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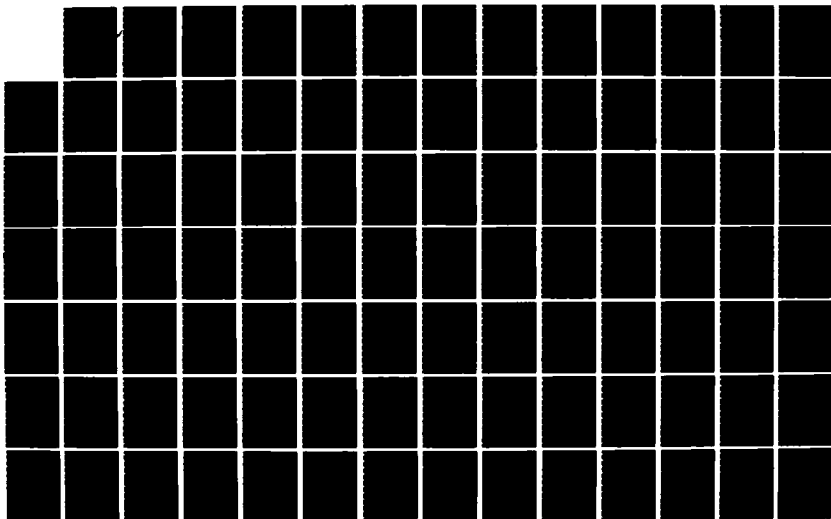
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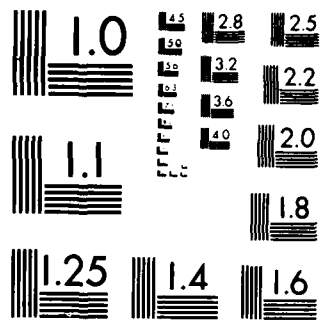
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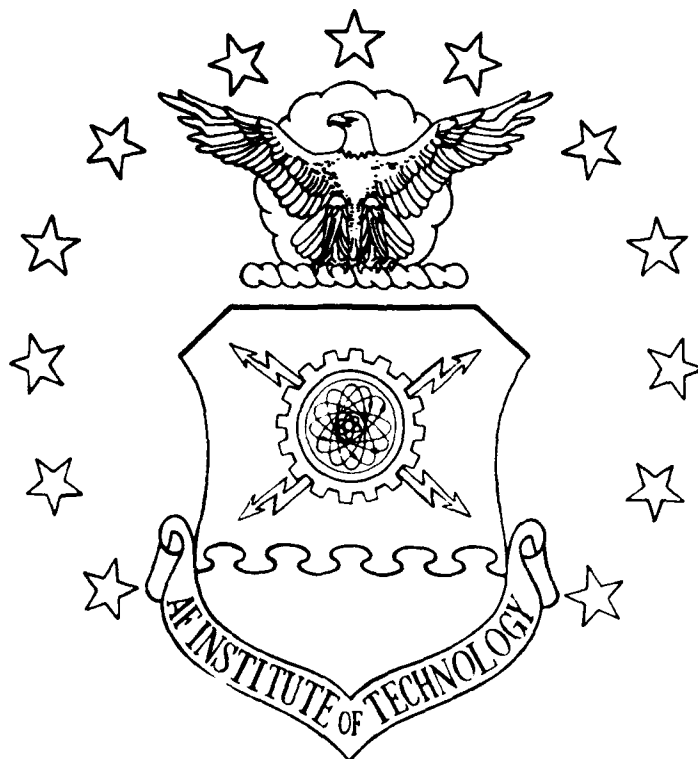
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A HISTORY OF CONTRACTOR INDEMNIFICATION
AND
ITS IMPLICATIONS FOR AIR FORCE POLICY

THESIS

Denean P. Rivera
Captain, USAF

AFIT/GLM/LSM/86S-69

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A HISTORY OF CONTRACTOR INDEMNIFICATION
AND ITS IMPLICATIONS FOR AIR FORCE POLICY

THESIS

Presented to the Faculty of the School of Systems and
Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Denean P. Rivera, B.S.

Captain, USAF

September 1986

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Denean P. Rivera, Captain, USAF

Abstract

Indemnification is an assurance from one party freeing another from risk of loss. Under certain circumstances, such as the use of nuclear power or hazardous materials, the government may elect to indemnify a contractor. The focus of this effort was to determine the parameters of the global government contractor indemnification problem and then examine the implications for the Air Force. To accomplish this task, an historical perspective on government indemnification was presented, studies and investigations on indemnification were examined, relevant litigation was reviewed, legislative attempts to change indemnification and product liability laws were described, and finally the evolution of Air Force policy on indemnification was examined. With this basis, an in-depth discussion of primary indemnification issues facing the Air Force--those of insurance, catastrophic risk and product liability--was undertaken. The results were (1) a primer on the indemnification of government contractors; and (2) general recommendations for future Air Force indemnification policy. Three general recommendations were made based on the author's perception that, given the nature of future Air Force programs, indemnification of government contractors for catastrophic loss and product liability is inevitable. The recommendations are: (1) informal policy should be loosened

to include consideration of catastrophic risk and product liability indemnifications; (2) retention of a case-by-case approval of indemnification is essential; and (3) there is a need for an insurance consultant in the approval process.

A HISTORY OF CONTRACTOR INDEMNIFICATION AND ITS IMPLICATIONS FOR AIR FORCE POLICY

I. Introduction

Indemnification, as defined in a report of the Commission on Government Procurement, is "an assurance wherein one party frees another from an anticipated loss, or risk of loss, or prevents him from suffering loss or damage due to the legal consequences of an act" (14:1). Under certain circumstances the government may elect to indemnify a contractor. In so doing, the government acts as the insurer for the contractor in the event of loss, damage, or liability during the performance of the contract. In the case of the Department of Defense, the government indemnifies defense contractors who are working with hazardous materials or in unusually hazardous situations, such as working with volatile fuels or nuclear power (14:1).

There are two legislative statutes the Department of Defense employs to indemnify defense contractors. They are 10 U.S.C. 2354 and 50 U.S.C. 1431, commonly known as Public Law 85-804. 10 U.S.C. 2354 permits indemnification of contracts for research and development only. There have been few problems associated with the use of that statute. The residual powers of Public Law 85-804, however, permit the Department of Defense to indemnify a contractor for the sole purpose of facilitating the national defense (75:1).

Executive Order 10789, as amended by Executive Order 11610, implements Public Law 85-804 and impacts indemnification of government contracts by stating that risks covered must be "unusually hazardous or nuclear in nature, for which commercial insurance is not reasonably obtainable" (52:1).

The Department of Defense, particularly the Air Force, has utilized Public Law 85-804 as a vehicle to indemnify production contracts involving hazardous conditions. In practice, the use of Public Law 85-804 has been inconsistent and fraught with volatile issues, such as insurance, catastrophic risk and product liability, of interest to both the contractor and the government.

The methodology of this thesis will be to define the parameters of the indemnification problem by (1) presenting an historical perspective on government indemnification; (2) examining studies and investigations conducted by government agencies; (3) reviewing relevant litigation; (4) describing the repeated, unsuccessful attempts at legislative change; and (5) examining the evolution of Air Force policy.

Having examined the global indemnification problem and then narrowly focused on Air Force indemnification policy, the platform is set to evaluate the primary indemnification issues facing the Air Force; those of insurance, catastrophic risk and product liability. Implications for current and future Air Force acquisition programs such as the Space

Shuttle, Global Positioning System (GPS), and Strategic Defense Initiative (SDI), will be included in the discussion of issues. These programs, set in an environment of limited insurance availability, increased contractor liability and the increased probability of catastrophic accidents, may in the near future, appear to be unacceptable risks to Air Force contractors. If that should occur, the Air Force could find itself in a position of (1) indemnifying more programs than it feels is expedient, or (2) paying contractors for their perceived increased risk. Neither alternative is attractive.

In light of the implications of the primary issues for the Air Force, the author will offer recommendations for future Air Force policy on indemnification. These recommendations are designed to serve as a basis for further, more narrowly-focused investigations, in order to arrive at specific policy changes.

II. Historical Perspective

This chapter will present an historical perspective on the broad topic of indemnification of government contractors. Included in this review are applicable statutes such as The First War Powers Act Title II, the revival of Title II, 10 U.S.C. 2354, Public Law 85-804, and the Price Anderson Act.

The First War Powers Act, Title II

The origin of indemnification of contractors by the government can be traced to the First War Powers Act, Title II, passed as a result of the attack on Pearl Harbor during World War II. The intent of this legislation was to ease the emergency procurement of war materials by giving the President the power to enter into contracts "without regard to otherwise applicable requirements of law" (66:2-3).

There was considerable debate in the Congress over the apparently broad range of authority delegated to the President by Title II. The bill's sponsor, Senator Van Nuys, felt the range of authority was not too broad. The Executive Branch had identified what it felt were the objectives of the legislation. Those objectives were: 1) authorization to suspend competitive bidding; 2) release from the necessity of requiring performance or other bonds; 3) authorization for agencies to amend contracts; and 4) authorization for progress payments. Senator Van Nuys agreed with the

Executive Branch. Senator Taft, however, felt the language was so broad that the legislation was a "... blanket, substantive change in the law governing the award and modification of war contracts." (66:2-3)

Eventually, an amendment was made to address a specific concern regarding any limitation on profits, but it did nothing to change the inherent power of the legislation. Further debates took place in Congress and were resolved. None of these debates involved the question of the right of the government, under Title II, to indemnify contractors. The statute did not address the subject of indemnification, nor did President Roosevelt's executive order implementing Title II.

In 1942, the Attorney General, responding to a request by the Secretary of War for clarification on indemnification and other issues, stated that indemnification was clearly within the authority of the Secretary of War. The Attorney General determined that if the discretionary authority of Title II was used reasonably and if the action taken was a "good faith determination that it would facilitate the war effort", the indemnification action was authorized. (66:2-3)

The specific request by the Secretary was for the indemnification of a dredge owner against loss of his dredge and plant by enemy action and against liability under Workmen's Compensation Laws. In light of the Attorney General's determination, this and other indemnification

requests were subsequently approved under Title II. (66:2-3)

Title II Revived

Although the authority of the First War Powers Act originally was limited to World War II, it was extended for the Korean Police Action. While indemnification was not initially a subject of Title II, the situation had changed greatly by 1950.

On April 16th, 1947, the French freighter Grandcamp carrying 2,500 tons of ammonium nitrate fertilizer under contract to the United States Army, caught fire and exploded. The fertilizer was to have been delivered abroad as postwar aid. It was produced and shipped according to United States specifications and under United States control. The resultant destruction in and around the Texas City, Texas docks included a nearby steel barge, two light planes, a Monsanto chemical plant, oil refineries, tin smelters and waterfront tanks containing chlorine gas, sulfur and nitrate. The following morning, the Grandcamp's sister ship, the High Flier, exploded. (69:1; 59:3)

There were a total of 570 persons dead, 50 missing and 3,500 injured. Approximately 1,000 homes, factories and other buildings were badly damaged or destroyed. Total claims were estimated from \$300 million to billions of dollars. The Army paid \$17.1 million in settlement of claims under the limited settlement authority of the Texas City Disaster Relief Act, enacted eight years after the accident.

Limits set by the statute were \$25,000 on awards for death, personal injury and property damage. The last payment would not be made until 1962, fifteen years after the accident. The limited Relief Act had been the only means of compensation to victims since the fertilizer contract had not been indemnified under Title II. (14:99; 69:1; 59:3-4)

President Truman called for new legislation similar to Title II. His argument for new legislation included his concern for the need to indemnify defense contractors. In a letter to Congress, President Truman stated:

...It is already apparent that agencies responsible for defense production will need authority to modify existing contracts in order to avoid undue delays on production and to keep suppliers in business on government work

Other government contractors, engaged in especially hazardous work for the military services, may have to be indemnified promptly for damage to facilities and equipment in order that repair or replacement may be undertaken without delay. (66:4)

In hearings before the Senate Committee on Expenditures in the Executive Departments, Under Secretary of the Army, Archibald Alexander testified to the need for indemnification agreements with contractors:

The Chairman. Can you cite any other examples of how the act will work in cases that have developed, particularly with reference to making advances on contracts?

Mr. Alexander. Yes, sir. I can cite an example where the Air Force has wished to make a contract which it cannot find a contractor to take because of its inability to invoke the indemnity provision. In other words, the risk which the contractor finds he takes if he is to be his own indemnifier is so great because of the dangerous area where the work

is to be done

The Chairman. You do not know how vitally important that particular item is?

Mr. Alexander. No sir; but the aggregate, counting the number of explosive contracts that we will have to be getting into with private contractors, my opinion is that very soon the total amount of contracts which would be inordinately expensive if we cannot indemnify the private contractors, will be very great. (66:4)

It is apparent from other testimony in 1950, that World War II indemnification under Title II had been authorized in order to reimburse contractors for the high cost of their insurance. While this was still true, there was now evidence to prove a need for indemnification when insurance coverage was unavailable because of the hazardous conditions under which contractors were now being asked to work.

Instead of the new legislation President Truman had requested, Title II was simply revived. However, since the intent of the revival was to support the Korean Police Action, which was not a declared war, an important amendment was made to Title II. Title II, which originally could be utilized only "to facilitate the prosecution of the war" was amended to be utilized where it would "facilitate the national defense." In 1951 President Truman issued Executive Order 10210, implementing the revived, amended Title II.

Initially President Truman delegated authority for the use of Title II only to the Department of Defense. Shortly thereafter, however, he extended his delegation to the Atomic Energy Commission, the National Advisory Committee for

Aeronautics, the Government Printing Office, the General Services Administration, and the Federal Civil Defense Administration. (66:4-5)

10 U.S.C. 2354

By 1952, continued research and development efforts utilizing hazardous materials had increased the risks associated with defense contracts. Because of the increased risks, commercial insurance policies became either completely unavailable to contractors or provided inadequate coverage against possible catastrophic occurrences. As a result, contractors began to request indemnification of their research contracts (38:1).

Congress became particularly concerned with ensuring that defense contractors would continue to conduct the government's experimental work. Research and development efforts were pushing the state-of-the-art in potentially hazardous areas. Examination of the legislative history reveals that military research and development programs were seen as the "future security of our Nation" (72:2282).

The Assistant Secretary of Defense, Max Leva, wrote to the Chairman of the Senate Committee on Armed Services, on January 5, 1951 in reference to the passage of H.R. 1180 (Army, Navy and Air Force Departments - Research and Development Work):

...The purpose of this legislation is to provide the military departments with administrative authority required to carry out research and

development programs. (72:2282)

Mr. Leva then outlined seven administrative powers which were essential to effectively implement Department of Defense research and development programs. Among them was "The indemnification against damage loss, where the contractor is unable to procure insurance coverage." He went on to assure Congress that the enactment of the proposed legislation would result in no additional expenditure of funds, "except to the extent that unforeseen hazards may create liabilities under the indemnity provisions ... It is impossible to foresee the extent of claims under those provisions." (72:2283)

Later in 1951, 10 U.S.C 2354 was passed as a means to provide indemnification to contractors engaged in research and development efforts for the Department of Defense. The legislative history reflects that the absence of adequate insurance coverage and the presence of prohibitive premiums were justification for its passage. The primary requirement of 10 U.S.C. 2354 was that the contract involve unusually hazardous new developments. This requirement excluded any follow-on production contracts. Additionally, claims had to arise out of direct performance of the contract. Finally, 10 U.S.C. 2354 applied only to Department of Defense contracts. (65:3)

By electing to indemnify under 10 U.S.C. 2354, the government assumes the risk of loss, destruction or damage to the contractor's property and liabilities of third persons

for injury, death or property damage. The inclusion of Department of Defense Federal Acquisition Regulation (FAR) clause 52.235-7000 for fixed price contracts and 52.235-7001 for cost reimbursement contracts is a matter of individual review, approval, and negotiation. Negotiations extend beyond the applicability of indemnification to specific areas of risk and the amount of insurance coverage.

Public Law 85-804

Other than Title II of the War Powers Act (which had been revived for the Korean Police Action and extended several times), there were no provisions for the indemnification for other than government research and development contracts. After World War II, the advent of nuclear power and the accompanying use of highly dangerous fuels required for missiles, however, increased production as well as research and development risks to defense contractors. Consequently, Congress began to examine the need for specific legislation to provide for the indemnification of the production of government contract items which, "although not considered especially hazardous in themselves, might yet give rise to an enormous amount of claims" in the event of an accident (66:7).

As a result of testimony during proceedings in 1950 to revive Title II, the need to provide indemnification on production contracts was already well known. In 1958, Congress indicated a desire to enact permanent Title II

legislation, rather than continuing to grant renewals to Title II. In response, H.R. 12984 was submitted.

In reference to potential disasters in programs such as missile development and nuclear shipbuilding, the Department of Defense General Counsel testified:

Of course, the fact is that this [an accident] is not extremely likely to happen is something which does not give complete comfort to the directors or legal officers of these private companies because if the accident that is not likely to happen does in fact happen it may have such extraordinary consequences attached to it. The mere bringing of such suits where there is no insurance coverage against an ultimate judgement and no indemnification against an ultimate judgement may seriously affect the stockholders of that company, even if they finally win the lawsuit. This is the reason for the great concern in this field. (66:5)

The Deputy General Counsel of the Department of the Navy testified that indemnification agreements had been used to indemnify contractors constructing nuclear submarines, because an incident involving nuclear submarines could cause much larger damages than those brought about by the Texas City Disaster. The Chief of the Bureau of Ships testified that it was impossible to negotiate a contract for the construction of a nuclear submarine or surface vessel unless the contractor was indemnified.

Congressman Forrester explained to the House of Representatives the need for the United States to assume potential liability:

As I say, it is absolutely essential that this legislation be passed. For instance, the Government just simply must have the right to assure our contractors that it will indemnify them

against some losses that might occur, in the missile field and in the satellite field particularly.

One of the witnesses over there likened this situation to the Texas City Disaster, where it was said on that occasion it was not supposed to happen, and, of course, there was a billion-dollar loss there. That is what our government is facing. They have to have those indemnifications

They have to have the opportunity to give those indemnifications, particularly in the missile field, the satellite field, the building of submarines, and the building of ships, and have the right to modify and make more of those contracts equitable. (74)

When H.R. 12984 was reported out of Congress on July 18, 1958, the report reflected their views as follows:

One of the most significant developments, under Title II has been the use of that authority as the basis for indemnity provisions in certain contracts Production contracts for items like nuclear-powered submarines and missiles, although not considered especially hazardous, still give use to the possibility of an enormous amount of claims. The Department of Defense and the Committee believe, therefore, that to the extent commercial insurance is unavailable, the risk of loss should be borne by the United States. (66:6)

Public Law 85-804 was enacted by Congress on August 29, 1958. It states, in part:

The President may authorize any department or agency of the government which exercises functions in accordance with regulations prescribed by the President for the protection of the Government, to enter into Contracts or into amendments or modifications of contracts heretofore or hereafter made and to make advance payments thereon, without regard to other provisions of law relating to the making, performance, amendment, or modification of contracts, whenever he deems that such action would facilitate the national defense. (75:1)

While there was no actual mention of indemnification in

Public Law 85-804, Executive Order 10789, as amended, implemented it and authorized indemnification of contractors by stating that risks covered must be defined as "unusually hazardous or nuclear in nature, for which commercial insurance is not reasonably obtainable" (52:1).

The use of Public Law 85-804 for indemnification was substantially limited by Executive Order 10789, which required agencies to make any indemnification agreement "subject to the availability of funds." Executive Order 10789, paragraph 1, made indemnification subject to "the limits of the amounts appropriated and the contract authorization provided therefor ..." (52). The argument was made that a reservation of funds was required to cover any potential indemnification liability under Public Law 85-804. The opposite camp said that since an indemnification is, in fact, a contingent liability, it is not obligated against any specific appropriation in government accounting. The Department of Justice was asked to consider this matter.

On August 11, 1967, the Justice Department held that the language "relates to the conventional obligations of procurement and construction contracts and not to highly contingent liabilities under indemnity clauses included therein." They did, however, recommend an amendment to the Executive Order to "expressly authorize and regulate the conclusion of indemnity agreements. (66)

Executive Order 10789 was amended with the issuance of

Executive Order 11610 by President Nixon in 1971, adding paragraph 1A:

A. (a) The limitation in paragraph 1 to the amounts appropriated and the contract authorization provided therefor shall not apply to contractual provisions which provide that the United States will hold harmless and indemnify the contractor against any of the claims or losses set forth in subparagraph (b), whether resulting from the negligence or wrongful act or omission of the contractor or otherwise This exception from the limitations of paragraph 1 shall apply only to claims or issues arising out of or resulting from risks that the contract defines as unusually hazardous or nuclear in nature. (53)

In 1982, the Comptroller General, in response to a Department of Health and Human Services request for an opinion, determined that the procurement regulation governing Department of Defense indemnifications (Defense Acquisition Regulation (DAR) 7-203.22) violated the Anti-Deficiency Act and the Adequacy of Appropriations Act. The Comptroller General held that committing the Government to pay undetermined liabilities that could feasibly exceed the available appropriations was illegal. In response, the DAR Council extended a blanket deviation, modifying the regulation and limiting recovery to the amount of available appropriations at the time of the incident. (56:324)

In 1983, the Comptroller General, in decision B-201072, reversed his previous opinion and defined statutes such as Public Law 85-804, 10 U.S.C. 2354 and Price Anderson as "statutory exceptions" to the Antideficiency Act:

...confer[s] what might be termed "contract authority" - i.e., authority to commit the

Government to future obligations even though no appropriations are available to pay the obligation at the time the contract is made (15:7)

Executive Order 11610 also added three more requirements to the provisions of Public Law 85-804. They were: 1) to approve indemnifications "in advance by an official at a level not below that of the Secretary of a military department;" 2) to make each indemnified contractor "provide and maintain financial protection of such type and in such amounts as is determined by the approving official to be appropriate under the circumstances;" and 3) to consider the availability, cost and terms of "private insurance, self-insurance, other proof of financial responsibility, and workmen's compensation insurance" (53).

In addition to the Department of Defense, other agencies given authority to utilize Public Law 85-804 were the Department of the Treasury, Department of the Interior, Department of Agriculture, Department of Commerce, Atomic Energy Commission, General Services Administration, National Aeronautics and Space Administration (NASA), Tennessee Valley Authority and the Government Printing Office (52). Executive Order 11610 added the Department of Transportation (53). This list of agencies was a substantial increase beyond those authorized under the First War Powers Act, Title II and beyond the Department of Defense limitation of 10 U.S.C. 2354.

Although other agencies were included in Public Law

85-804, they were not quick to use it to indemnify their contractors. Two agencies that have very recently decided to utilize Public Law 85-804 are NASA and the Department of Transportation.

Until recently, NASA has, as a matter of policy, not utilized Public Law 85-804. This was due to its reluctance to declare that NASA space shuttle operations are "unusually hazardous" and would "facilitate the national defense." For some time NASA effectively handled third party liability by requiring inter-party waivers of shuttle users. These Interparty waivers are, in effect, a "promise" not to sue NASA or the other shuttle users, in the event of an accident.

NASA's acceptance of Public Law 85-804 indemnification occurred after trying several other approaches. In 1961, NASA submitted a bill to Congress to extend indemnification authority to NASA, similar to that of the Department of Defense. A revised bill passed the house that year. During Senate hearings, the bill was revised along the lines of the Price Anderson Act (described later in this Chapter). However, no further consideration has been given to that bill by Congress since that date.

In 1978, NASA proposed the addition of Section 308 of the National Aeronautics and Space Act of 1958, entitled "Indemnification and Insurance." Under Section 308, NASA would require commercial space shuttle users to insure

against third party liability. This could be accomplished by 1) requiring users to purchase commercial insurance; or 2) using NASA appropriations to procure commercial insurance and then reimbursing those appropriations by prorating the premiums for the insurance among several users. (48:4-6)

Additionally, if the entire shuttle flight were for government purposes, the Government would act as self-insurer. However, if even one of the payloads on a government flight were commercial, NASA would indemnify that user for third party liability. It should be noted that in the case of NASA indemnification, NASA is essentially the contractor and indemnifier to the customer or user. (48:4-6)

NASA's indemnification policy recently shifted further to include use of Public Law 85-804. The apparant reason for this shift was the announcement by Rockwell International that its insurance underwriters were proposing to add a seperate premium charge of \$1 million per space shuttle launch. This was an addition to the product liability coverage premium, while the basic premium was also to be increased. According to an Air Force Systems Command letter, insurance premiums would increase from \$230,000 for STS-5 to \$2,900,000 for STS-6 (6:1). These increased costs would be passed on to the Government. Based on this, NASA decided to review its prior policy with respect to Public Law 85-804 and its Space Transportation System (STS) contractors. NASA stated:

Indemnification is necessary to the accomplishment of NASA's mission since there is a substantial risk that NASA would not be able to obtain the necessary participation of private contractors in essential space activities without use of this authority. (34:8; 3:1)

The NASA Memorandum of Decision Under Public Law 85-804 provides the following:

The initiation of scheduled Space Transportation System (STS) operations at an increasing frequency has dictated a reexamination of the risks in repetitive space activities of the STS and the present availability of adequate insurance at reasonable premiums to manufacturers and operators of the system. While NASA's STS space activities are designed to be safe, and have been proved to be safe, there exists the remote and low statistical probability that a malfunction of either hardware, software or operator error could occur resulting in an accident. This low probability of occurrence, albeit remote, cannot be totally removed. In the event that such a malfunction or operator error led to an accident, the potential liability arising from such an accident could be substantially in excess of the insurance coverage NASA contractors could reasonably be expected to acquire and maintain considering the availability, cost and potential terms and conditions of such insurance at the present time. (7:4)

The Memorandum of Decision goes on to describe the STS risks as follows:

These risks are considered unusually hazardous risks solely in the sense that if, in the unlikely event, the Space Transportation System, its cargo or other elements or services used in NASA's space activities malfunctioned causing an accident, the potential liabilities could be in excess of the insurance coverage that a NASA prime contractor would reasonably be expected to purchase and maintain, considering the availability, cost, terms and conditions of such insurance. In no other sense are the Space Transportation System, its cargo or other elements or services used in NASA's space activities unusually hazardous. (7:5)

NASA's definition of unusually hazardous risks is a

departure from the Department of Defense's traditional interpretation as risks associated with dangerous activities. The reason for this broad interpretation is probably due to NASA's policy of portraying the STS as a somewhat routine, dependable transportation system. The 1986 Space Shuttle Challenger disaster would seem to belie this contention and support NASA's decision to indemnify users through Public Law 85-804.

On January 28, 1986, the Space Shuttle Challenger exploded seventy-three seconds after launch. The subsequent investigation revealed the accident was primarily due to the failure of the rubber sealant "O" rings on the rocket booster. All seven crew members were killed. The Shuttle and its payload were destroyed. The two solid rocket boosters were destroyed by the Air Force safety officer within seconds after the explosion, to preclude their possible impact on the surrounding communities. Fortunately, the accident occurred over the ocean, so there was no civilian damage or catastrophic accident. (57:19-20)

NASA was not the only agency lately embracing Public Law 85-804. On December 7, 1981, the Secretary of Transportation authorized the Federal Aviation Administration (FAA) to indemnify under Public Law 85-804 contracts related to its Air Traffic Computer Replacement Program. Justification for indemnification of this program under Public Law 85-804 is found in the Secretary's Decision:

Under FAA's En Route Air Traffic Computer Replacement Program, equipment will be developed to update the present Air Traffic System. This operational system will be the primary tool used by the air traffic controller to perform a widespread and continuous safety function. This system will have automated control decisional functional capability so that in response to projected increasing congestion in the national airspace system, the potential for human error will be minimized or eliminated. The hardware and software developed for the program will be quite sophisticated, inasmuch as it will possess a fail safe capability, including self-test and evaluation capabilities. The replacement system will be capable of operating 24 hours a day and will possess technical requirements for hardware and software utilized in most commercial applications of computers. Statistically, there is a low probability of malfunction to the system; however, this cannot be reduced to zero. In the event that a malfunction leads to an accident, the potential claimants would be quite numerous, and the severity of potential damage could be catastrophic. While the risk of a catastrophic accident may be remote, if it occurs, it could be far in excess of the insurance coverage that reliably and reasonably could be obtained by manufacturers in the marketplace for the life of the system. (27:1)

The risks involved are defined in the authorization as:

... occurrence or series of incidents or occurrences, causing personal injury or death, or loss or damage to property arising out of or resulting from the use, operation, malfunction, or failure of any hardware or software provided under this contract (7:3-4)

It is notable that the authorization does not describe risk in terms of being unusually hazardous. Additionally, the authorization includes a \$500 million deductible amount per accident, meaning the Government is only liable for damage if recoveries exceed \$500 million per accident (7:3-4).

The Department of Transportation and NASA have taken

similar approaches in liberally interpreting the unusually hazardous provision of Public Law 85-804. However, they have also taken separate approaches in risk coverage since NASA has not applied a deductible amount to its indemnified contracts.

Price-Anderson Act

Prior to the passage of the Atomic Energy Act in 1954, virtually all atomic energy programs were conducted in government-owned laboratories and plants. Initially the Manhattan Engineer District (MED) of the War Department, and later its successor, the Atomic Energy Commission (AEC) used "management contractors" to conduct government programs. This allowed the government to take advantage of industry's skill and experience while maintaining control. In this type of relationship the government bore all of the risks of loss. However, even so, the contracts typically contained indemnification clauses for the unusual and potentially hazardous risks. (46:912-915)

When Congress enacted the Atomic Energy Act, the intent was to encourage private industry to enter the field in order to "speed the further development of the peaceful uses of atomic energy" (64:6). However, many of the same companies who had earlier participated as management contractors were reluctant to become licensees because the risk of liability for damages was perceived as too great.

In fact, according to 1957 estimates, liability damages

for a nuclear accident could range from several hundred thousand to a billion dollars for a runaway reactor (64:6). As a result of private industry's reluctance to risk its own capital to such a degree, in 1957 Congress passed an amendment to the Atomic Energy Act, entitled the Price-Anderson Act.

Price-Anderson was intended to 1) encourage the development of the nuclear industry through the participation of private industry; and 2) assure the availability of funds in the unlikely event of a catastrophic nuclear accident. Although it was not an express intent to include protection for contractors as well as licensees, contractors were included. Additionally, in 1958 Price-Anderson was amended to include in its indemnity provisions the United States' first nuclear powered submarine, the Savannah (76)

While Price-Anderson removed the requirement of law subjecting contracts to the availability of appropriated funds, the Act did not rely on whatever funds could be accumulated after the fact -- after a nuclear accident. Instead, the Act provides for liability recovery through the use of four components, each discussed below:

Financial Protection. Companies in the nuclear industry are required to maintain insurance at the levels specified by the Nuclear Regulatory Commission (NRC) (successor in 1974 to the AEC). Section 170 of the Price-Anderson Act reads, in part:

(a) Each license issued under Section 103 or 104 and each construction permit issued under Section 185 shall, and each license issued under Section 53, 63 or 81 may, for the public purposes cited in sub-section 2(i) of the Atomic Energy Act of 1954, as amended, have as a condition of the license a requirement that the licensee have and maintain financial protection of such type and in such amounts as the Commission in the exercise of its licensing and regulatory authority and responsibility shall require in accordance with sub-section 170 (b) to cover public liability claims ... (73:8)

Each company has the option of procuring private insurance or of self-insurance. If private insurance is selected, the NRC requirements can be satisfied by the use of a standard form nuclear energy liability policy (64:6). This financial protection will be the first source of funds tapped in the event of an accident.

Deferred Premium Insurance. The NRC requires licensees to provide proof that a deferred premium amount (up to \$10 million) will be available for use in an excess damage pool. This pool would only be activated in the event of a nuclear accident that exhausts the financial protection of the company involved in the accident. If a licensee is unable to make deferred premium payments when assessed, the NRC makes the payment instead, but the company must reimburse the NRC in a timely manner, or risk having its license suspended or revoked. (64:6)

Recovery Ceiling. A \$560 million ceiling is imposed on total recoveries from any one nuclear accident. The constitutionality of this provision was challenged as a

violation of "Due Process" under the Fifth Amendment. A U.S. District Court held it was a violation because it (1) imposed a limitation on recoveries which was not rationally related to the potential losses; (2) tended to encourage irresponsibility; and (3) did not give the public anything in return for limiting the damage recovery available to members of the public. The Supreme Court reversed the U.S. District Court decision, stating the \$560 million was not irrationally low and did not encourage irresponsibility. The Supreme Court felt that, without this limited fund, the public could only collect from a single company whose funds would be more limited. (64:6)

Government Indemnification. This is the last resort for damage recovery under Price-Anderson. This is a requirement, not an option, for licensees who are required to maintain protection of less than \$560 million.

(c) The Commission shall, with respect to licenses issued between August 30, 1954 and August 1, 1987, for which it requires financial protection of less than \$560,000,000, agree to indemnify and hold harmless the licensee and other persons indemnified, as their interest may appear, from public liability arising from nuclear incidents which is in excess of the level of financial protection required of the licensee. (73:10)

Licensees maintaining more financial coverage may also be indemnified; however, this provision is not currently applicable since the maximum protection the NRC is requiring is \$160 million. Therefore, all licensees are presently indemnified for the liability exceeding the required

financial protection.

It should be noted that Price-Anderson applies only to nuclear facilities. It does not cover the explosion of a nuclear bomb, or accidents with nuclear warhead missiles.

On April 26, 1986, a Soviet nuclear power plant at Chernobyl exploded. According to Soviet reports, only thirty-two people have died, although hundreds became sick and it is unknown how many may eventually develop cancer. Damage has been estimated at \$2.8 billion and approximately 400 square miles of land in the northern Ukraine and Southern Byelorussia are contaminated. More than 100,000 evacuated people were relocated and provided with new housing and jobs. (61:6A)

According to Soviet Government statements and press reports, the accident was a result of worker negligence while conducting experiments on a turbine generator. A description of the accident was provided:

... the reactor surged out of control. The cooling system failed, radioactive steam was vented and combined with hydrogen that exploded in a giant fireball, ripping open the reactor. (68:4-A)

Under normal circumstances, one would expect to use this accident to judge the appropriateness of Price-Anderson's recovery ceiling and indemnification provisions. However, since full and responsible information on casualties and damage in the area may not be forthcoming, the United States may learn very little from the accident that will be helpful in estimating the appropriateness of our own provisions.

Additionally, even if information is provided, it may be difficult to equate damages incurred in the controlled society of the Soviet Union to damages that would be claimed in the United States.

III. Studies and Investigations

Commission on Government Procurement

In the early 1960's, a study was conducted by Columbia University, sponsored by the National Security Industry Association. The recommendation from the study was to expand the availability of indemnification of government contracts. This recommendation was later supported by a 1968 study by the Bar of the City of New York and hearings by the Military Operations Subcommittee.

As a result of Congressional hearings, in 1969 the Commission on Government Procurement was established to make recommendations on procurement issues (34:6). Its Study Group No. 8, Negotiations and Subcontracting, was assigned responsibility for indemnification for catastrophic accidents and consequential damages (13:1). In September 1971, Study Group No. 8 held workshops with panelists from government, industry, and the insurance community. A list of potential issues for discussion were formulated by the Study Group based on Congressional Hearings. The list can be found at Appendix A.

In December 1972, the Commission on Government Procurement issued a report that included recommendations concerning indemnification. Volume 4, Chapter 3, of that report addressed the probability of a catastrophic accident occurring in connection with a government program. A

catastrophe was defined by the Commission as "a disaster of such magnitude that the resulting claims for personal injury and property damage would exceed the monetary level for which there is reasonably available insurance coverage" (14:99).

It was established that it is impossible to estimate the probability of occurrence of a catastrophic accident or the extent of damages. The Commission, therefore, was concerned with "the means available to compensate the victims of a catastrophic accident and to protect government contractors from uninsurable risks arising from such accidents" (14:99).

The Commission found that if an accident should occur, there was no guarantee that the victims would be compensated. In fact, the greater the damage, the less likely the chance of compensation through insurance or civil suit (the only private means of compensation to victims).

Government contractors engaged in hazardous contracts ordinarily carry insurance against third-party liability. The Government permits the costs of this insurance to be included either directly or indirectly in the contract cost.

The Commission pointed out three areas where private sector insurance is inadequate for relief for a catastrophic accident arising from a government program:

First, the amount of insurance available is not sufficient to pay judgments for losses sustained by the injured public when the total damage reaches catastrophic proportions. Normally, when a company is exposed to risks so large that it is unable to assume them, it spreads the risk by purchasing insurance. The enormity of a potential catastrophe in some government programs is such that sufficient

insurance would not be available. Therefore, contractors could be liable for amounts which would bankrupt them, but still leave huge portions of the injuries and losses uncompensated.

Second, private insurance held by potential victims is an incomplete means of relief. It will not be carried by a high percentage of disaster victims and, even when it is carried, it only affords protection up to a certain dollar amount.

Finally, even to the extent a contractor is covered by liability insurance, if a catastrophe were to arise out of a government program, payment to insured members of the public would depend ordinarily on their establishing liability for damages. The victim might have difficulty proving the accident to be the responsibility of one or more contractors, particularly if the accident destroyed the evidence, or if the evidence were unavailable because of government security classifications. (14:101)

In addition to existing insurance inadequacies, the Commission also felt existing statutory authority was inadequate. Both 10 U.S.C. 2354 and Public Law 85-804 were found lacking in several important areas:

(1) They do not provide for interim relief to victims or provide for a waiver of defenses [the Government Contract Defense which allows the contractor to share in the government's immunity from suit, under certain circumstances].

(2) They do not address the subject of financial protection. The issue of insurance is left to individual agencies as their own policy determination. This leads to inconsistent treatment of contractors.

(3) There is no provision for a ceiling on total recoveries in a particular catastrophe or for a scaling down of claims.

(4) There is no provision for consolidation of suits. For example, in a single large catastrophe, persons may be injured in more than one state, thereby subject to different state laws. (14:102)

In each of the above areas, the Commission pointed out that the Price-Anderson Amendment to the Atomic Energy Act of 1954 does have relevant provisions:

The basic framework of the Price-Anderson Amendment is sound, and it forms a model for the broad indemnification authority that is necessary. However, Price-Anderson is limited to nuclear accidents arising out of or connected with AEC contractual activities or joint programs in which the AEC is a participant. (14:102)

As a result of identifying these inadequacies of insurance and statutes, the Commission made two recommendations, called H-4 and H-5:

H-4. Enact legislation to assure prompt and adequate compensation for victims of catastrophic accidents occurring in connection with government programs.

H-5. Enact legislation to provide government indemnification, above the limit of available insurance, of contractors for liability for damage arising from a catastrophic accident occurring in connection with a government program. (14:Appendix A)

A Task Group was established to develop legislation incorporating recommendations H-4 and H-5. The Task Group recommended legislation closely modeled after the Price-Anderson Act, but extending coverage to an open-ended range of Government contract and grant programs. These programs were to be identified as unusually hazardous by the President. The proposed legislation would: 1) authorize agencies to indemnify against third party liability exceeding required insurance; 2) permit "no-fault" recovery by persons injured while limiting the total recovery amount; and 3)

provide for immediate interim payments to victims by the agency concerned out of funds available for the discharge of judgments against the United States.

OFPP Interagency Task Force

In 1977, the Office of Federal Procurement Policy (OFPP) began to examine the merits of the Procurement Commission's recommendations H-4 and H-5. To that end, the OFPP sent a request for comments to fifteen government agencies, including the Department of Defense. The comments were to address the OFPP's alternative proposed legislation that would provide for the following:

- General coverage for contract programs only
[excluding grants]
- Coverage limited to accidents
- Coverage contingent on the potential for large liability (i.e. greater than \$250 million)
- Direct assumption of liability by the Government
- Indemnification above insurance required
- No mandatory coverage [as called for in Price Anderson]
- No retroactive indemnification
- Exemption from any current appropriation requirement
- No tort reform regarding product liability
- Interim relief payments
- Repeal of 10 U.S.C. 2354 as no longer necessary
- Reliance on Public Law 85-804 in "bail-out" situations only (30:7-9)

Agency comments were studied by OFPP; however, they did not at that time choose to initiate the introduction of new legislation covering indemnification (50:1).

On June 19, 1981, the OFPP established an Interagency Task Force on Indemnification. This Task Force was formed in response to the Commission on Government Procurement's recommendations H-4 and H-5. It was also due to a June 1981 letter from the General Counsel of NASA. The General Counsel had been requested to coordinate NASA indemnification policy with the other Executive Agencies. This request came from the House Committee on Science and Technology.

Part I of the Task Force Report, dated January 1982, addressed recommendation H-5, which focused on the indemnification of government contractors against third party liability claims. The Committee on Science and Technology had recommended an amendment to an Executive Order (presumably Executive Order 10789) to indemnify, whenever practicable, contractors in excess of required liability insurance (37:1).

To ascertain if there was a genuine need for indemnification, the Task Force sent a Memorandum to thirty-five executive agencies, asking if, in their experience, there was a need to indemnify their contractors. Nineteen agencies responded. The results are generalized below:

...agency agreed to indemnify certain of its contractors who were carrying out agency programs

involving unusually hazardous risks but such indemnity was limited to available appropriations and there was no implication that Congress would at a later date appropriate funds sufficient to meet deficiencies.

...agency involved in the testing of devices and compounds to be used by human test subjects pointed out that in their view many contractors have not been willing to contract with their agency because of the risks involved.

Two agencies identified two instances where a contractor refused to enter into a contract because of the inability of the agency to indemnify. One such contract involved air traffic control automation systems and the other involved the testing of a device by human test subjects.

One agency indicated it had in the past relied on the rule of necessity to indemnify its contractors, relying on a rule of necessity recognized by the Comptroller General in 59 Comp. Gen. 705 (1980). The agency agreed to indemnify an airline for evacuation flights from Vietnam even though the agency did not have express statutory authority to indemnify its contractors. This agency also used the rule of necessity in agreeing to indemnify certain sea carriers during the fall of Indo China for certain liabilities. In two other instances, this agency had agreed to indemnify its contractors subject to the availability of appropriations. (38:3)

According to the Task Force report, significant problems were faced by agencies who believed a contract was critical to their mission and could only be obtained through inclusion of indemnification. When the agency determines that it falls within the "rule of necessity", there is considerable uncertainty as to when such a determination can be made without violating the Anti-deficiency Act (38:4).

The Task Force felt there were probably other instances

where a contractor refused to enter into a contract without indemnification. However, documentation is difficult to obtain because (1) agencies do not keep records of contracts lost; and (2) many contractors may simply not have bid, without giving indemnification as the reason.

An additional result of the survey was an indication that when indemnification is not available, appropriated funds would be used to provide relief to victims. Often this involves exorbitant insurance premiums paid by the agency through the contract. It is possible these funds could be better spent on the agency's mission.

The role of insurance was considered important. In the opinion of the Task Force, insurance "assures that the contractor will be diligent and use reasonable care in his contract performance" (38:5). In this respect, the Task Force felt Executive Order 10789 was on target in permitting various types of financial protection. The ad hoc consideration of available insurance for each situation was considered appropriate, given the numerous factors to be considered when a contractor requests insurance coverage from the insurance industry.

A final issue the Task Force undertook was the interpretation of "national defense" as referred to in Public Law 85-804, Section 1. The Task Force chose to make a broad interpretation of what types of activity facilitate the national defense. It made this interpretation because it

believed that congress did not intend to limit the applicability of Public Law 85-804 to military agencies.

The Task Force also researched statutory provisions and judicial decisions involving the "national defense." It found that current statutory provisions defined national defense broadly for such varying purposes as (1) establishing naval petroleum reserves; (2) defining sabotage; (3) developing defense housing facilities; and (4) establishing the breadth of the Defense Production Act of 1950 (38:10).

The courts have often referred to the "national defense" in legislation as a reason for government involvement in activities. In so doing, they have not expressed opinions on the scope of this term. Subsequently, the Task Force determined an agency proposing to indemnify a contractor would only need to show a national defense connection.

As a result of its investigations into the above areas, the Task Force made four basic conclusions:

(1) There is reasonable justification for amending Executive Order 10789, as amended, to authorize all Executive Agencies who may exercise functions in connection with the national defense to agree to indemnify contractors against third party liability claims under the authority of Public Law 85-804 and subject to the other conditions of Executive Order 10789, as amended.

(2) Executive Order 10789 also should be amended to permit an eligible agency to agree to indemnify a contractor if the particular contract gives rise to the possibility of "catastrophic losses"

(3) The head of an Executive Agency has the authority to broadly construe the clause appearing in paragraph 1 of Executive Order 10789, as amended, which authorizes the agency to agree to

indemnify a contractor whenever in his judgment
"the national defense will be facilitated thereby."

(4) The Task Force is not now prepared to recommend that there is a convincing justification to provide through legislation for the indemnification of all government contractors. Furthermore, the Task Force believes that if the Executive Order is amended, as proposed, indemnification will be made available to most contractors who need the protection of indemnification. Some members of the Task Force believe that legislation should be drafted to reverse the precedent of Stencel Aero Engineering Corp v. United States, 431 U.S. 666 (1977) and, moreover, to require the Government to indemnify a contractor where the contractor is held liable under the doctrine of strict liability as a result of government imposed specifications or drawings [product liability]. However, a majority of the Task Force believed that a recommendation proposing such a sweeping change should be supported by an indepth study, but the task force did not have the facilities, staff, or time to accomplish such a study. Moreover, such a study would no doubt duplicate the work underlying H.R. 1504, 97th Cong., 1st Sess. a bill "To provide Government in certain cases in which such suppliers become liable for loss with respect to those products and for other purposes" and similar bills which the Congress has had under consideration recently. Finally, we believe such a study should be undertaken by a team representing the various interests affected and not solely representatives of government agencies. (38:1-2)

The recommended revisions to Executive Order 10789 alluded to in the above conclusions were in the form of three proposed amendments to Executive Order 10789:

Amendment 1: Revise Part I, paragraph 1A.(a), second sentence to read:

This exception from the limitations of paragraph 1 shall apply only to claims or losses arising out of or resulting from risks that the contract defines as (1) unusually hazardous or nuclear in nature or (2) giving rise to the possibility of catastrophic losses; i.e. losses which a particular contractor cannot reasonably

protect against through private insurance or self-insurance by the payment of a reasonable premium or the establishment of or reliance on a reasonable self-insurance reserve." (38:14)

Amendment 2: Revise Part II, paragraph 21 by renumbering that paragraph 21A and by adding a new paragraph 21B reading as follows:

Subject to the limitations and regulations contained in paragraphs 1 to 14, inclusive hereof, and under any regulations prescribed by him in pursuance of the provisions of paragraph 22 hereof, the head of each of the following-identified agencies is authorized to perform or exercise as to his agency, independently of any Secretary authority described in paragraphs 1 and 1A hereof to provide in a contract provision that the United States will hold harmless and indemnify the contractor against specified claims or losses as set forth therein:

Each Executive Agency of the United States as defined in 5 U.S.C. 105. (38:15)

Amendment 3: Revise paragraphs 22 and 23 of the Executive Order 10789 by adding the terms "agency named" and the terms "or identified." [not specifically naming authorized agencies] (38:15)

All of the above proposed amendments were constructed to address the Commission on Government Procurement's recommendation H-5. The Task Force did not make any recommendations on H-4 (prompt victim compensation), but opted to continue its research and discussions in that area. Plans were to incorporate those recommendations into Part II of the report to be released in March 1982 (12:1). However, according to the OFPP, Part II of the Report of the OFPP

Interagency Task Force on Indemnification was never accomplished.

IV. Litigation

Cases salient to the subject of indemnification have evolved around product liability to third parties. Specifically, should contractors be indemnified by the Government in cases where a third party is damaged or injured as a result of a defect in the government contractor's product?

In 1940, with the case of Yearsley v. Ross Construction Company, the Supreme Court recognized that a contractor could avoid liability by reason of a government contract; this was called the "government contract defense" (54:126). In Yearsley, the contractor destroyed part of the plaintiff's property while building dikes for the Government. The contractor was found to be acting as an agent of the government and thereby immune from suit. The Supreme Court stated that an independent contractor should be afforded sovereign immunity protection when acting as an agent of the Government, noting the following:

Where an agent or officer of the Government purporting to act on its behalf has been held to be liable for his conduct causing injury to another, the ground of liability has been found to be either that he exceeded his authority or that it was not validly conferred. (60:990)

The case of Sanner v. Ford moved beyond the agency concept to include government contractors who claim they were under compulsion of federal law to manufacture a product

under the control of the Government (60:986). The evolution of similar public works cases has resulted in contractors not being held liable for damages resulting from contract performance, but held liable if the damage arises from the negligent manner in which the work is performed (54:127). Recent litigations however, have expanded and legitimized the concept of the government contract defense.

Courts have traditionally applied this defense to actions against public works contractors. Additionally, courts have extended this immunity to some government contractors who performed government contracts in a non-negligent manner in accordance with government specifications (8:710). The acceptance of this defense by the courts can provide some relief for government contractors. However, since the government is immune from suit in most instances, the injured party will have no other recourse for compensation, beyond normal workmen's compensation benefits, veterans benefits, etc..

In government contract product liability cases, there are two types of product defects--design and manufacture. A manufacturing defect (a particular unit does not conform to identical units of the same product or to the specifications) has not been a successful defense against claims of product liability. (60:993)

The government contract defense addresses a design defect, allowing a manufacturer who has complied with

government specifications to escape liability by sharing in the sovereign immunity of the government (54:25). There are four basic elements of this defense which are generally required by the courts:

- (1) the government is immune from liability
- (2) the government established or approved the specifications for the defective item.
- (3) the item conformed to the specifications
- (4) the contractor warned the government about the dangers involved in the use of the item. (54:29)

Under the doctrine of sovereign immunity, suits may not be brought against the government without its prior consent (62:184). The sovereign immunity of the Federal Government effectively bars all actions against the government which are based on strict product liability. Strict product liability is an interpretation that the manufacturer gave an implied warranty to the ultimate purchaser, even though there was no privity of contract. Strict product liability is a rule in most states and is defined as requiring companies which have a part in making an item to be liable for damages caused by defects in the item, even if the company did not contribute to the defect (56:315).

In 1946, the Federal Tort Claims Act (FTCA) was enacted, in an attempt to remedy the position of individuals who had previously been barred from suing by the doctrine of sovereign immunity (60:987). However, the FTCA does not permit suits against the Government in three cases:

(1) claims arising out of the combatant activities of the armed services during time of war

(2) primary and derivative claims for injuries sustained by service members incident to active military service

(3) many claims by non-military plaintiffs who allege negligence in the design of a military product--this is a "discretionary function"
(54:121)

The reasoning for the first exception to the FTCA is obvious. Persons will be injured or killed in war and the government cannot be held liable for those occurrences.

The second exception stems from Feres v. United States in 1950. Feres was a soldier who was killed in a fire in his barracks. His estate claimed the Government was negligent in providing wooden barracks with a faulty heater. The Court found that servicemen are already given compensation for injuries and death. Therefore, feeling that allowing suits by servicemen against the Government would upset military discipline, the Court held that the Government is not liable to servicemen under the FTCA in suits arising out of a service-connected incident. (56:320)

The Feres case was particularly relevant to government contractors because service personnel routinely use government contractor products. The question of extending the government's immunity to government contracts, however, was not settled by Feres. Twenty-seven years after Feres (1977), the Stencel Aero Engineering Corp. v. United States court faced this question.

In *Stencel*, a serviceman was injured when his ejection seat malfunctioned. He sued *Stencel* and the Government. *Stencel* cross-claimed against the Government, claiming the Government had supplied faulty specifications and components and that the Government had had custody of the ejector system since its manufacture. The Court ruled that the *Feres* doctrine should control, protecting the Government; not entitling *Stencel* to indemnity from the Government.

The effect of the *Stencel* decision was to completely insulate the government from liability to servicemen who make a claim directly against the Government, and also from manufacturers who make third party claims against the Government--regardless of proof of negligence on the part of the Government (44:3).

However, there was a case with a different outcome, called *Lockheed Aircraft v. United States* in 1983, in which a civilian Air Force employee died in a crash of an aircraft that was manufactured by Lockheed. The Government paid survivor's benefits under the Federal Employees Compensation Act (FECA). Lockheed was sued by the estate for wrongful death arising from a defective product. Lockheed settled the claims and then sought indemnity from the Government. The Court held that the FECA benefits did not preclude indemnity action against the Government. This case, however, was not appealed on the substantive issues--hence it does not necessarily set precedence for future litigation and does not

alter the standing of Stencel. (56:319-320)

The third exception to the FTCA, that of "discretionary function," stems from Dalehite v. United States in 1953. In this case, injuries resulted from the explosion of ammonium nitrate fertilizer produced and shipped under government control. The Court made a distinction between the operational level and the planning level. It held that the Government is immune from suits based upon discretionary determinations made by executives at the planning level, as opposed to employees making decisions at the operational level. (54:121)

The Courts have interpreted this element of the government contractor defense differently. Some courts have relied on the findings of the In re Agent Orange Product Liability Litigation of 1980. In the Agent Orange case, the district court stated:

Tort liability principles properly seek to impose liability on the wrongdoer whose act or omission caused the injury, not on the otherwise innocent contractor whose only role in causing the injury was the proper performance of a plan supplied by the Government....(55:202)

This litigation resulted from the military's use in Vietnam of the chemical herbicide called Agent Orange. From 1962 to 1971, over seventeen million gallons of herbicides were sprayed over South Vietnam (60:1003). Servicemen claim to have been affected by the herbicides with physical disorders and mental distress. The plaintiff's position was that this herbicide had been manufactured by the defendants

since 1948 and that the specifications had been drawn up by the military based on information from the defendants. The Court, however, stated that the government contract defense required only proof that the Government established the design:

...that the product...supplied was a particular product specified by the Government. If it should appear that the contractor set forth merely a 'performance specification', as opposed to a specified product, then the government contractor defense would be more restricted. (54:129)

Other courts have been even more lenient by requiring only that the Government "approved reasonably precise specifications"(44:2). This was established in a 1983 landmark case called McKay v. Rockwell International Corp. This case was the result of the deaths of two Navy pilots in separate accidents on Navy RA-5C aircraft. The manufacturer of the aircraft, Rockwell, was sued by the families of the deceased servicemen on the basis of a defective and dangerous ejection system. The Court found for the plaintiffs. (44:4)

However, the case was appealed to the Circuit Court where the decision was reversed on the basis of the government contract defense. The Court stated the following test for the government contract defense:

The supplier [must prove] that the United States established, or approved reasonably precise specifications for the allegedly defective military equipment. (54:129)

The plaintiffs, in this case, contended that this requirement was met because the Government had requested in

writing, that Rockwell design a new ejection system, and agreed in advance to purchase the system. The district court, to which the case was remanded, found that the Government had set or approved reasonably detailed specifications; allowing the government contract defense. The Court said, however, "when only minimal or very general requirements are set for the contractor by the United States the rule is inapplicable." (44:20-22)

In the McKay case, the Court's reasons for applying the government contract defense were cited by the majority as follows:

First, the Supreme Court emphasized in Stencel that the United States cannot be directly or indirectly liable to servicemen injured by defective military products. But holding the supplier liable in government contractor cases without regard to the extent of government involvement in fixing the product's design and specifications would subvert the Feres-Stencel rule since military suppliers, despite the Government's immunity, would pass the cost of accidents off to the United States through reflecting the price of liability insurance in the contracts or through higher prices in later equipment sales....

Second, to hold military suppliers liable for defective designs where the United States set or approved the design specifications would thrust the judiciary into the making of military decisions...At this point, it must be acknowledged, separation of powers becomes a proper concern....

Third, it should be noted that in setting specifications for military equipment, the United States is required by the exigencies of our defense effort to push technology towards its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods.

Finally, a Government contractor defense provides incentives for suppliers of military equipment to work closely with and to consult the military authorities in the development and testing of

equipment.... (44:21-22)

It is important to note that the McKay case does not establish an automatic government contract defense. The definition of "reasonably precise specifications" will likely be a matter of contention in many future cases. (44:34)

Also, in McKay, there was a strong dissent statement made by Judge Alarcon. Judge Alarcon rejected the majority opinion, concentrating on their first argument, that the Government would ultimately pay damages indirectly without the government contract defense. He stated that the control of the free market society would hold suppliers liable, and that they "...because of unsafe equipment, will be unable to pass on these costs freely due to the lower bids of their safer competitors." (60:999)

Since McKay, there has been a mixed reaction by the courts. In McLaughlin v. Sikorsky Aircraft and Hubbs v. United Technologies, the courts recognized that government contractor immunity was available to manufacturers. However, a dissenter, Associate Justice Wiener, criticized the majority, agreeing with Judge Alarcon's dissent in McKay. Justice Wiener stated that the doctrine of strict product liability will not lead to increased costs to the Government, but would produce safer products. With respect to an argument made that servicemen are already compensated by the Veteran's Benefit Act, he stated:

...this unsupported premise...presupposes that for some unknown reason military personnel bargain for defective products when they enlist. I am unaware of any law...or any articulated public policy that

says military personnel should face an increased risk of harm due to defective products when they enter military service. (60:1002)

In another case, Johnson v. United States, the Court held against the use of the government contract defense, sharply criticizing its underlying policy as having no valid basis for denying recovery to victims of design defects.

(62:202-205)

In Nobriga v. Raybestos-Manhattan Inc., the Hawaii Supreme Court defied the McKay government contract defense by attempting to distinguish between cases involving a dangerous product incorporated into a government design and cases where the government design is defective.

In the In Re Air Crash Disaster at Mannheim, West Germany, the Court held the government contract defense was not available. The court's reasoning was that the Government merely provided a general requirement rather than a detailed specification. (62:202-205)

In a recent case (December 1985) entitled Edwin Lees Shaw v. Grumman Aerospace Corp, the District Court found that the contractor (a) knew of the defect; (b) was aware of the risk; and (c) failed to sufficiently warn the Navy, who had relied on the contractor's advice (not having enough expertise to make a warning unnecessary). (17:4-6)

At the present time, the government contract defense is attractive to contractors as a possible source of protection from claims. However, it cannot be depended upon, since it is subject to interpretations and acceptance by the courts.

Consequently, while it provides some assurance to contractors, it is far more advisable for contractors to seek indemnity through legislation.

U. Proposed Legislation

Throughout the years, numerous bills have been submitted to Congress in efforts to make changes to existing indemnification statutes. In 1964, the Department of Defense and NASA drafted a comprehensive bill intended to apply government-wide. The bill was later revised to more closely resemble the Price-Anderson Act. Eventually, action was suspended on the bill--a fate that would occur on future indemnification bills on subjects such as product liability and catastrophic risk. Already discussed is the OFPP draft bill which was never introduced to Congress. A chronology of subsequent, relevant proposed legislation follows.

H.R. 5351

On September 20, 1979, H.R. 5351 was submitted to the Committee on the Judiciary by Mr. Gudger, Mr. Derwinski, Mr. Erleborn, Mr. Forsythe, Mr. Volkmer, Mr. Hall, Mr. Pepper, Mr. Pritchard and Mr. Wyatt. The title of the proposed act was "Government Contractors' Product Liability Act of 1979."

The purpose was:

...to establish just standards of ultimate liability for suppliers of products to the United States Government by providing indemnity for those suppliers in certain instances in which the United States Government is logically responsible for the harm creating the supplier's liability but cannot be required to provide indemnity because of sovereign immunity. (77:1-2)

Hearings were held on July 21, 1980 by the Judiciary

Committee, Subcommittee on Administrative Law and Governmental Relations. The American Bar Association submitted a letter supporting the bill. (78:154)

The implication of H.R. 5351 is that of accepting the Government's responsibility for product liability in cases where the liability arises from a product characteristic that was required by specifications imposed by the Government.

The Chairman of the Committee on the Judiciary, the Honorable Peter W. Rodino, Jr. requested the Defense Department's views on H.R. 5351. The Acting General Counsel for the Department of Defense, Mr. L. Niederlehner, responded in a letter to Congressman Rodino (49:1).

In the letter, the Department of Defense endorsed the stated purpose of H.R. 5351 (establishing just standards of ultimate liability). They took exception, however, to the broad structure of H.R. 5351, fearing it would:

"...require the Government to indemnify a contractor against any and all liability claims regardless of the item supplied the Government and whether or not the contractor complied with the contract specifications in producing the item or otherwise exercised due care in its manufacture."
(49:1)

Instead, the Department of Defense felt the specific problem that needed to be addressed was that of indemnification of catastrophic accidents. For these reasons, the Department of Defense chose not to support H.R. 5351, preferring an OFPP draft bill, which they forwarded to the Committee for consideration.

The draft bill proposed by the OFPP was entitled, "Contract Indemnification Authorization Act." The key difference in the draft bill from Public Law 85-804 was a paragraph defining the approval requirement as contingent upon high liability risk or the non-availability of insurance coverage for catastrophic risk:

Indemnification may be provided only with the prior specific approval, for each contract or class of contracts, of the head or an assistant head of the agency, upon a determination that the cumulative amount of liability, loss or damage of the contractor may exceed the higher of either the dollar amount established pursuant to section 2 or the amount of such insurance as may be required or approved under or for the contract in consideration of such factors as the availability, cost and terms of private insurance, self-insurance, or other proof of financial responsibility. (S1:2)

In a January 1980 letter, however, the Air Force Systems Command, Office of the Staff Judge Advocate, Contract Opinions Division, disagreed with the Department of Defense position (2:1). Air Force Systems Command (AFSC) is one of two primary indemnifiers of Air Force contractors. The other is Air Force Logistics Command.

The AFSC criticism focused on certain aspects of the proposed bill:

...the bill [proposed by DOD] is extremely broad and does not appear to limit the Government's liability to any of its contractors.

...no guide lines concerning when indemnification should be granted are set forth. (2:1)

The recommendation made by the Contract Opinions Division was to specify that only "unusually hazardous risks

will be indemnified and ...the regulations of the administrator for federal procurement policy will more readily define such risks." Apparently the latter would include catastrophic accidents, since there was agreement that "the catastrophic accident is of the utmost concern." H.R. 5351 was not passed. (2:1)

H.R. 1504

H.R. 1504 was introduced to the 97th Congress by Chairman Danielson and Congressman McClory (78:154). Hearings were held on March 19, 1981. Similar to H.R. 5351, this bill would provide for the indemnification of government contractors for product liability (56:326). The exception would be if a determination was made that the accident was a result of the contractor's willful negligence (56:326).

Unlike H.R. 5351, H.R. 1504 would cover an accident that was not of catastrophic proportions. The American Bar Association, Section Committee on Insurance and Indemnification supported this bill (78:154). However, the Justice Department opposed it, fearing it would provide a disincentive for contractor safety and that it would be a burden on taxpayers to pay for damages that were a result of a manufacturer's poor performance of a contract (56:327). The Department of Defense was in favor of legislation, but was concerned that the Government could become a "general insurer" (56:327). The bill was not passed by the 97th Congress.

It was suggested by Mr. David Polinsky in his article entitled "Product Liability and the United States Government Contractor" that the failure of this bill was due to its all-inclusive nature. He suggested changing the bill in three ways. First, the indemnity should be limited to cost-reimbursement contracts, since fixed-price contractors are generally paid a higher profit for increased risks. Second, standard commercial products should not be included. Third, a threshold should be set, below which the Government will not have liability. (56:329-330)

The 97th Cong. Hearings

In September and December of 1982, the Senate, Committee of the Judiciary, Subcommittee on Agency Administration, held hearings on the subject of the "Indemnification of Government Contractors." Senator Grassley chaired the hearings. A statement was made by the Assistant Attorney General, Civil Division, U.S. Department of Justice, Mr. J. Paul McGrath:

...the administration strongly opposes suggestions that the Government's obligations to provide contribution or indemnity to government contractors be broadened. (78:3)

His supporting argument (consistent with the Justice Department's position on H.R. 1504) was as follows:

The Department of Justice opposes current proposals to enact legislation requiring that contractors' expenses be paid out of public funds. Those proposals ignore the special nature of government--a non-profit generating institution--and would undermine the appropriations process....Also, there is no justification for proposals which give contractors special rights or

remedies which are not generally available to others or which detract from the play of market forces and hinder efforts to keep the costs of government programs and procurements to a reasonable minimum. (78:7)

In contrast to the Department of Justice position, Mr. T. Richard Brown, representing the National Association of Manufacturers, stated:

Contractors cannot ignore the litigation explosion of recent years, nor the trend toward inflationary recoveries in the courts, nor the creative theories developed to justify tapping the deep pockets of private enterprise in the understandable desire to compensate innocent victims.

...it does not make sense either from the contractor's standpoint or the Government's standpoint to encourage contractors to carry excessive levels of insurance to cover worst case possibilities under every contract. Over the long term, the Government's financial interests are best served by assuming the responsibility for losses in excess of reasonable levels of insurance. (78:20)

Mr. Brown's statement included a draft bill which was a result of collaboration between the National Association of Manufacturers' Task Force and the House Subcommittee on H.R. 1504. This draft included a "comparative fault" concept that would grant a contractor a right of contribution from the Government proportionate to the fault of the Government in creating the liability. It would also require contracting agencies to regulate the amount of third party liability the contractor must bear through insurance, with indemnity provided over that amount. (78:22,34)

At the second oversight hearing, Mr. William A. Long, Deputy Under Secretary of Defense stated, in cases where

there is a possibility of an extremely high liability loss, for which insurance cannot be obtained at a reasonable rate, some type of indemnification should be provided. His concern, however, was that bills introduced to-date had been so broad as to make the Government an indemnifier for all contracts. (78:34)

S. 1839

On October 18, 1983, hearings were held on S. 1839, entitled "Indemnification of Government Contractors." Senator Grassley presided. His opening comments outlined the primary provisions of the proposed bill:

...a government contractor may seek indemnification from the Federal Government for any damages or losses sustained as a result of suits brought solely against the contractor. The legislation also provides that the Government will include an indemnification provision in contracts where the risks are defined as unusually hazardous or nuclear in nature or giving rise to the possibility of liability against which the contractor cannot reasonably protect through private insurance or self-insurance. (79:1)

The first part of the proposed legislation would allow any party to a civil suit seeking to hold the contractor liable for damages or loss arising from the use of a product by a federal employee, to petition the court to make findings of fact to determine the extent of the Government's fault. Based on those findings, the contractor would only be liable for the percentage of the award for which the Government was not found at fault. It is important to note, that under this bill, the Government would not be liable for the percentage

for which it is found at fault. Its liability would be limited to workmen's compensation or employee benefits provided by statute. (31:478)

This provision partially addresses the situation contractors have found themselves in as a result of the Stencel decision. In his statement to the sub-committee, Mr. Fred Israel of Israel and Raby quoted a statement made by the Section of Public Contract Law of the American Bar Association, which he felt appropriately summarized the contractors' situation:

Strict liability is the rule in practically all states. This basically means that those companies which have a part in making an item are liable for damages caused by defects in an item even if the company did not contribute to the defect. In commercial cases, if the defect is the result of a design deficiency, then the manufacturing companies can secure indemnification from the design company. But this is not the case in military contracts.

If the Air Force, for example, develops detailed specifications and these are strictly followed by the contractor, but, nevertheless, the item is defective due to a design deficiency and a serviceman is injured thereby, the manufacturing companies are strictly liable--and the U.S. Supreme Court has held in the Stencel Aero Eng. Corp. v. United States...case that the United States is not liable for indemnification, even though the United States is at fault. (79:54)

Based on the statements during the hearing by Mr. Israel and Mr. Brown (representing the National Association of Manufacturers), the government contractor community views the effect of Stencel as unfair. Mr. Israel feels S. 1839 falls short of addressing the "unfairness" of Stencel in cases where a design defect is neither the "fault" of the

contractor or the Government. He suggests replacing the word "fault" with "act." Mr. Brown however, supports this provision as a compromise position. (79:54)

. The second part of the proposed legislation (the catastrophic aspect) would broaden agencies' authority to include indemnification clauses in their contracts. In addition to the provision paraphrased above by Senator Grassley, it also provides for the inclusion of all goods and services that are not identical in nature and scope to commercial goods and services. (79)

The existing procedure, under Executive Order 10789 as amended, for agencies to set the level of financial protection required of a contractor, remains. Additionally, the willful misconduct or lack of good faith by the contractor is barred from claims--possibly addressing the Justice Department's expressed concern that indemnification will encourage contractors to disregard safety. A final aspect of S. 1839 is to make it clear that obligations may be made, notwithstanding the Antideficiency Act and the Adequacy of Appropriations Act. (31)

S. 1839 was approved by the Sub-committee for Administrative Practice and Procedure. However, it was never considered by the Judiciary Committee.

H.R. 4199

S. 1839 was introduced to the House of Representatives as H.R. 4199, on October 24, 1983. Hearings were held by the

House Judiciary Committee, Sub-committee on Administrative Law and Governmental Relations, on March 14, 1984. Mr. Karl G. Harr, Jr., President of the Aerospace Industries Association testified. Mr. Harr proposed replacing the words "unusually hazardous risk" in Section 5, with the term "catastrophic." He felt the effect of this change would be to remove the term "unusually hazardous risk" from the bargaining table. Mr. Harr also requested that the requirement for insurance be made subject to a contractor's certification of reasonable availability, rather than subject to executive agency procedures. (80)

Ms. Mary Ann Gilleece, Deputy Under Secretary of Defense for Acquisition testified that:

"The Department of Defense has serious reservations about the potential financial liability resulting from wholesale indemnification of contractor's liability.... We believe that indemnification should only occur in very limited situations.... If severe limitations are not included, the Government will be in the position of serving as the insurer for situations currently covered by private insurance policies." (80:46)

H.R. 4083

H.R. 4083, entitled the "Government Contractor's Product Liability Act of 1983" was discussed in hearings simultaneously with H.R. 4199. It focused on providing indemnification for goods the Government purchases, when government negligence causes harm.

This proposed bill was not embraced by industry or Government. The two primary shortcomings to it were (1)

there were no provisions for indemnifying services provided to the Government; and (2) there were no provisions for catastrophic loss situations. (80:34,152)

Several industry representatives suggested revisions to the proposed bill, but generally favored H.R. 4199 as more useful. The Department of Defense position, as stated by Ms. Gilleece, was the same for both bills:

...we believe that the laws that we have available to us allow us the flexibility we need when you have unusual and hazardous circumstances; and we are not, nor do we support, seeking any further authority. (80:46)

S. 1254

S. 1254 was introduced by Senator Charles Grassley to indemnify contractors for product liability losses beyond reasonably available insurance. Hearings were held in June 1985. This bill was identical to Senator Grassley's bill S. 1839--including the equitable reduction provision basing the contractor's liability on the proportion of fault attributable to the Government. It would also require a determination on indemnification made before contract award by the head of the contracting activity. (20:1098-1099)

The Department of Justice also opposed this bill. Mr. Willard testified again, stating:

"Providing government indemnification will only pass tort judgments to the 'deep pocket' of the taxpayer.... Indeed it may cause the size of judgments to increase because the seemingly unlimited resources of the Government will be available for judgments" (20:1098).

He added that the requirement for government agencies to set the level of insurance required for indemnification is unrealistic because the Government does not have access to the information needed to assess the appropriate level of insurance. (20:1098)

Several industry representatives testified in support of S. 1254. However, they generally urged revising it to adopt the approach of H.R. 1623. S. 1254 is still in subcommittee, although no further hearings have been held.

H.R. 1623

H.R. 1623 is entitled the "Fair Allocation of Government Fault Act." H.R. 1623 differs from S. 1254 in that it would not require government officials to make advance determinations on all new contracts on the threshold amount of indemnification. Mr. Brown, of IRW, testified that "The self-executing approach dispenses with the need to outguess whether catastrophic liability could ever accrue under a specific contract." (20:1099)

H.R. 1623 was sponsored by Rep. Thomas Kindness. However, Rep. Dan Glickman, Chairman of the House Judiciary Sub-committee on Administrative Law challenged contractors to come up with a "compelling reason" for the passage of the legislation. Glickman noted that this bill would provide indemnification for contractors in cases where senior contractor management were negligent. He asked whether it would also cover gross negligence by any contractor

employees. Mr. Robert Gusman of Aerospace Industries Association replied that it would. In response, Mr. Glickman observed that it would be difficult to get votes for this type of bill. He added an invitation for suggestions on modifying the proposal to make it more likely to be approved. (58:846)

Thus, although many bills have been introduced, none have been passed. Apparently, an acceptable compromise between the contractor position and the public interest has not yet been reached.

VI. Air Force Policy Evolution

Indemnification Approval History

Any review of the indemnification of Air Force contracts must consider those indemnified under 10 U.S.C. 2354 and those under Public Law 85-804 separately. Indemnification approval for Research and Development contracts, falling under 10 U.S.C. 2354, has generally not been difficult for contractors to obtain. No one has questioned the appropriateness, or even the necessity, of indemnifying hazardous research and development efforts.

Perhaps the only issue with respect to these indemnifications has been a question of the appropriateness of the Air Force delegated approval level. Some have questioned delegating approval to the Head of the Contracting Agency. This has been questioned because of the high approval level required under Public Law 85-804 for other than research and development contracts. No serious effort has apparently been undertaken to change the approval level under either statute.

The approval history of indemnifications under Public Law 85-804, however, has been inconsistent. Since Air Force Systems Command (AFSC) has the largest portion of indemnification actions, its approval history is largely representative of the Air Force. A review of AFSC documentation reveals several trends. During the early and

mid 1970's, indemnifications were approved on a case-by-case basis with the primary concern being whether "extra hazardous risks" existed (41:1).

In 1978, the Honeywell Pendulous Integrating Gyroscopic Accelerometer (PIGA) contract was approved for indemnification. The risks associated with PIGA were defined by the Space and Missile Systems Organization (SAMSO), as follows:

The unusually hazardous risks arise through the integration of Honeywell PIGAs into the Minuteman guidance and control system. The PIGA provides missile acceleration rate information to the guidance system which is essential to maintenance of the missile's assigned flight trajectory. Failure of a Honeywell fabricated PIGA under in-flight conditions would create a guidance system failure with potentially hazardous risks. (1:1)

During review of the PIGA indemnification request, the USAF General Counsel expressed concern over this contract and the Minuteman II and III contracts, for extending the "classic concepts of an unusually hazardous risk." The Assistant General Counsel, Mr. Daniel S. Rak, stated in a February 1978 letter, an explanation for the concern:

The classic case involves an unusually hazardous instrumentality and risks arising during contract performance rather than, as in the Minuteman examples, articles which, in some cases, are not inherently hazardous and risks arising during a time frame after the contractors have delivered the components.

...[we] identify this latter [PIGA] risk category as unusually hazardous for contractual indemnification coverage. Nevertheless, we note that such approvals may lead to requests from other contractors extending the Minuteman reasoning to cases where the risk is less and less hazardous and

the post-contractual catastrophe is more and more remote or theoretical.

...requests...may begin to assume the character of product liability coverage or "no-fault" insurance.

...As a result of the Commission on Government Procurement Report, there have been a number of policy initiatives regarding "no-fault" insurance for government contractors and protection against catastrophic events resulting from a product delivered under a government contract. (21:1-2)

While not objecting to the indemnification of PIGA, Mr. Rak advised "judicious assessment" and "prudent acceptance" of future indemnification requests (21:2). One week later, in a memorandum from the Office of the Assistant Secretary of the Air Force for Research, Development and Logistics, Mr. Harvey J. Gordon, Deputy for Procurement advised:

...we agree with General Counsel that coverage beyond the life of any given contract approximates product liability and/or "no fault" indemnification. In our view, such indemnification goes beyond that which should be provided by the Air Force. It exposes the government to potential third party liability without limitation and without expiration...(22:1)

Concern over the potential for indemnifying for product liability resulted in PIGA being the last program approved for Public Law 85-804 indemnification by the Secretary of the Air Force, until 1985. During this time period (1979 - 1985), contractors inundated the Air Force with indemnification requests to cover broadly defined "unusually hazardous risks" and "catastrophic risks." The Secretary of the Air Force did not approve these requests, apparently because of an inability to appropriately define the

"unusually hazardous risk" involved. (S:10)

One example of such a request was for the indemnification of the Global Positioning System (GPS). In 1983, Rockwell International Corporation requested indemnification under Public Law 85-804 for unusually hazardous risks under their proposed GPS production contract. The indemnification requested was not for the production of the twenty-eight GPS space vehicles, but for the launching and flight of the GPS space vehicles--product liability. The unusually hazardous risks were defined as follows:

The risks defined as unusually hazardous risks are those arising from the use of and/or the performance of the products and/or the services provided under this contract--beginning only when such products and/or such services are provided to the Government at a government installation, to the extent specifically described below:

(1) Explosion, burning or detonation of the GPS space vehicle(s) and/or the GPS Orbit Insertion Subsystem Motor(s) within the STS Orbiter;

(2) Surface impact of the GPS Space Vehicle(s) after liftoff and/or the GPS Orbit Insertion Subsystem Motor(s), and/or component(s) and/or part(s) thereof;

(3) Damage to the STS Orbiter, or to cargo in the STS Orbiter other than that of the contractor caused by the GPS space vehicle(s) and/or the GPS Orbit Insertion subsystem motor(s), occurring during launch, initial trajectory, low earth orbit, deployment operations, and/or landings; and/or

(4) Damage to other satellites, spacecraft, vessels, vehicles, and/or aircraft, and consequential damage caused by the foregoing, caused by

electro-magnetic and/or stray electronic signals emitted by the GPS space vehicle(s) and/or resulting from navigational and/or other use of the GPS space vehicle(s). (67:3)

An AFSC talking paper on the GPS indemnification request reveals the reason for the request. Apparently, Rockwell officials were experiencing high product liability insurance premiums and were "seeking ways to cover their risks without adding to their costs...to protect themselves in those situations where insurance coverage is not available" (4:1).

The question of insurance availability would continue to surface. In September 1983, AFSC requested of Space Division information on the cost and availability of insurance for the Titan III, Defense Meteorological System Program Optical Linescan System, Inertial Upper Stage Solid Rocket Motor and Launch Support, and the Defense Satellite Communication System (28:1-2). The information was provided, however no indemnification action was taken on these programs.

In 1984, the Air Force General Counsel advised against indemnifying the Infrared (IR) Maverick missile program. The risks for IR Maverick were defined as follows:

- (1) The burning, explosion, and/or detonation of material or casting powder.
- (2) the burning or explosion during the preparation, mixing, loading, transporting, casting, or testing or propellant;
- (3) the toxic, explosive or other unusually hazardous properties of chemicals or energy sources utilized for the performance of this contract, or

which may be utilized in conjunction with the performance of this contract;

(4) the burning, explosion, and/or detonation of missiles or components thereof;

(5) the fabrication, assembly, testing, launching, flight or landfall of missiles, rocket engines, or components or parts thereof;

are "unusually hazardous risks" whether or not the contractor's liability arises from the design, fabrication, or furnishing of other products or services under this contract. (23:3-4)

The General Counsel questioned the unusually hazardous nature of the risks involved:

The Maverick is, after all, merely a sophisticated missile designed to destroy relatively small targets. It is not, as we understand it, designed to carry nuclear warheads. It does not appear to significantly differ from other "high-explosive" conventional weapons. (23:4)

According to the General Counsel, the IR Maverick was perceived, by the buying community, as a test case that would indicate the direction of the Department of Defense toward future indemnifications; i.e., whether the traditional DOD approach indicated by the Gilleece statements to Congress or the more liberal approach recently undertaken by the FAA and NASA, would prevail. The IR Maverick program was not indemnified. (23:5)

In December, 1985, a blanket indemnification for the Peacekeeper Stage III contracts of Hercules, Inc., was approved by the Secretary of the Air Force. It should be noted that Hercules, Inc. indicated it would stop work if the contracts were not indemnified by the Air Force. The

Hercules description of the unusually hazardous risks was the same as for the IR Maverick described earlier, with the addition of the following:

A nuclear incident which includes the radioactive, toxic, explosive or other hazardous properties of special nuclear or by-product materials. (33:4)

This addition was accepted by the Air Force. However, the provision for the "fabrication, assembly, testing, launching, flight or landfall of missiles, rocket engines or components or parts thereof," was omitted (26:3). Caveats were also placed on the approval, requiring no greater than ten percent variation on the amount of insurance coverage and the maintenance of adequate safety programs by the contractor (26:1).

The difference between the Hercules and IR Maverick definitions of "unusually hazardous risks" was twofold. First, the Hercules risk included a nuclear component, clearly more hazardous than a conventional missile. Second, coverage for product liability was effectively removed by the deletion of the above provision in the definition of its unusually hazardous risk. For these reasons, the Hercules Peacekeeper III solid propellant casting contracts were deemed appropriate requests and were indemnified on December 2, 1985.

Since the approval of the Peacekeeper III indemnification, other approvals have followed. In April 1986, Aerojet Technologies was indemnified for the storage of

hydrazine fuel, used for on-site engine testing. Then, in May 1986, ten Peacekeeper contractors were granted indemnification. General Dynamics was also indemnified, in 1986, for launch services at Vandenberg Air Force Base (AFB). These approvals were preceded by a draft Air Force policy letter which indicated a new Air Force position on the subject.

Policy Shifts

In July 1973, the Air Force instituted a procedure for "Blanket Authority." This authority was delegated by the Secretary of the Air Force to the Head of the Procuring Agency (HPA), for the purpose of committing the Air Force to indemnify more than one contract, related to the same program, under the same contractor.

The reason for this policy initiation on Blanket Indemnification was outlined in a July 1973 AF/LGPM letter. It was established, "to reduce the administrative burden of annual, contract-by-contract processing of requests for indemnification by procurement activities, Air Force Commands, Air Staff, General Counsel and the Secretariat." Justification was also provided by the fact that, "many contractors qualifying for indemnification consistently face the same risks and maintain the same general insurance coverage." (40:3)

A key element of this Blanket Authorization was that, once issued, it would remain in effect as long as "pertinent

conditions do not change"(40:3). To insure this element was adhered to, the HPA was required to:

Confirm that the risks faced by the contractor have not significantly changed, that the contractor's financial program has not significantly changed [no more than a 10% deviation in insurance coverage], and that good safety practices continue. (40:3)

The HPA's confirmation of these conditions was required at least once in any twelve month period. (16:9)

The shift in policy allowing Blanket Indemnification was mild compared to the change in Air Force policy that occurred in 1985/1986 with the issuance of an Air Force FAR Supplement. The need for a policy determination by the Air Force on the definition of unusually hazardous risks, coverage for catastrophic disasters and coverage for product liability was evidenced by the aforementioned hiatus in indemnification approvals under Public Law 85-804.

In 1984, industry representatives drafted a proposed regulation concerning indemnification approval criteria. It stated that indemnification should be provided by the Government in the following instances:

- (1) ...insurance is not commercially available or the total insurance premium costs over a period of time could well approximate the dollar coverage afforded;
- (2) A war risk in areas where hostilities are involved;
- (3) The cost of insurance is so excessive it is unreasonable;
- (4) A requirement affords insufficient time to receive a well-considered insurance quotation, or

(5) The risk, even though remote, could result in liability in excess of reasonably available commercial insurance. (70:2)

In comparison to the very broad provisions of the industry proposed policy, AFSC also drafted a proposed Air Force FAR Supplement on indemnification policy in 1984. The AFSC supplement specifically addressed unusually hazardous risk. It stated that an unusually hazardous risk can be determined by an "evaluation of availability, cost and terms of private insurance." The criteria set for determining unusually hazardous risk was a system whose acquisition costs total \$500 million or more and where insurance is unreasonable or unavailable. It also required these high dollar value programs to acquire insurance worth \$500 million. This proposed supplement had a much narrower scope than that anticipated by industry. (32:Atch)

Industry comments on the AFSC proposed supplement attempted to broaden the scope by (1) expanding the definition of unusually hazardous risk; (2) removing the \$500 million insurance requirement; (3) including nuclear risks; and (4) removing the limitation to prime contractors, allowing the direct inclusion of subcontractors. However, these industry suggestions were not included in a later 1984 AFSC draft. (32:1-3; 24)

In January 1985, HQ USAF issued a draft policy letter on indemnification under Public Law 85-804. The letter narrowly defined unusually hazardous risks which are "directly related

to the intrinsically hazardous or nuclear nature of the instrumentality or activity." Indemnification beyond the period of contract performance was permitted only in cases with potential for "devastating financial loss" resulting from "normal" use of the product. Programs having the potential for catastrophic loss were recognized as legitimate when defined as furthering programatic aims. However, catastrophic loss was specified as an exception to basic policy. As such, indemnification requests based on catastrophic loss would only be approved under "compelling and exceptional circumstances" (42:1). AFSC was invited to comment on the draft policy letter, before its implementation. (42)

The AFSC response was in the form of another proposed supplement. The primary concern of AFSC with the Air Force proposed policy was the treatment of the issue of catastrophic loss. Rather than describing catastrophic loss as an exception to basic policy, AFSC requested the following provision:

...the Air Force will indemnify contractors against risks with a potential for catastrophic loss for the purpose of furthering programatic aims in the national interest. Programatic aims in the national interest include, but are not limited to, security considerations, maximizing competition, protecting the economic viability of a contractor, and eliminating prohibitive insurance costs...(25:1)

To support its position on catastrophic loss, AFSC described a recent contractor incident which highlighted the

problem:

...the recent virtually unprecedented refusal of an Air Force contractor to participate in an Atlas launch, until Space Division paid it an additional \$225,000 for additional insurance premiums for that single launch. Space Division expects to repeat this scenario for a total of 14 launches if relief is not forthcoming...(6:1)

As of July 1986, the Air Force FAR Supplement on indemnification was still being circulated for comments. It was basically unchanged from the Air Force proposed policy, requiring risks to be precisely defined and directly related to the "intrinsically hazardous or nuclear nature" of the activity. It allows consideration of indemnification for catastrophic loss for furthering programatic aims. Finally, it allows consideration of indemnification for product liability arising out of "normal" use of the product. (36)

While the Air Force FAR Supplement does appear to be approving of the indemnification of contracts for catastrophic loss and product liability, it does not actually go that far. It only states that those situations may be considered for indemnification as exceptions to normal policy. This means the Air Force could still decide, under the new policy, not to indemnify any contracts for catastrophic loss or product liability.

This draft supplement does not begin to approach the liberal guidelines requested by industry, yet it does open the door for possible indemnification for catastrophic loss and product liability. It is, indeed, a large step forward

from the DOD position taken so often in Congressional Hearings. It also appears to differ with a statement made by Brigadier General (then Colonel) Kenneth U. Meyer, USAF/RDC, to the author, that "we should not indemnify for catastrophic loss" (47). Additionally, a statement was made by his Deputy, Mr. Ira Kemp, that "we need a lid on liability" (43). Because of the long-standing DOD and Air Force positions, this Air Force policy shift could be viewed as a stop-gap measure possibly intended to preclude the success of broad product liability legislation similar to those described in Chapter U.

VII. Current Air Force Issues

Indemnification issues, such as insurance, catastrophic risk and product liability will no doubt become more important as today's research programs become tomorrow's production and operational programs. Each of these issues impact and are a part of the others. So, while the author attempts to discuss each separately (for clarity), the reader should recognize their interdependence.

This chapter is designed to highlight the importance of these issues. Their evolution has already been traced in previous chapters, along with government and contractor positions. Therefore, what remains is to break down the issues into their various aspects, expound on those aspects, and stress their importance by relating them to current and future Air Force programs. Specific solutions or recommendations are withheld until the final chapter.

Other issues, such as the use of blanket indemnification, the negotiation of indemnification, direct subcontract indemnification and the level of approval are not discussed in this chapter. The reason for their exclusion is that, from the author's viewpoint, they are not primary issues and would have no great impact on the indemnification of future Air Force programs.

Insurance

Availability/Affordability. In their support of proposed legislation and policy changes, contractors have consistently pointed to the present state of insurance availability and affordability. In the insurance industry, a decision on making coverage available at a particular price is determined by an analysis of the risk involved. Specifically, "what is the probability of a loss?" and "what would be the degree of loss?" are the pertinent questions.

When the uncertainty of loss is considered high, insurance coverage will be very expensive. As the cost of the insurance approaches the level of coverage, insurance is for all practical purposes, unavailable because it is unaffordable. (63:130)

From the insurance industry's perspective, product liability coverage has had increasing risks. The insurance industry points to the trend in litigation for frequent and high awards to victims. To support this contention, they claim that the number of million dollar judgments has "dramatically" risen during the past twenty years (63:130). (There is no indication as to whether inflation has been accounted for.) Additionally, an Insurance Customer Protection group disagrees that the frequency of awards has increased.

The OFPP Interagency Task Force was not convinced that insurance is unavailable. Their report stated they found "no

evidence of a wide-spread problem of product liability insurance being unavailable" (64:5). They did find, however, that some high risk product lines were finding it difficult to obtain insurance. (64:5)

The Task Force outlined reasons for problems in obtaining insurance:

- (1) a company did not make a thorough search of all sources of product liability insurance.
- (2) a company had a bad claim record, possibly producing unsafe products.
- (3) the premium may be so great that the insurance is not affordable, and thus it is effectively unavailable. (64:5)

Government programs, in production and beyond the contract life, have been of great concern to government contractors. As already discussed, there have been instances where contractors refused to participate in a government program without government indemnification, claiming that insurance was either unavailable or too expensive.

The problems experienced by contractors and insurance syndicates involved with satellites can shed some light on possible future insurance difficulties Air Force contractors may experience on such programs as Space Defense Initiative (SDI) and Global Positioning System (GPS).

In 1965, the first commercial satellite was covered by insurance--but only prior to launch. Insurers recognized that there was a market for launch and post-launch coverage, but had no data on which to analyze the risks involved. In

1968, after the Intelsat F-1 was lost, insurance underwriters began to compile information on satellites and launch vehicles, in order to define the risk. (39:1)

During the 1970's, satellites were covered by insurance. However, the coverage generally contained at least a one-satellite failure deductible.

In 1980, the loss ratio for spacecraft insurance was computed to be greater than two hundred percent (39:6). As a result, satellite underwriters reevaluated their positions on the risk. As a result, in 1983, Lloyds of London (previously a major insurer in this area) decided not to write further space vehicle insurance, deeming it too risky (29).

Lloyds' decision came too late to protect them from the February 1984 failures of the Palapa B satellite and the Weststar 6 satellite, launched by the Space Shuttle. A record payment of \$107 million was paid on the Weststar policy (71:21). The Palapa satellite was eventually rescued from its erroneous geosynchronous orbit and successfully re-launched later in 1984.

Mr. A.H. Bolton, Chairman of Bowing Space Projects in London, in an address to the American Bar Association's National Institute on Litigation in Aviation Space Law, made the following comments on the availability issue:

In reality, there is a vast amount of potential insurance capacity, if all the risk-taking insurance companies and worldwide reinsurers decide to put their combined strength together. My evidence for this is the example of drilling rigs where I believe London alone can provide in the

area of \$1 billion Money is also there to provide a similar amount of capacity for the insurance of communications satellites but perhaps that is where the problem lies, if indeed we have a problem--in terms of the profitability of the business. (10:19.9)

A determination of the true state of the space insurance availability/affordability situation should be of great interest to the Air Force. GPS production contractors have already requested, and been refused, indemnification. SDI contractors will surely request indemnification against product liability also. If insurance for these programs is not "effectively available" in the insurance market of the near future, the Air Force may have to reconsider indemnification of these programs.

Insurance Expertise. The subject of insurance is very broad and complicated. There are several aspects of indemnification that are tied closely with insurance. Issues such as the requirement for proof of insurance coverage and the level of required insurance fit this category.

Proof of insurance has been (and is still) required by the Air Force. Contractors have questioned this requirement, stating that it causes extra work and is of no practical use to the Government. There may be some credence to this complaint, since the Air Force has no one who is trained in the insurance area (really capable of examining the insurance documents to determine their acceptability), involved in the indemnification process.

Exclusions are a good example of important information

to be gained from the insurance documents. Insurance policies generally contain exclusions, limitations or conditions of coverage, as a method of limiting the scope of coverage (63:131). Underwriters for government contractors have also included exclusions.

When considering indemnification of a contract, the Air Force is concerned about exclusions to the contractor's insurance coverage. If certain types of situations are excluded from the insurance coverage, those situations will be included in the Government indemnification coverage. It behooves the Air Force, then to (1) identify the exclusions; (2) determine whether they are reasonable; and (3) determine whether other policies may be available without the exclusions.

The question then becomes, is there anyone in the Air Force, involved in the indemnification approval cycle who has the background and experience necessary to make this kind of analysis. Indemnification requests begin with the Contracting Officer, who certainly has very little familiarity with insurance. Government lawyers evaluate the request, but they are looking for adherence to the regulation rather than forming any opinion on the contractor's insurance. For Public Law 85-804 indemnifications, approvals from the Command and from HQ USAF must also be obtained, before the Secretary of the Air Force considers approval. However, there is no one at either level, with the technical

insurance expertise to adequately investigate these types of insurance questions.

The level of insurance coverage required is another area of concern. Currently there is no set level required. Under the new Air Force FAR Supplement, it is essentially a matter of what level is economically available. In fact, the new Supplement requires only that the contractor maintain financial protection "in amounts considered within the industry to be prudent in the ordinary course of business" (6). Obviously this is an attractive situation for contractors.. However, does it protect the Government? If the contractor submits a statement that a specific level of insurance is all that is reasonably available to him, should the Government be satisfied?

Questions have been raised earlier in this thesis and in this chapter, as to whether there is a "real" insurance availability problem. How does the Government know that the contractor has exhausted all options to find insurance? The answer is, the Government makes no real attempt to reassure itself that the contractor has obtained the highest level of insurance possible. The reason, once again, is that the Air Force has no one skilled in the insurance arena who could adequately investigate insurance coverage.

Catastrophic Risk

An accident causing losses exceeding the amount of available insurance is termed a catastrophe. The eventuality

of a catastrophic accident arising out of a government program is perceived by some as just a matter of time. Typically, nuclear, space and missile programs have been those of concern. Nuclear programs will not be discussed here, since (with limited exceptions) they have been a clear-cut case for indemnification by the Government because of the very obvious hazards involved.

Whenever attempts have been made to change the rules of indemnification, several arguments have repeatedly been made. First, is a concern for the protection of the public. Second, is a concern for the protection of the government contractors, and the resulting effect on the Defense Industrial Base. Finally, recent arguments, particularly, have warned of the increasing probability of occurrence of a catastrophic accident. These arguments will be examined in further detail.

Public Protection. There are two avenues available to the victims of a catastrophic accident involving a government contractor who is not indemnified by the Government. They are private insurance and civil suit against the government contractor. Typically, insurance protection is provided through workman's compensation programs. The inadequacies of these programs are (1) all victims may not be employed and/or covered by workman's compensation, and (2) the degrees of coverage may vary greatly, as will personal insurance. As a result, in the event of a catastrophic accident, there may be

large numbers of persons who may need immediate recovery, with no alternative but to file suit against the contractor(s) involved.

The process of litigation, of course, is a time-consuming and expensive undertaking. Consequently, it may not be an entirely satisfactory solution for victims. This is particularly true since litigations against government contractors have met with mixed results, as discussed in Chapter IV.

If a catastrophic accident should occur, few would disagree that the Government would provide some type of relief to victims, regardless of indemnification. The fallacy to depending solely on this type of government relief is easily highlighted by the Texas City Disaster. The victims of that accident, in the absence of indemnification, received too little compensation, much too late. A very good argument could certainly be made that it is the Government's responsibility to ensure the public is automatically protected, particularly when the catastrophe occurs on a government program.

Contractor Protection. Government contractors are in a precarious position with respect to protection from civil suit, when indemnification is not available. The courts have, more often than not, found government contractors liable for damages to third parties, both in cases where the contractor was negligent (regardless of government

negligence) and in cases of strict liability.

Contractors have made numerous attempts to change existing product liability laws to relieve themselves of this type of liability on government contracts. They are especially concerned with their liability in the event of an accident of catastrophic proportions, because of the potential magnitude of the claims. One contractor called a decision to perform a hazardous government contract without indemnification, a game of "bet your company." This illustrates the situation from the contractors' perspective of presently being almost completely liable for damages arising from a catastrophic accident. This perspective hinges on the nonavailability of adequate insurance, which, as discussed earlier in this chapter, is still a matter of contention.

Presently, there appears to be little evidence that this situation is actually causing contractors to forego government business. As a result, the Air Force has been in an enviable position of very selectively authorizing indemnifications. However, the tables could turn very quickly if a catastrophic accident should occur. In that event, insurance would certainly become even more expensive and possibly unavailable. Contractors would re-evaluate the risk and could conceivably decide to forego a particular government program. Under this scenario, it is not unrealistic to predict some impact on the Defense Industrial

Base. The degree of impact, however, probably cannot be foreseen.

Probability of Occurrence. The fact that the military has not experienced a catastrophic accident since Texas City, could lead to a perspective that another one will never occur. This perspective would be wrong. While it is generally accepted that the probability of any particular catastrophe occurring is slim, few would argue that it has increased over the past several decades. The military, particularly the Air Force, has been involved in programs (not necessarily hazardous in themselves) which contribute to an increasing probability of a catastrophe. Programs such as the Space Shuttle, the use of missiles to launch satellites and the satellites themselves, are potential sources of a catastrophic accident.

Although the Space Shuttle is now indemnified by NASA under Public Law 85-804, the NASA coverage will not extend to a "military" Space Shuttle launched from Vandenberg AFB. The recent Space Shuttle accident will postpone Vandenberg operations, possibly until 1991, but eventually the Air Force will have its own shuttle. To date, Space Division has not concurred with NASA's position on indemnifying Space Transportation System (STS) contractors; stating that there is no "substantial risk that contractors would avoid STS related contracts for lack of indemnification" (3:1). This position is taken, in spite of the fact that in 1993, NASA

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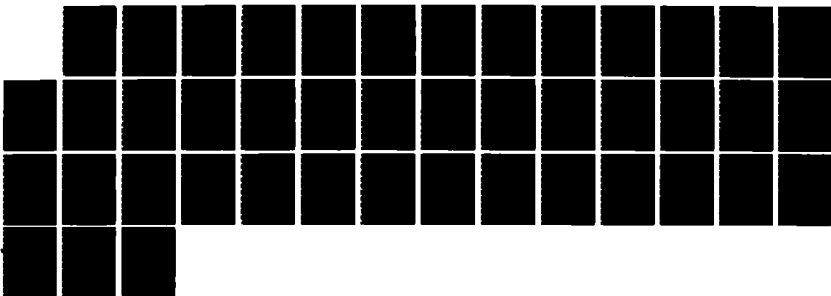
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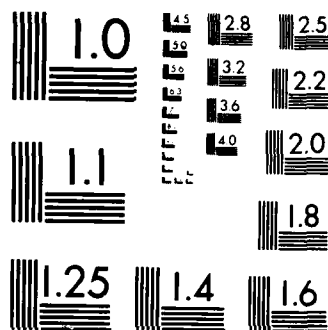
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

identified seventeen areas of Space Shuttle operations that could lead to a catastrophic accident. This listing can be found at Appendix B.

NASA's identification of Space Shuttle catastrophic hazards is a recognition by NASA that accidents can occur, due to system failure or human error, and could be of catastrophic proportions. The 1986 Space Shuttle accident, while not catastrophic (in terms of damage to the public), proves that the systems can fail.

One possible system failure was discussed in 1983 comments on the indemnification of space activities from Space Division to the AFSC Staff Judge Advocate. This failure would involve the loss of power while in orbit:

The STS operates at altitudes of 150-400 nautical miles. At these altitudes, unaided objects (objects without any means of propulsion like the Skylab or two Cosmos satellites) can partially survive descent through the atmosphere and impact the earth. The Space Handbook indicates that such an object in a 150 nautical mile orbit will descend in approximately 35 days, an object in a 200 nautical mile orbit will descend in approximately 200 days, and one in a 300 nautical mile orbit will descend in approximately 4,000 days. If the STS orbiter or its payloads lost power while the STS were in orbit, they would continue to orbit, gradually break up, and their debris could impact the earth. (3:4)

As long ago as 1964, a report was made by Columbia University on the hazards of government sponsored activities. In that report, principal cities around Vandenberg AFB were identified, along with a population count for those cities. This table can be found at Appendix C. The reason the report

identified these cities and their populations, was to show possible "targets" in the event of a space launch vehicle failure. The fact that this table is more than twenty years old means only that the "targets" have grown substantially. It should be noted that Vandenberg AFB has actually experienced some mishaps related to their missile programs. The most recent one occurred on April 18, 1986, with the explosion of a Titan 34-D rocket over the launch pad, roughly five seconds after liftoff. A large cloud, containing unburned liquid fuel, drifted across the base and out to sea. (61:6A)

According to the Columbia report, the possibility of large damages is real:

The accidental impact of a military or space launch vehicle can cause damage in a variety of ways. The explosion of fuel produces blast, incendiary and fragmentation damage. In the event a nuclear engine is involved [as in some payloads], radiation and contamination damage may be contributory factors with certain fuels toxicity is still another possibility. (9:42)

In addition to the inherent dangers associated with space vehicle launches, the mere ground transportation of the fuels can be a realistic scenario for a catastrophic accident. A study by A.D. Little warned of the potential for "explosive violence" when highly reactive chemicals used for military and space programs become accidentally mixed with normal civilian chemicals. The Columbia report detailed the danger as follows:

The shipment of fuels used in the propulsion of

missiles and space vehicle systems is recognized as being particularly hazardous because of their high energy content per unit weight. The uncontrolled and accidental release of this energy can lead to explosion and fires Unfortunately, these regulations and practices fail to take into account the possible coaction of the high energy fuels with normally "safe" industrial chemicals to produce combinations of high equivalent TNT yields. Thus ammonium nitrate fertilizer normally safely transportable may co-act with hydrazine upon derailment to produce a detonable mixture. Should the locale of the accident be inside a city damages in excess of 50 million dollars are easily estimated Compounding these losses could be the losses of life arising from the toxic effect of certain chemicals. Assuming appropriate weather conditions damages arising only from loss of life and particularly incapacitating injuries can reach major proportions. (S:6-7)

The shipment of volatile fuels by rail and highway increases yearly. As the Air Force becomes increasingly involved in space programs, the probability of this type of accident will continue to rise.

The mixing of hazardous fuels, however, is not necessary to cause an accident involving Air Force fuels. Toxicity is also a potential problem. According to the Columbia report, a minor train derailment can cause a tank car to develop a puncture that could lead to spillage. If this is accompanied by a blast or fire, a lethal cloud could form over a square mile area. Additionally, if the accident occurs at night at certain temperature conditions, the cloud could remain long enough to be fatal to persons in the area. (S:108)

The July 8, 1986, Miamisburg Ohio derailment accident came uncomfortably close to this scenario. This accident was the nation's largest evacuation resulting from a train

derailment. The area was evacuated twice, as a result of the burning tank car that had been filled with phosphorous. After two days, firefighters finally extinguished the fire and the phosphorous cloud eventually dissipated. Although some residents were evacuated for several days, injuries sustained were apparently limited to some temporary respiratory ailments. Later in July, the railroad corporation responsible announced it would remain financially solvent, in spite of damages resulting from the accident. (19:1)

The Miamisburg accident has important implications. Damage was minimal, due only to fortunate circumstances. The accident could easily have been catastrophic had the tanker been carrying a more toxic fuel, or had weather conditions been different.

Finally, the dangers involved with satellites in space are important to discuss, particularly because of the Air Force involvement in satellite programs such as SDI and GPS. The danger can be defined in terms of the sheer numbers of satellites in space. According to a 1982 article entitled "The Collision Hazard in Space" by V.A. Chobotov, the use of space since 1957 has resulted in an increasingly large number of "space objects which represent a constantly increasing collision hazard for current and future satellite systems" (11). These systems include "active and spent payloads, rocket bodies, and miscellaneous debris, including numerous

explosion fragments." A 1980 North American Defense Command (NORAD) Catalog of Objects in Space can be found at Appendix D. (11:191)

However, a study conducted on close encounters of two geosynchronous satellites in 1980, the OPS 6391 and WESTAR-A, reveals only a small probability of collision. The example provided in the Chobotov article to describe the probability was the following:

...the current 1000 day probability of collision for a 10 meter radius spacecraft at low altitudes is on the order of ... 0.15%. This is equivalent to stating that one in ninety such spacecraft would experience a collision in 20 years. (11:208)

Chobotov does predict that the collision hazard will increase in the future as satellites become larger and the density of debris increases (11:208). However, since most space objects either burn up during re-entry to the earth's atmosphere or fall into the oceans (covering two thirds of the earth), the scenario of a catastrophic accident caused by the collision of satellites is probably the least realistic.

Product Liability

Product Liability is generally defined as an action in which an "injured person seeks to recover damages from a seller for personal injury or loss of property by proving that the injury resulted from a defective product" (56:314). Never a straightforward issue, product liability becomes especially complicated on government programs. Issues such as (1) the extent of Air Force involvement in the design and

(2) the Air Force's use of the product, have surfaced in litigation (see Chapter IV).

These issues are key in determining whether product liability should be included in the indemnification of a product. However, the implications for the Air Force, with regard to future programs such as GPS must also be considered. Finally, and most importantly, the position of potential victims must be considered.

Air Force Involvement in Design. While the Air Force buys large numbers of products off-the-shelf, it also spends billions of dollars annually on products produced by Air Force specifications. These specifications are often a joint product of the contractor and the Air Force. However, whatever the genesis of the specification, the Air Force makes the final decision on its content.

Once the contractor has the Air Force contract, he is committed to building the product according to the Air Force specification. Because of this, contractors have claimed in litigation that the Government, not the contractor, should be held liable for damages. As discussed in Chapter IV, some courts have looked for proof of clear government involvement in a flawed design. Other courts, however, have held that, notwithstanding government involvement, the contractor has a duty not to knowingly produce a flawed product.

The issue of government involvement in the product design has not been resolved by litigation, and is one of the

reasons contractors are seeking legislative changes regarding product liability.

Air Force Product Use. Another issue that has been raised by contractors, is that they have no control over the product once it is accepted by the Air Force. With the exception of some systems which have interim service agreements, most systems are maintained by the Air Force. The Air Force also uses some systems, as it determines a need, regardless of its intended use. Contractors claim this lack of control over the product should remove liability on their part.

To examine the substance of this issue, it is helpful to look at the same issue, in a non-government scenario. The ladder industry will serve as an appropriate analogy. Manufacturers of ladders typically apply over a dozen different stickers to their product to warn consumers of unsafe uses of their product. In spite of all of the warnings on a ladder, consumers have successfully sued for damages incurred by using a ladder (1) in ways warned against by the manufacturer's stickers and; (2) for other purposes for which a ladder was never intended to be used. This analogy makes it clear that government contractors are in no worse a situation with respect to control of the product, than are some civilian manufacturers.

It has indeed been the Air Force position not to take on product liability as an area for indemnification. The new

Air Force FAR Supplement may permit product liability indemnification in catastrophic situations and for "unusually hazardous or nuclear risks initially defined in the contract" (6). However, this would be very limited in scope and on an exceptional basis. Air Force has expressed specific concerns for indemnifying beyond contract life and has not yet indemnified a program for product liability.

When GPS becomes operational, the Air Force may have to consider indemnifying it for product liability. The GPS is a space-based radio-navigation satellite system that will provide highly accurate, three-dimensional position, velocity, and time information to an unlimited number of users, anywhere on or near the earth (45:89).

While GPS has potentially a large number of military applications, it also has potential for extensive civilian applications. Some civilian applications currently being investigated are harbor control, sea navigation, helicopters, civil aviation, and the space shuttle. Even though there may be concerns for product liability with military applications, the primary concern of contractors will probably be for the civilian applications. (45:89)

It is anticipated that the military users of GPS will obtain a three-dimensional accuracy of fifty-five meters or better with a ninety-five percent probability (45:89). However, due to national security concerns, current plans are to make GPS available to civilian users at an accuracy of

approximately two hundred meters within a fifty percent confidence level (45:89). This would seem to represent a significant reduction in reliability of the system. If civilian users are to adopt GPS at this reliability level, there will certainly be product liability concerns.

Implications. The primary concern of the Air Force with respect to product liability is one of opening up a Pandora's box. It is a valid concern. If the Air Force approves the indemnification of just one program for product liability, contractors will have a basis for pressing for indemnification of many other programs. In this situation, the Air Force would find itself examining just how much contingent liability it can afford to incur. This obviously would not be a prudent position for the Air Force to allow itself to get into.

To date, the Air Force has successfully avoided such a situation by refusing to approve any indemnification for product liability. This approach has served well so far, but future programs may force the issue, leaving the Air Force no alternative but to open up that Pandora's box.

Another implication of allowing indemnification for product liability is a concern for receiving a quality contractor product. An argument has been made that if manufacturers are not held liable for their products, they will lack the incentive to produce safe products. The courts have often supported this argument. Although the Rockwell

case did not support this argument, the dissenting opinion supported it eloquently:

Just as the Military can make any parachute packer take one out that he has just folded and make him jump with it, the court should require that Rockwell stand behind the products for which it voluntarily contracts and provides at a profit.
(44:41)

Contractors have contended, however, that there is no empirical evidence that holding a manufacturer liable for his product will result in a safer product.

If one believes that holding a contractor liable (to some extent) for his product, will contribute to a safer product, then one would certainly question full indemnification of an Air Force contractor for product liability.

The Victim's Position. If the contractor, then, is not to be indemnified for product liability and he cannot maintain adequate insurance, in what position is a potential victim left? In cases involving large government contractors, contractor funds should generally be sufficient to cover claims (assuming a non-catastrophic incident). The same cannot be assumed for the many small contractors with whom the Air Force contracts.

Another concern for the victim is whether he will be successful in court against the contractor. As discussed in Chapter IV, some contractors have successfully used the government contract defense to avoid paying damages. In those cases where the contractor is able to share the

Government's immunity from suit, the victim has no recourse.

Congress, government contractors, and the Air Force have tackled these very broad issues of insurance, catastrophic risk and product liability for government programs. There have been no easy solutions to them. In fact, they have only become more complex and more pressing, as Air Force programs advance technologically.

VIII. Recommendations and Conclusion

The complex indemnification issues facing the Air Force do not have a simple solution. In order to arrive at any recommendations, existing and future pressures must be acknowledged.

Currently, insurance is not easily available at reasonable prices to many government contractors. Contractors have been joined by the insurance industry in further attempts at legislative reform in the areas of product liability and catastrophic risk. Additionally, courts are consistently awarding product liability damages against manufacturers and are inconsistently allowing/disallowing government contractors immunity from suit.

Facing this environment, the Air Force has two basic alternatives. Its first, and easiest choice, is to continue present policy until new indemnification or liability legislation is finally passed. The problem with this approach is that the Air Force will then have to live with legislation that may have been strongly influenced by contractors, as were the legislative attempts described in Chapter V. There is the potential, based on past legislative attempts, for extensive product liability indemnification, after-the-fact indemnification and catastrophic risk indemnification. Future operations of Air Force programs,

such as GPS, SDI, and Space Shuttle missions from Vandenberg AFB, may very easily fall into these categories.

The other alternative for the Air Force is to change its policy further to protect itself from inevitably large contingent liabilities that could result from broad liability or indemnification legislation. Any changes to Air Force policy should be based on (1) a concern for protecting the public from hazardous conditions due to Air Force programs; (2) a concern for the survival of Air Force contractors, in order to preserve the Defense Industrial Base; (3) a recognition that both the Air Force and the contractor are responsible for Air Force programs; and (4) a recognition that indemnifications must be limited in order to control contingent liabilities.

Past Air Force policy can only be said to be based on the fourth consideration above. The new draft FAR Supplement begins to address the other considerations. However, if there is no intention on the part of the Air Force to actually indemnify any contractors for product liability or catastrophic loss, in spite of the draft FAR Supplement, then these considerations have not been addressed.

There are ways that the Air Force could liberalize its policy, while continuing to protect itself against large contingent liabilities.

Recommendations

- (1) Consider loosening Air Force informal policy

to include catastrophic risk and product liability indemnifications that are in the national interest.

(2) Retain existing case-by-case analysis and approval of indemnification requests.

(3) Hire an Insurance Consultant to participate in the indemnification approval recommendation.

Recommendations Examined

Catastrophic Loss and Product Liability Indemnification.

The nature of future Air Force production and operational programs, together with pressure from contractors, the insurance industry and Congress, will likely place the Air Force in a position of eventually approving the indemnification of a contractor for catastrophic risk or product liability. Once that occurs, pressure will only increase for further indemnifications. The Air Force will then be faced with attempting to control contingent liabilities.

How then, can the Air Force insure that it is not barraged with these types of indemnifications? The author suggests that, in addition to the draft FAR Supplement, the Air Force should realistically consider the indemnification of some contractors for catastrophic risk and product liability. The concern for limiting contingent liabilities could be addressed by the creation of an indemnification structure, similar to that in the Price Anderson Act.

This structure would involve a step approach to indemnification that would require not only promises from the

Air Force, but also promises from the contractor. In effect, just as the Air Force and the contractor participate in the design, development and production of an Air Force product, they will jointly participate in providing financial protection.

The step approach is based on having several avenues of financial protection. These avenues would be stepped through, in the event of an accident, in order to provide full relief to injured parties, while protecting the government contractor from financial jeopardy and protecting the Air Force from large contingent liabilities.

The following is an example of how this step approach to indemnification could be structured. It is not intended as a specific recommendation, rather as one possible approach.

Step 1:

Require Air Force contractors requesting indemnification to maintain a specified level of insurance coverage. The level could differ for large and small businesses (the majority of indemnifications are for large businesses).

Step 2:

Require a commitment by Air Force indemnified contractors to contribute to a deferred premium pool (to be actually paid only in the event of an accident exceeding the insurance coverage required in Step 1). A possible approach to this provision would be to require a commitment equal to a specified percentage of the total dollar value of a contractor's indemnified contracts.

Step 3:

Place a liability ceiling on any one accident. It may be appropriate here,

too, to distinguish between large and small businesses.

Step 4:

Finally, after the first two steps have been exhausted and the ceiling in Step 3 has been reached, government indemnification will cover remaining damages.

Steps 1 and 2 will serve to require the contractor to take on some responsibility for financial protection and essentially for producing a quality product. Additionally, the inclusion of Step 2 in this structure will insure that contractors will examine the need and legitimacy for indemnification before making a request. The liability ceiling in Step 3 will protect contractors in the event of a catastrophic accident, while not removing all risk to the contractor. The Step 4 indemnification, above the ceiling, will protect victims and contractors, while ensuring the contractors will be willing to take on future Air Force programs.

The author makes no attempt to suggest specific dollar requirements and ceilings for this approach. That would be beyond the scope of this investigation. The author recognizes, however, that these dollar figures will not be easily defined, due to the very limited data base of accidents on which to make comparisons and estimates of potential damage.

It should also be pointed out that the DOD industry differs from the nuclear industry, making a direct adaptation

of Price Anderson-type policy unacceptable. For example, the nuclear industry is more closely regulated and more homogenous than Air Force contractors. For this reason, the above approach differs from the Price Anderson approach outlined in Chapter II. Finally, a legal determination will be necessary as to whether an approach of this type is permissible under the residual powers of Public Law 85-804.

Retention of Case-by-Case Analysis. Some have suggested setting very specific guidelines and definitions to make indemnifications somewhat automatic. In light of the present and future pressures on the Air Force for more extensive use of indemnification, the author views it as imperative that the Air Force continue to examine each Public Law 85-804 indemnification request on a case-by-case basis. This approach is justified by the large differences in Air Force contractors and the hazardous situations they face.

Contractors differ in size, experience, safety and quality programs, insurance and in types of products they typically manufacture. All of these variables are players in a decision to indemnify. Indeed, if catastrophic risk and product liability are ultimately considered for indemnification by the Air Force, these variables will become more important than ever, and should continue to be examined on a case-by-case basis.

In addition to differences in contractors, there are also differences in hazardous situations. It has proven

impossible to define an "unusually hazardous" condition that covers all cases for indemnification. Determination of a hazardous condition is ultimately somewhat subjective. For example, victims of an airplane crash would surely consider an airplane hazardous. However, largely because of the length of time the airplane has been commonplace, it is not considered hazardous. But, at what exact point in time did air travel cease to be hazardous?

Many people considered the Space Shuttle as commonplace, or non-hazardous, before the 1986 accident. In the wake of that accident, reevaluations were made and it was announced that the Space Shuttle will no longer be utilized to transport civilian satellite payloads. The issue of indemnification will surely reappear, probably more forcefully this time, when Space Shuttle operations begin at Vandenberg AFB. This risk differs from other risks the Air Force has indemnified, and should be examined individually.

Insurance Consultant. At the onset of this thesis effort, the author spoke at length with Major Tom Kolubik, the focal point for indemnification issues for the Air Staff. His primary concern for the handling of indemnification cases was the lack of insurance expertise involved in the process (36). Having completed the extensive research necessary for this thesis, it is apparent that an insurance expert should be part of the process.

The use of a consultant from the insurance industry is

recommended because a consultant would be intimately familiar with the insurance industry; how it works and how it is changing as the environment changes. Additionally, a consultant would be capable of evaluating indemnification requests from the viewpoint of insurance availability, affordability and risk to the contractor and the Air Force.

Conclusion

The Air Force has never been comfortable with Public Law 85-804 indemnification. The apparently inevitable future indemnification of a contractor for catastrophic risk or product liability should be, and is, of great concern to the Air Force.

The recommendations made by the author will not be easily implemented. They require extensive investigation, in order to arrive at a level of detail that is beyond the scope of this effort. The recommendations are essentially offered as "food for thought." Notwithstanding the recommendations, there is considerable value in the preceding chapters as a primer on indemnification and on primary Air Force indemnification issues.

There is a need for contractor indemnification in the current Air Force environment. Looking toward future programs, it is evident this need will increase. It is indeed possible that certain contractors will insist on indemnification as a condition of doing business with the Air

Force. In lieu of Congressional action, the Air Force has an opportunity to formulate indemnification policy that will protect itself, its contractors and, most importantly, the American public.

Appendix A: Indemnification for Catastrophic Accidents
Specific Issues for Discussion by Panel Members

1. To what extent should indemnification be provided for catastrophic incidents?
 - a. The General Public
 - b. The Government
 - c. Private Industry
 - d. Foreign Governments or Nationals
2. Is the available insurance capacity adequate to protect (a) the public, (b) industry, (c) the Government both as to its property as well as its personnel?
3. In addition to DOD, AEC, NASA, and DOT, what agencies of the Government conduct programs which could involve a catastrophic accident?
4. Can we define "catastrophic accident/incident"?
5. Assuming the interests of the public, the Government and private contractors dictate a need for government indemnification, do these same interests apply to protection against catastrophic losses resulting from private activity (e.g., commercial aircraft, nuclear power reactor)?
6. What should be the extent of coverage, particularly product liability arising after completion and performance of contract?
7. Should limits of liability be imposed?
8. Should limitations on amounts which can be settled administratively without court decision or concurrence of Attorney General be provided?
9. Should limitations be imposed on amounts which can be settled without specific appropriations being made therefor?
10. Should a special forum be established to adjudicate claims?
11. What law should govern determination of liability - should it be the law of the place where the incident occurred?

12. To what extent should State statutes of limitations govern liability?
13. Should private insurance protection be required and, if so, in all cases to what extent and under what circumstances?
14. Should the obligation to indemnify be exclusive of applicable insurance coverage actually carried by the contractor or if not, to what extent inclusive of insurance coverage required and approved by the Government?
15. Should risks for which insurance is available include only those directly connected with performance?
16. Should contractor organizations which are immune from liability under State law be exempted from coverage?
17. Should indemnification be extended to subcontractors? If so, should it be only to first-tier subcontractors or to subcontractors of any tier?
18. Should the President be authorized to promulgate regulations which would standardize to the extent possible the terms, conditions, format, etc., of indemnification agreements and procedures for settlement?
19. Should indemnification liability be extended to incidents arising outside the United States?
20. Should private insurance facilities and services be utilized to assist in administering indemnity agreements?
21. Should liabilities resulting from the negligent acts or omissions of the contractor and its employees be covered?
22. Should claimants be required to establish negligence on the part of the contractor or the Government?
23. Should indemnification liability be imposed for bodily injury as well as property damage?
24. Should indemnification agreements in appropriate cases be mandatory and not dependent on the discretion of the contracting agency?
25. Should the right of the Government to subrogation be required in indemnification agreements?

Appendix B: Identification of Catastrophic Hazards

The Accident Assessment Report identifies twenty-nine (29) separate circumstances which were classified as hazards. Seventeen (17) of these were assessed as having catastrophic consequences should they occur.

This attachment provides the following information relative to the seventeen (17) hazards determined to have catastrophic consequences:

- Title
- Description
- Area (flight or ground)
- Cause(s)

1. TITLE: Structural Failure

DESCRIPTION: Structural failure due to mission loads during launch, ascent, and descent/abort. Fugitive material causes damage to the Space Transportation System (STS) payload bay or Orbiter damage sufficient to preclude successful reentry of the Orbiter. Solar paddle structural failure is not a credible hazard during non-flight operations.

AREA:

Flight - Catastrophic
Ground - N/A

CAUSE:

- Mission loads exceed design loads or appropriate safety factors not applied.
- Structure fails due to stress corrosion.
- Structure fails due to the propagation of a pre-existing flaw(s) in the material used.

2. TITLE: Inadvertent Operation of Propulsion Thrusters

DESCRIPTION: Inadvertent release of high temperature gases from thrusters could cause damage to the inner surfaces of the Orbiter payload bay in the vicinity of the thrusters. Inadvertent operation of propulsion thruster could occur by means of Ground Support Equipment (GSE).

AREA:

Flight - Catastrophic
Ground - Critical

CAUSE:

- Failure of mechanical propellant flow control device(s) may allow hydrazine to flow through the thruster, initiating thruster engine operation.
- Electrical component failures.
- Commanding errors.

3. TITLE: Hydrazine Adiabatic Detonation

DESCRIPTION: Adiabatic detonation could occur within the Propulsion Subsystem with sufficient energy to rupture propellant lines and initiate a self-sustaining (explosive) hydrazine decomposition process. The consequences of the above scenario would be catastrophic, e.g. damage to the Satellite, Integration Upper Stage (IUS), Orbiter, ground equipment/facilities, and major injury to or death of personnel, depending on the operation/phase.

AREA:

Flight - Catastrophic
Ground - Catastrophic

CAUSE: Conditions conducive to adiabatic detonation, e.g. (a) availability of sufficient upstream pressure to compress hydrazine vapors adiabatically to reach detonation temperature coupled with the premature operation of isolation valve(s), due either to an (b) electrical or (c) mechanical failure, and (d) insufficient propellant line structural strength to contain adiabatic detonation energy. (e) Debris/contamination tend to lower the pressure/temperature threshold for adiabatic detonation.

4. TITLE: Battery Case Failure

DESCRIPTION: Battery case failure due to an internal overpressurization condition and/or worst case induced environments may result in the release of battery cells and/or battery case fragments causing collision and fire hazards.

AREA:

Flight - Catastrophic
Ground - Catastrophic

CAUSE:

- Structural design inadequacy
- Stress corrosive susceptible material

5. TITLE: Lightning Strike

DESCRIPTION: A direct lightning strike on the Orbiter may couple into the DSP-1 payload or associated ground support equipment resulting in secondary effects such as premature firing of ordnance, rupture of propulsion subsystem components and other payload-oriented events potentially catastrophic to the Orbiter.

AREA:

Flight - Catastrophic
Ground - Catastrophic

CAUSE: Burning, blasting, direct coupling of voltages and currents and structural deformation caused by lightning. Additionally, high pressure shock waves and magnetic forces may be produced by the associated high currents.

6. TITLE: Inadvertent Link 1 RF Radiation

DESCRIPTION: Inadvertent operation of Link 1 in the Orbiter payload bay during launch, ascent and descent/abort will result in RF radiation exceeding the acceptable emission levels allowed.

AREA:

Flight - Catastrophic
Ground - None with RF hats

CAUSE:

- Electronic hardware failures may cause power to be applied prematurely to the Link 1 transmitter(s) and associated power amplifier(s).
- Ground commands inadvertently sent to the spacecraft may cause power to be applied prematurely to the Link 1 transmitter(s) and associated power amplifier(s).

Note: Analyses show that if Link 1 were to be energized in the Orbiter payload bay, RF radiation limits would be exceeded, and by definition, this is a CATASTROPHIC hazard.

7. TITLE: Inadvertent Deployment of Solar Paddles

DESCRIPTION: Shuttle damage or payload bay door interference may result if the paddles deploy prematurely in the Orbiter payload bay. Since paddle deployment will violate the Orbiter maximum allowable payload envelope, premature paddle deployment is by definition CATASTROPHIC. Unplanned paddle deployment can injure personnel in their immediate proximity.

AREA:

Flight - Catastrophic

Ground - Critical

CAUSE:

- Electronic hardware failures may activate the ordnance device(s) that initiate deployment of the solar paddles.

- Commands inadvertently sent to the spacecraft may activate the ordnance device(s) to deploy the solar paddles.

- The SP 7211 cartridges in the 117720 pin puller assemblies, which allow solar paddle deployment, may fire prematurely due to electrostatic discharge, electromagnetic interference or other causes.

- Fracture of the supporting structure or retaining pin.

8. TITLE: Inadvertent Sunshade Cover Deployment

DESCRIPTION: Inadvertent deployment of the sensor sunshade cover may cause personnel injury or equipment of the sunshade cover to be a CATASTROPHIC hazard during the Phase "O" Safety Review held in November 1981.)

AREA:

Flight - Catastrophic

Ground - Critical

CAUSE:

- Electronic hardware failure(s) in the ordnance firing circuitry that initiates cover deployment.

- Commands inadvertently sent to the spacecraft may activate the ordnance devices that initiate cover deployment.

- The guillotine ordnance devices, which allow cover deployment, may fire prematurely due to the electrostatic discharge, electromagnetic interference, or other causes.

9. TITLE: Structural Failure of the Laser Crosslink System (LCS)

DESCRIPTION: Failure of the LCS primary or secondary structure may cause Orbiter damage or loss. Failure on the ground could result in personnel injury.

AREA:

Flight - Catastrophic
Ground - Catastrophic

CAUSE:

- Undetected material defects.
- Damage due to mishandling.
- Stress corrosion.
- Uncaged Gimbal Telescope Assembly (GTA) motion.
- Inadequate design margin.

10. TITLE: Laser Crosslink System (LCS) Hazardous Voltage Sources

DESCRIPTION: The LCS contains voltage sources that exceed 30 volts with potential for electrical shock and/or burns.

Note: The LCS is not powered while within the payload bay.

AREA:

Flight - Not an STS hazard
Ground - Catastrophic

CAUSE:

- Improper bonding/grounding
- Ground personnel contact with:
 - Exposed contacts, wires, terminals or link devices.
 - Defective connectors or insulation during maintenance test or checkout.
- Open return line(s) - "hot" chassis.
- Improper handling or improper procedures.

11. TITLE: Laser Hazard Due to Inadvertent LCS Turn-on

DESCRIPTION: Inadvertent LCS turn-on is an optical hazard to ground personnel during ground operations and to the Orbiter crew during payload deployment until safe separation is

achieved. (The LCS laser has been categorized as a Class III B laser per AFOSH STD 161-10 and in its "acquisition" mode of operation, exhibits a safe eye exposure distance of 2411 feet.)

AREA:

Flight - Catastrophic

CAUSE:

- Electrical/electronic hardware failure.
- Operator error.

12. TITLE: Inadvertent Link 9 (MDM UHF) RF Radiation

DESCRIPTION: Inadvertent Mission Data Message (MDM) Rebroadcast UHF (Link 9) RF emission in the Orbiter payload bay during launch, ascent, and descent/abort will result in RF levels exceeding those defined as CATASTROPHIC.

AREA:

Flight - Catastrophic

Ground - None with RF hats

CAUSE:

- Electronic hardware failures may cause power to be applied prematurely to Link 9 transmitter/power amplifier.
- Ground commands inadvertently sent to the spacecraft may cause power to be applied prematurely to the Link 9 transmitter/power amplifier.

Note: Analyses show that if Link 9 were to be energized in the Orbiter payload bay, RF radiation limits would be exceeded, and this by definition, is a CATASTROPHIC hazard.

13. TITLE: Ignition of Payload Bay Flammable Atmosphere

DESCRIPTION: Ignition of a flammable payload bay atmosphere that may result from leakage or ingestion of fluids into the payload bay during Orbiter entry, landing, and postlanding operations.

AREA:

Flight - Catastrophic

Ground - Catastrophic

CAUSE:

- Arcs produced by making and breaking electrical circuits.

- Arcs produced by electrostatic discharge.
- Hot surfaces (>325 degrees F).

14. TITLE: Ignition of Flammable Materials

DESCRIPTION: Use of flammable materials such as thermal blankets in close proximity to ignition sources in DSP Satellite may result in fire and flame propagation in Orbiter Cargo Bay.

AREA:

Flight - Catastrophic
Ground - Catastrophic

CAUSE:

- Existence of an ignition source
- Inadequate screening by Materials and Processes of materials for flammability characteristics.

15. TITLE: Attitude Control System (ACS) Test Set Causes for Spacecraft Reaction Wheel Overspeed

DESCRIPTION: When the Attitude Control System Test Set (ACSTS) controls the operation of the spacecraft reaction wheel while the spacecraft/IUS is in the Satellite Payload Integration Facility (SPIF), driving the wheel to excessive speeds could result in disintegration of the wheel and cause injury to people and major damage to the SPIF facilities and the spacecraft/IUS.

AREA:

Ground - Catastrophic

CAUSE:

- Attitude Control System Test Set (ACSTS) hardware failure.
- Test conductor/procedure error.

16. TITLE: Ignition Sources for Flammable Vapors

DESCRIPTION: Ignition sources in Electronic Ground Support Equipment (EGSE) such as relay sparking, short shorts, and hot electrical components, if not controlled, could cause ignition of flammable gases. This could occur in the SPIF during propellant loading and pressurization or ignition of flammable gases from the Orbiter/IUS while in the Rotating Service Structure (RSS) or Orbiter Bay.

AREA:

Flight - N/A

Ground - Catastrophic

CAUSE:

- Hot electrical components, relay sparking and electrical shorts.

17. EGSE Causes Failed-on Power to Isolation Valves

DESCRIPTION: Failures in the Propellant Loading Test Set (BLTS) and/or failures in other SITS elements may result in continuous application of control power to the propellant tank isolation valves after hydrazine is loaded into the propellant tank. Overheating of the valve could cause explosion of the hydrazine inside the valve and line resulting in dumping of all propellant from a tank into the spacecraft, causing major damage to the spacecraft, Satellite Payload Integration Facility (SPIF), and the IUS.

AREA:

Ground - Catastrophic

CAUSE:

- Propellant Loading Test Set (PLTC) hardware failure.
- SITS commands spacecraft power to isovalues.
- Personnel/procedure error.

Appendix C: Principal Cities Around Vandenberg AFB (1964)

Principal cities located around Vandenberg AFB and population statistics:

50 Mile Radius:

Santa Barbara	59,000
Lompoc	14,000
San Luis Obispo	20,000
Santa Maria	20,000

50 - 100 Mile Radius:

Santa Paula	13,000
Oxnard	40,000
Port Hueneme	11,000
Bakersfield	57,000
Delano	12,000

100 - 150 Mile Radius:

Los Angeles	2,479,000
Long Beach	344,000
Santa Ana	100,000
San Fernando	16,000
Pasadena	116,000
Hanford	10,000
Tulare	14,000
Visalia	16,000
Fresno	144,000

150 - 200 Mile Radius:

Riverside	84,000
San Bernadino	92,000
Redlands	27,000
Barstow	12,000
Merced	20,000
Modesto	37,000
San Jose	204,000
Alisal	16,000
Salinas	29,000

Appendix D: NORAD Catalog of Space Objects

NORAD Catalog of All Objects for 27 April 80[1]:

Earth Orbit Payloads	1055	
Earth Orbit Debris	3384	
Deep Space Payloads	61	
Deep Space Debris	52	
Current Objects:	4552	4552
Decayed Payloads	1399	
Decayed Debris	5831	
Decayed Objects:	7230	7230
Total Objects:		11782

SYNCHRONOUS POPULATION

A. Operational Satellites		
DOD (SCF)/Nato	23	
Nasa	17	
Comsat Corp.	13	
Lincoln Labs RCA. W.U..ESA	10	
USSR	16	
UK,CAN,JAP,FR,IT,INDONESIA	18	
Total Operational:	97	97
B. Rocket Bodies and De-Activated Satellites		
With Current Tracking	47	
No Recent Tracking	56	
Total Bodies:	103	103
Total Synchronous:		200

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Indemnification is an assurance from one party freeing another from risk of loss. Under certain circumstances, such as the use of nuclear power or hazardous materials, the government may elect to indemnify a contractor. The focus of this effort was to determine the parameters of the global government contractor indemnification problem and then examine the implications for the Air Force. To accomplish this task, an historical perspective on government indemnification was presented, studies and investigations on indemnification were examined, relevant litigation was reviewed, legislative attempts to change indemnification and product liability laws were described, and finally the evolution of Air Force policy on indemnification was examined. With this basis, an in-depth discussion of primary indemnification issues facing the Air Force--those of insurance, catastrophic risk and product liability--was undertaken. The results were (1) a primer on the indemnification of government contractors; and (2) general recommendations for future Air Force indemnification policy. Three general recommendations were made based on the author's perception that, given the nature of future Air Force programs, indemnification of government contractors for catastrophic loss and product liability is inevitable. The recommendations are: (1) informal policy should be loosened to include consideration of catastrophic risk and product liability indemnifications; (2) retention of a case-by-case approval of indemnification is essential; and (3) there is a need for an insurance consultant in the approval process.

END

12-86

DTIC