.S. economic interests play a key role in decisions on export controls and to take immediate action to increase the rigor of economic analysis and data available in the decision-making process.

Appendix A: Estimating the Economic costs of Export Controls

A

Discussing Clinton Administration changes in export control policy for computers, then-Deputy Secretary of Defense William Perry said that the economic burden to exporters imposed by controls on computers was ". . . a significant factor, but I do not know how to quantify it." [1] This appendix illustrates the difficulties in trying to assign economic costs of nonproliferation export controls in the U.S. machine tool industry. First, however, is a discussion of the general difficulties of finding meaningful data.

DATA

The Department of Commerce (DOC) computer system for managing export control application reviews began as a means of simply tracking the status of applications. A weakness of the system is that it is not designed to yield certain kinds of aggregate data that would help assess the economic impact of controls. The basic unit of record keeping is the license application. After determining whether a given product requires an export 1icense, a company may need to apply for an Individual Validated License (IVL) to export the good to a specific buyer. However, a single license application may cover multiples of the same article, or it may cover several types of article, each with its own Export Control Classification Number. It may also include items that, if they were not to be shipped with a controlled product, would not require a 1icense. (The Department maintains a "Commerce Control List" that

Then-Deputy Secretary of Defense William Perry said that the economic burden imposed to exporters by controls on computers was ". . a significant factor but / do not know how to quantify it. "

1 William J. Perry, transcript of Breakfast with Reporters, Oct. 15, 1993 (venue not state(l).

specifies the kinds of goods and technology that are subject to export controls. Although some control numbers may be assigned each to a single, narrowly defined product, others may cover a broad range, and may contain either very general descriptions or large sublists of commodities.)

The result of this system is that the Commerce database can be searched either for numbers of license applications or for aggregate values of proposed shipments in licenses *containing* specific control numbers. But. short of individually examining each license application, it is not possible to determine the values of specific kinds of exports when several kinds are included in single licenses. In addition, licenses frequently are granted on the basis of 2-year forecasts by the applicants. The DOC has no way of knowing whether the licensed transactions actually take place. Given the shrinking development periods and lifecycles of high-technology goods, 2-year licenses may never be fully utilized.

Complicating matters is the fact that the Export Control Classification Numbers bear no relation to the ways in which other trade statistics are kept (e.g., the Bureau of the Census' export and import record system[2]). Thus, it becomes difficult to determine the actual portion of a particular industrial sector that is affected by the requirement to apply for an export license.

Even if such numbers could be determined, however, they do not tell the story of sales not made either because the buyers chose to shop in nations with less cumbersome export restrictions or because potential sellers chose not to bear the costs they perceive to be imposed by the system.

CASE STUDY: MACHINE TOOLS

Machine tools cut and form metals or other hard materials with varying degrees of precision. Sometimes they are used directly in manufacturing, and sometimes they are used to make the machines that produce other articles. They are essential to civilian industry, but they have a range of military industrial applications as well. They are useful for manufacturing many types of conventional weapons and vehicles. They are also useful for building nuclear weapons, for manufacturing high-speed centrifuges that can enrich uranium to go into nuclear weapons, and for making precision missile parts. Numerically controlled (usually meaning computer-controlled) machine tools meeting certain performance specifications are on the Commerce Control List (CCL) for both nuclear and missile nonproliferation reasons. Related computer hardware and software are also on the list. In addition, some tools not on the list for nonproliferation reasons are there for national security, i.e., Coordinating Committee on Multilateral Export Controls (COCOM), reasons.

The U.S. machine tool industry declined dramatically between the 1970's and the 1980's: in constant 1982 dollars, shipments declined from a high of $5.6 billion in 1980 to $2.2 billion in 1992. Thus, if the entire industry were considered to be one corporation, its sales in 1992 would have ranked only 159th in the Fortune 500 list.[3] In exports:

- Total U.S. machine tool exports in 1992 were slightly over $1 billion. The industry thus depended on exports for about 34 percent of its

[2]The Census Bureau (since 1989) gathers trade statistics using the Harmonized System (HS), which many countries use to facilitate comparison of international trade by commodity for various countries. The classifications of products in the HS bear no relationship either to the Export Control Classification Numbers or to the product descriptions on the Commerce Control List.

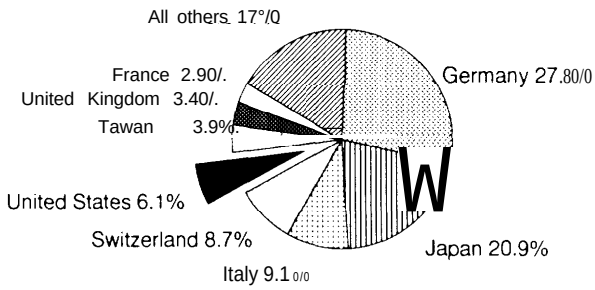
[3]"The Fortune 500 Largest U.S. Industrial Corporations," *Fortune*, Apr. 19, 1993, p. 190; with shipments estimated at $3.02 billion in 1992 dollars, if the industry were a single corporation it would have ranked between the Berkshire Hathaway company of Omaha and the Jefferson Smurfit company of St. Louis. The number one corporation, General Motors, had sales about 44 times larger.

revenues. (The machine tool industries of other major producing countries are even more dependent on exports. See figure A- 1 for distribution of the world machine tool export market.)

- Machine tools accounted for about 3.4 percent of U.S. durable goods exported in 1992.
- Import penetration is high—in 1982 imports accounted for 26.4 percent of machine tools consumed in the United States, but by 1992 they were 46.3 percent of consumption (even though, for several years beginning in 1987, "vo]untary restraint agreements" between the United States and several other machine tool producing countries helped restrict exports to this country).
- In the 1980s the United States consistently imported a billion or more dollars per year more machine tools than it exported. The difference went down to about $700 million in 1992, but consumption also declined.

All types of machine tools are not subject to export controls. Those subject to nonproliferation export controls are primarily computer-control led tools of relatively high precision. Numerically controlled machine tools of all types accounted for about $304 million, or 36 percent, of the U.S. machine tools exported in 1992, meaning that they accounted for about 12 percent of machine tool industry revenues. Table A-1 shows that in 1992, the Commerce Department approved 572 applications containing over $454 million worth of machine tools controlled for national security (COCOM) or foreign policy reasons. In the same categories of control, over $7 million in license applications were denied. Recall that IVLS are for 2-year periods and that the figures represent proposed sales, not actual shipments (nor shipments that would have taken place had a 1icense not been denied). Moreover, machine tool shipments generally occur 9 to 18 months after orders are placed. Nevertheless, the table suggests that a substantial portion of U.S. machine too] exports require

FIGURE A–1: 1992 Shares of Global Machine Tool Exports (All Types)



SOURCE Association for Manufacturing Technology 1993 and Office of Technology Assessment 1994

IVLS. Note, on the other hand, that in the same year (1992), only two approved applications, valued at $1.8 million, were for machine tools controlled only for nuclear nonproliferation reasons, and only one application for such an export, valued at about $400,000, was denied. As COCOM controls are further altered, the impact of export controls on the industry should decline.

In terms of dollar value relative to the Gross National Product (GNP) or the overall export picture, machine tools are not of great significance; in terms of the dollar value of business subjected to individual export licensing requirements, machine tools constituted about 2.5 percent.

Nevertheless, individual machine tool firms may be at risk. They depend on exports to stay in business and to supply revenues for research, development, and modernization. Since 1985, the United States has imported 40 to 50 percent of its machine tools. Machine tool industry advocates argue that theirs is a strategic industry. building machines

> . . . essential to our military readiness and our ability to respond quickly and effectively in the event of a national emergency ...4

[4]Thomas T, Connelly .. Statement on Behalf of AMT—The Association for Manufacturing Technology—before the Subcommittee on Economic Policy, Trade, and Environment of the House Committee on Foreign Affairs, " Nov.18, 1993, p. 2.

TABLE A–1: 1992 Machine Tool Individual Licenses

Reasons for control	Licenses approved		Licenses denied	
	Number	(Value $ millions)	Number	(Value$ millions)
National security (COCOM) only	312	309,4	6	6.3
National security and foreign policy	260	144,6	5	1,1
Foreign policy only	1	006	0	0
Nuclear proliferation only	2	18	1	0.4
Totals	575	455.8	12	7,8

SOURCE Department of Commerce, 1993

If the United States wants to maintain some elements of the U.S. machine tool industry for national security reasons, it may find that export controls that put the industry at a competitive disadvantage can interfere with that goal. The industry is highly dependent on exports for its livelihood and its research and development resource base; since it is a relatively small industry, business failure of a few key firms could have a major effect on the indigenous supply of advanced machine tools. In addition, industry advocates point out that U.S. companies are most competitive in the technological "high-end" products—the ones most likely to be subject to export controls.

Costs to U.S. Economy

On the other hand, of the eight countries that bought nearly 70 percent of U.S. machine tool exports in 1992, only two, China and Taiwan (together accounting for about 9 of those 70 percentage points) were likely to cause any proliferation concerns and possibly evoke licensing delays. At present, there is no concrete evidence to show that export controls in general, let alone the small fraction represented by nonproliferation controls, have in fact significantly harmed the industry. Better data, however, might show otherwise and give policy makers a better notion of whether one type of control or another places either the industry or particular firms at risk.

Appendix B: Complexities of Setting Export Control Thresholds: Computers

B

1993 COMPUTER EXPORT CONTROL CHANGES

In September, 1993, the Clinton Administration announced that it would:

- increase the threshold of computer capability above which U.S. licenses to most destinations would be required from 12.5 MTOPS (Million Theoretical Operations Per Second)[1] to the maximum that current Coordinating Committee on Multilateral Export Controls (COCOM) agreements would allow, 194 MTOPS;
- propose to COCOM partners to raise the multilateral threshold further to 500 MTOPS;
- propose to raise the definition of a supercomputer (in the bilateral control agreement with Japan) from 195 MTOPS to 2,000 MTOPS and review and update the requirements for safeguards on exported supercomputers;
- expand the availability of distribution 1icenses for computer exports; [2] and
- eliminate the control threshold for shipments to COCOM and COCOM-cooperating countries and increase the threshold for

It is questionable how significant a role advanced computation may play in improving the designs of a nuclear proliferant such as Iraq, Pakistan, or North Korea, especially in the absence of nuclear testing.

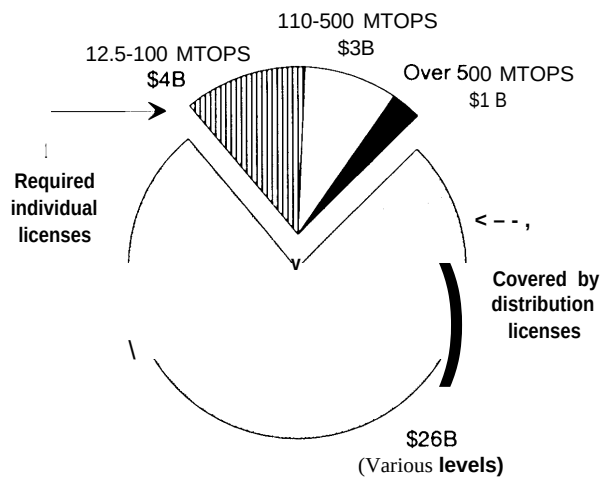
[1] MTOPS is the unit of measurement in the Department of Commerce's standard of "Composite Theoretical Performance" by which computers are compared for export control purposes.

[2] A distribution license allows a company to monitor its own exports for certain items, provided it maintains an internal control mechanism and submits to periodic government audits of its export records. See Export Administration Regulations, 15 CFR § 773.3 (Jan. 1, 1993).

shipments to many other destinations up to the supercomputer level.[3]

The Department of Commerce (DOC) estimated that the first step would free about $30 billion worth of computer exports annually from the requirement to obtain licensing authorization (see figure B-1). That $30 billion constitutes nearly 52 percent of the $58 billion worth of computer exports roughly estimated by the DOC to require either distribution licenses or individual validated licenses in fiscal year 1993 (note, however, that distribution licenses generally do not cover items controlled for nonproliferation reasons). The higher threshold for defining supercomputers would also freeup about $5 billion worth of computer exports annually from requirements for placing safeguards on their end uses.

FIGURE B–1: Value of Computer Export Licenses, FY 1993



SOURCE Department of Commerce, 1993

In ensuing negotiations, COCOM partners agreed only to decontrolling computers below 260, not 500 MTOPS, although U.S. officials considered this only an interim step. At the end of March 1994, the DOC announced that individual licenses would no longer be required for shipments of computers up to 1,000 MTOPS to former COCOM target countries. (The threshold would remain at 500 MTOPS for sales to nations listed in the Export Administration Regulations as being of nuclear proliferation concern.[4]) For the supercomputer control agreement, Japan would only agree to raising the threshold defining supercomputers to 1,500, not 2,000 MTOPS.

UTILITY OF COMPUTERS FOR DESIGNING WEAPONS OF MASS DESTRUCTION

Computers at the level of today's high-performance machines are not now—and never were—an essential technology for designing fairly sophisticated nuclear weapons.[5] Computers can contribute to weapon design by simulating the complex, high-speed physical processes occurring in a nuclear weapon. However, they are far from being critical tools that will make a difference in whether a country acquires nuclear weapons or not. Moreover, they are of most use to states with nuclear testing experience, since the calculations performed in weapon simulations are validated with test data.

Advanced weapon designers rely heavily on computers, and designers at any level of experience may also wish to use—although do not require—advanced computational capability. Nevertheless, the United States, drawing on its extensive body of nuclear test data, developed highly advanced nuclear weapons with computers

[3]Trade Promotion and Coordinating Committee, U.S. Department of Commerce, *A Message for Growth in a Global Economy: US Exports = US Jobs* (Washington, DC: U.S. Department of Commerce, 1993).

[4]In addition, computers above 6 MTOPS would continue to be denied to Iran and Syria, while Cuba, Iraq, and Libya continued to be generally embargoed by the United States.

[5]For a discussion of the utility of high-performance computers to a nuclear proliferant, see U.S. Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction.* OTA-BP-ISC-115 (Washington, DC: U.S. Government Printing Office, December 1993), pp. 125, 150-152.

vastly less capable than today's high performance machines. The Soviet Union and China developed their nuclear weapons with even less computing power.[6]

High-performance computers are relatively more important for advanced weapons, including thermonuclear ones, than for first-generation fission weapons. They can also be useful in the design of ballistic missiles' and other conventional military systems. According to a 1986 Department of Energy Report,

> With large-scale computers, we have been able to improve our designs by optimizing design parameters, while reducing the number of costly experiments in the design process. (Tests involving high explosives have been reduced from 180 tests for a 1 955-vintage weapon to fewer than 5 for today's weapons because of computation.)[8]

Moreover, although non-nuclear tests can provide information on the processes by which a nuclear explosion is triggered, no laboratory tests (other than computation) can simulate the processes of release of energy from nuclear materials. Therefore, the ability to carry out computer simulations can help weapon designers optimize the designs they want to test. Lacking adequate computational capabilities, the designers of the first U.S. nuclear weapons had to build in large margins of error, making the weapons much bulkier and heavier than they are today.

A U.S. supercomputer available in the early 1980s (the period immediately preceding the DOE report on supercomputer utility) was the Cray X-MP, whose peak performance was about 235 MFLOPS (Million Floating Point Operations Per Second—in this case roughly equivalent to the Commerce Department's MTOPS). This was about half the threshold that the Clinton Administration proposed in September 1993 to decontrol to most destinations and one-quarter of the March 1994 threshold.

LIMITS OF EXPORT CONTROLS

It is questionable how significant a role advanced computation may play in improving the designs of a nuclear proliferant such as Iraq, Pakistan, or North Korea, especially in the absence of nuclear testing. A judgment on this question would depend on:

- whether and to what extent the proliferant were able to obtain design information from one of the nuclear powers,
- how far both simulations and weapon designs can be refined in the total absence of actual nuclear tests,
- how capable the proliferant is of acquiring and using the necessary software, and
- the minimum practical thresholds of computational capability for carrying out the necessary s emulations.

THE QUESTION OF FOREIGN AVAILABILITY

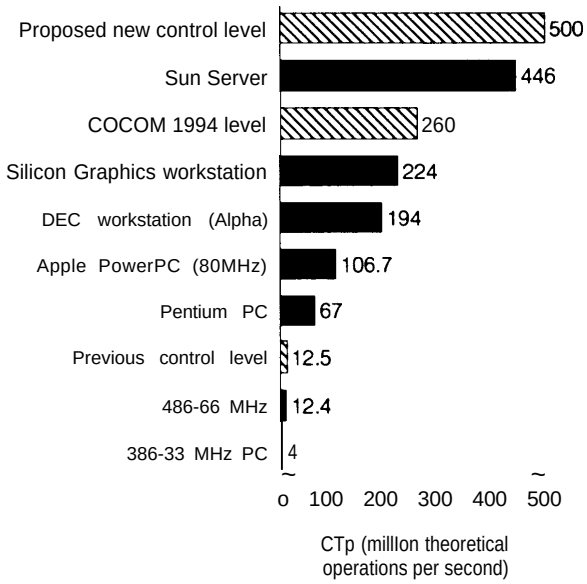
Critics of the Clinton Administration's relaxation of computer export controls have pointed out that the Nuclear Non-Proliferation Treaty (NFT) is a legally binding undertaking". . . not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture . . ." nuclear weapons; in this view, the phrase "in any way" is not conditioned by whether other nations are providing assistance, by whether U.S. firms are losing

[6]See Jack Worlton, "Some Myths About High-Performance Computers and Their Role in the Design of Nuclear Weapons," Worlton & Associates Technical Report No. 32, June 22, 1990, and "Export Controls for High-Performance Computers in the 1990s: A Reassessment," Worlton & Associates Technical Report No. 43, Nov. 1, 1993. See also the testimony of John Han ey before the U.S. House of Representatives Committee on Science. Space. and Technology, Aug. 13, 1993.

[7]See Gary M ilhollin, "'Designing the Third World Bomb," *Wisconsin Academy Review*, winter 1990-1991, pp. 15-18.

[8]See William D. **Wilson** et al., "The Need for Supercomputers in Nuclear Weapons Design, " manuscript, U.S. Department of Energy, Office of Military Application, January 1986, p. 9.

FIGURE B–2: Composite Theoretical Performance (CTP) of Selected U.S. Computers



SOURCE Department of Commerce, 1993, Apple Computer, 1994, and Off Ice of Technology Assessment, 1994

legitimate exports because of NPT compliance, or by the degree of importance of the assistance.[9] The U.S. Nuclear Non-Proliferation Act of 1978 (Section 309) does specify that the Department of Commerce should control '*. . . all export items [other than those licensed by the Nuclear Regulatory Commission] which could be, if used for purposes other than those for which the export is intended, of significance for nuclear explosive purposes." The definition of "significance" is not given, but clearly nuclear weapon designers would rather have computers than not, and would rather have more computing power than less.

Proponents of the computer decontrols argue that the potential effectiveness of controls *should be* taken into account. Although computers above the thresholds previously controlled by the United States may be useful to proliferant nations, they are increasingly available from non-U.S. sources. Despite continuing to control supercomputers in part because of apparent nuclear proliferation risks, the United States was unable to persuade the other members of the international Nuclear Suppliers Group to place them on the Group's list of multilaterally controlled dual-use technologies.

Although COCOM did control computers above the 195 MTOPS level, Administration officials judged that agreement on this threshold could not be sustained as COCOM underwent further post-Cold-War revision. Figure B-2 shows the Composite Theoretical Performance (CTP) of several U.S.-made computers, for which the central processing units have become or soon will become widely available throughout the world. A 1992 Commerce Department study of foreign availability of computers showed that machines exceeding the 12.5 MTOPS threshold were available from Brazil, China, Hong Kong, India, South Korea, Singapore, and Taiwan—none of which was a member of COCOM. Machines exceeding 60 MTOPS were available from Hong Kong, India, and Taiwan. The report predicted that widely available first-generation workstations based on the newest microprocessors would have CTP values ranging from 50 to 194 MTOPS. In general, advanced microprocessor chips are not controlled, and would be very difficult to control because of their small size, low cost, and vast consumer distribution.

Not only are higher performance central processing units becoming more widely available, but personal computers and work stations can be networked to process data in parallel, allowing them to exceed the performance of any element in the network. The hardware and software for doing so is widely available and not difficult to use. [10] On the other hand, some kinds of simulations may not be amenable to parallel processing, but instead require direct access by a single central processing unit to a large amount of random access memory.

[9] Applying this stricture to dual-use exports, however, has not been subscribed to either by U.S. administrations or by other NPT members.

[10] Worlton, "Export Controls for High-Performance Computers . . ." ibid.

Depending on the job the weapon designer is trying to do, parallel processing may or may not be useful.

Since high-performance computers are available from foreign sources and are not essential to whether any nation acquires nuclear weapons, U.S. companies argued that requiring licensing and end-user controls on American computers penalized them while serving no useful purpose.[11] Moreover, with the coming widespread availability of new high-power commercial processors such as the Pentium, Alpha, and Power PC, U.S. computer makers could lose much of the new market likely to center on those chips.

[11] Testimony of Tim Dwyer of Sun Microsystems, speaking for the American Electronics Association at a hearing of the Subcommittee on Economic Policy, Trade, and Environment of the House Foreign Affairs Committee, June 9, 1993.

Appendix C: Glossary of Abbreviations

C

BWC	Biological Weapons Convention
BXA	Bureau of Export Administration (Department of Commerce)
CCL	Commerce Control List
COCOM	Coordinating Committee on Multilateral Export Controls
CTP	Composite Theoretical Performance
CWC	Chemical Weapons Convention
DOC	Department of Commerce
DOE	Department of Energy
EAA	Export Administration Act
EAR	Export Administration Regulations
EC	European Community
ECCN	Export Control Classification Number
EPCI	Enhanced Proliferation Control Initiative
EU	European Union
IAEA	International Atomic Energy Agency
ISRO	Indian Space Research Organization
IVL	Individual Validated License
MFLOPS	Million Floating Point Operations Per Second
MTCR	Missile Technology Control Regime
MTOPS	Million Theoretical Operations Per Second
NAM	National Association of Manufacturers
NPT	Nuclear Non-Proliferation Treaty
NSG	Nuclear Suppliers Group
OEL	Office of Export Licensing, Bureau of Export Administration, Department of Commerce
PINS	Proliferation Information Networked System
PSLV	Polar Satellite Launch Vehicle
RWA	Returned Without Action
SNEC	Subgroup on Nuclear Export Coordination

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