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DEPARTMENT OF THE AIR FORCE

DEPARTMENT OF THE AIR FORCE
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Final

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Environmental Statement

FINAL ENVIRONMENTAL STATEMENT

ON

OPERATION GIANT PATRIOT

JULY 1974

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Air Force
Environmental Planning Division
(HQ USAF/CEVP)

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Washington, DC 20330-1260

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FINAL ENVIRONMENTAL STATEMENT
ON
OPERATION GIANT PATRIOT

SUMMARY

1. This document is a final environmental statement relating to the Strategic Air Command (SAC) Operational Base Launch program known as GIANT PATRIOT. It is submitted as a legislative action.

2. GIANT PATRIOT includes eight test launches of MINUTEMAN II missiles from operational launch facilities by operational crews. The purpose of these tests is to demonstrate unmistakably the deterrent capability of the MINUTEMAN force. Four launches are proposed for Winter 1975 (Jan 75-Apr 75) from Malmstrom Air Force Base Wing I, Great Falls, Montana. The other four launches will be discussed in an environmental statement at a later date. Proposed flight paths will overfly remote areas and sparsely populated sections of the western Unites States, and terminate at Canton Island in Phoenix Island group. In general, the corridor for these flights traverses Oregon, western Montana, northern Idaho, the southeast corner of Washington, and the northwest tip of California. The spent first stage will impact short of the Pacific Ocean. Flight paths have been selected so that the first stage will drop within remote, unpopulated areas. These drop areas will be in Idaho. Flight safety is insured by evacuating a prescribed corridor adjacent and immediately downrange of the launcher; by evacuating first stage drop areas; and by including destruct capability of the missile should it deviate from a predetermined flight profile.

3. The following is a summary of the potential environmental impact:

a. Some construction will be required to establish the necessary roads and support sites. Preparation and restoration of these roads and sites is expected to have minimal environmental impact.

b. The missile exhaust will cause infrequent short-term, non-persistent air pollution near the launch complex. The unlikely

event of an abort or an accident has been addressed and the resulting air pollution concentrations will be less than Public Emergency Limits.

c. Noise pollution occurs approximately 1 minute for each launch; aside from the annoyance factor, it is deemed of little environmental significance. A sonic boom is predicted to occur during the ascent of the missile. This sonic boom could cause some damage in a relatively small area if structures are present. Possible damage would range from broken windows to minor structural damage and would only affect a small area.

d. Missile debris will result from normal launch or missile destruct. There is a possibility of a fire due to impact of burning propellant pieces, but steps have been taken to reduce this to a minimum.

e. Possible adverse effects could occur subsequent to missile destruct. There would be slight chance of a fire occurring or injury as a result of destruct action following a malfunction. The possibility of injury has been calculated as 3 in 100,000 per launch.

4. ALTERNATIVES

a. CONDUCT GIANT PATRIOT FROM A DIFFERENT MINUTEMAN II WING. MINUTEMAN II is deployed in three locations and each location was considered. Malmstrom AFB, Montana was selected because it provides the safest and shortest overland flight corridors to the Pacific Ocean. Also, Malmstrom is the only MINUTEMAN wing that has both major weapon systems collocated; thus a more inclusive test program can be designed.

b. CONDUCT GIANT PATRIOT FROM A VANDENBERG AFB LAUNCH FACILITY. Several launches, using the GIANT PATRIOT missiles, have been successfully conducted from Vandenberg AFB. These launches will provide valuable correlation data for accuracy evaluation. However, they do not provide the demonstration and confidence value of actual test launches from operational sites.

c. CONSTRUCTION OF AN OPERATIONAL BASE FACILITY ON THE COAST OF THE UNITED STATES. This alternative would consist of building a complete operational MINUTEMAN launching facility on the coast of the United States. A new operational complex on the coast is currently prohibited by the Strategic Arms Limitation Agreement, would not be representative of existing operational bases, and launches from such a facility would not demonstrate the operational capability of existing bases. In addition, the environmental impacts due to construction of such a base would be longer term and would be more adverse than those due to the proposed Malmstrom launches.

d. LAUNCH THROUGH STAGE I FLIGHT ONLY FROM AN EXISTING OPERATIONAL BASE. Launch through Stage I only from operational bases is not a demonstration of the total system. Local environmental impact would be similar to that from GIANT PATRIOT and risks in the local area would be comparable; however, impact in the Stage I drop zone would be greater.

e. EXERCISE WITHOUT LAUNCH. Exercise without launch is a continuing requirement for training and for limited operational evaluation of the system, but cannot demonstrate total system capability. Environmental impacts would be negligible. However, the alternative would not provide any significant increase in the deterrent credibility of the MINUTEMAN weapon system.

f. DO NOT CONDUCT GIANT PATRIOT. Although SAC has consistently stated the rationale and specific objectives for full-range operational base launches, no such program has been conducted. Testing has been accomplished from Vandenberg AFB, California. The Vandenberg test launches are treated as statistically representative of operational launches and the results are used for war planning. The operational launch facilities are tested through electronic simulation. These programs, however, do not provide the demonstration and confidence value of full-range operational base launches.

5. List of Federal, State and local agencies from which written comments have been received:

a. State of Idaho
(State Planning and Community Affairs Agency)

b. Environmental Protection Agency
(Office of Federal Activities

c. HEW

d. Department of Transportation
(FAA Northwest Region

e. Office of the Assistant Secretary of Commerce

f. HUD

g. Department of Transportation (FAA Western Region)

h. Department of Agriculture

i. HEW (Regional Office, San Francisco

j. Department of Transportation (FAA Environmental Quality)

k. Department of the Interior (Office of the Secretary)

l. Department of Agriculture (Forest Service)

m. State of Oregon (Executive Department)

n. State of Oregon (Department of Environmental Quality)

o. State of Oregon (Nuclear and Thermal Energy Council)

p. Department of State (Bureau of International Scientific and Technological Affairs; Office of Environmental Affairs)

q. Office of the Secretary of Transportation

r. State of California

6. The draft environmental statement was made available to the Council on Environmental Quality and the public in February 1974.

7. The final environmental statement was made available to the Council on Environmental Quality and the public in July 1974.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (CONT'D)

LIST OF FIGURES (CONT'D)

I. PROJECT DESCRIPTION

A. INTRODUCTION AND HISTORY

1. General Discussion

a. This document addresses the environmental impact of conducting a set of four MINUTEMAN II launches from operational launch sites in the vicinity of Malmstrom Air Force Base, Montana, to Canton Island in the Pacific Ocean in the winter of 1975 (Jan - Apr); the program for these tests is formally titled the Operational Base Launch (OBL) program, which has been given the nickname GIANT PATRIOT. The elements of GIANT PATRIOT, other than performing the actual OBL launches, include developing and testing modified MINUTEMAN II missiles and a Mobile Range Safety System for the launches. The OBL program has several objectives, among which are verifying and demonstrating the credibility and reliability of the in toto MINUTEMAN weapon system.

b. The MINUTEMAN weapon system is part of the United States TRIAD, the other elements being the long-range bomber force of the United States Air Force, and the Submarine-Launched Ballistic Missile (SLBM) force of the United States Navy. The operability and survivability of a large percentage of all three elements of the TRIAD are critical for successful retaliation in the event that the United States is attacked, and for evincing credibility as a deterrent force to minimize the possibility of attack.

c. The performance of the long-range bomber and SLBM forces is evaluated and verified by conducting operations virtually identical to those that would be required in the event of a national emergency; the systems employed in the operations, e. g., the aircraft, missiles, submarines, and command and control systems, are also identical or virtually identical to those that would be used in a time of emergency. For example, after research, development, test and evaluation (RDT&E) and operational test and evaluation (OT&E) the bombers are assigned to operational units and flown under operational conditions. Similarly, after RDT&E and OT&E the SLBMs are installed in their respective submarines, and the system undergoes launch trials at sea under conditions closely approximating operational conditions. The MINUTEMAN system has never been tested in a similar manner.

d. The primary reason that the MINUTEMAN system has not had a comprehensive operational test is that to do so requires launching MINUTEMAN missiles over the continental United States (all MINUTEMAN bases are at inland locations of the continental U. S.). The fact that the flight paths of MINUTEMAN missiles launched from operational bases necessarily pass over inhabited territory mandates that extreme caution be exercised in the planning and performance of such tests. Thus, while the Air Force has desired OBL tests since 1963, it was not until recently that the performance of OBL modified missiles and range safety systems were thoroughly verified and permission granted by Congress to proceed with the planning of actual launches.

e. Throughout this document, distances referred to in miles are in statute miles. (1 mile = 5280 feet.)

2. MINUTEMAN System Description

a. As the result of advancing military technology that included the development, both in the United States and abroad, of ballistic missiles capable of carrying nuclear warheads and traveling intercontinental distances, the United States required a force of intercontinental ballistic missiles (ICBM's) to deter military attacks on the United States and to counterattack if necessary. In 1958 the United States Air Force was authorized to develop and deploy a fleet of solid-propellant intercontinental ballistic missiles that became the MINUTEMAN system. MINUTEMAN to this day remains the dominant land-based ICBM force in the United States arsenal, representing approximately 95 percent of that force. The end result of the 1958 authorization was the emplacement of 1,000 operational MINUTEMAN missiles at remote and dispersed sites in the western United States. At each site a hardened and secure silo, termed a launch facility, was constructed to provide an unmanned facility capable of permitting remote missile launch. Ten launch facilities are assigned to one launch control facility to form a unit known as a flight; five flights are integrated to form a squadron; therefore, there are 50 missiles assigned to each squadron. The unmanned launch facilities are continuously monitored electronically from the launch control facility by missile combat crews. Administratively, the missile force is divided into six operational wings consisting of either three or four squadrons each.

b. MINUTEMAN deployment began in 1961 and was completed in 1967. The force is controlled by the Strategic Air Command (SAC) with headquarters at Offutt Air Force Base, Omaha, Nebraska.

The first missiles were deployed as Wing I in the vicinity of Malmstrom Air Force Base, Great Falls, Montana, which is the wing from which OBL launches are planned. Deployment continued at Wing II through VI with respective headquarters at Ellsworth Air Force Base, Rapid City, South Dakota; Minot Air Force Base, North Dakota; Whiteman Air Force Base, Knobnoster, Missouri; Francis E. Warren Air Force Base, Cheyenne, Wyoming; and Grand Forks Air Force Base, North Dakota. Vandenberg Air Force Base, California serves as a test launch center. Figure 1-1 shows the locations of six wings, SAC Headquarters, and the test launch center.

c. Wing I at Malmstrom contains four squadrons of MINUTEMAN II missiles (LGM-30F) housed in two ground system configurations (WS-133A-M and WS-133B), which are basically representative of the ground configurations for the entire MINUTEMAN force. The ground system configurations are referred to in abbreviated form as the A-M and B configurations. Figure 1-2 shows the squadron layout for Wing I, and Figures 1-3 through 1-6 show the A-M and B system configurations of Wing I launch facilities and launch control facilities. Wing I is the only wing containing both configurations. The 564th Squadron, which is a B system, and the 12th Squadron, which is an A-M system, will participate in OBL; the location of these squadrons is shown in Figure 1-2.

3. Previous MINUTEMAN Tests

a. Except for early research and development tests performed at Cape Kennedy, Florida, (Figure 1-7 is a photograph of the first MINUTEMAN launch) all MINUTEMAN test launches have been performed at Vandenberg. SAC operational testing at Vandenberg began in 1963. For an operational test an alert missile is selected from one of the operational wings and transported to Vandenberg for test launch. Prior to testing, instrumentation and range safety systems are added to the missile. In the past 10 years almost 300 MINUTEMAN operational tests have been performed, all from Vandenberg.

4. GIANT PATRIOT Program Description

a. From the beginning of operational testing, SAC has desired to fully demonstrate and verify the MINUTEMAN weapon system. Between 1965 and 1968 a series of four limited-range test launches of modified MINUTEMAN missiles were performed from an operational base. The modified missiles contained only 7 seconds of

Figure 1-1. MINUTEMAN SITES

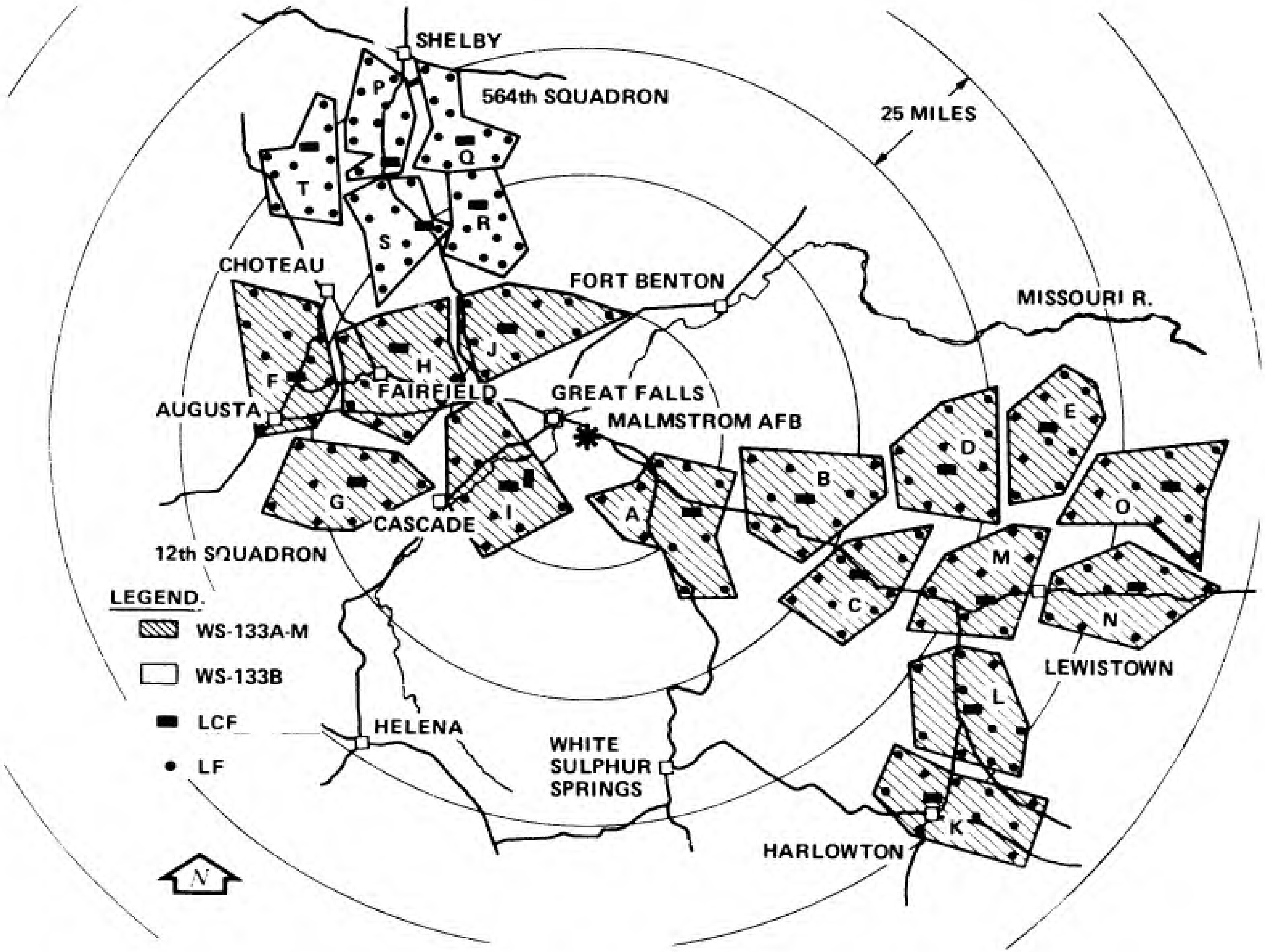


Figure 1-2. WING I SQUADRON LOCATIONS

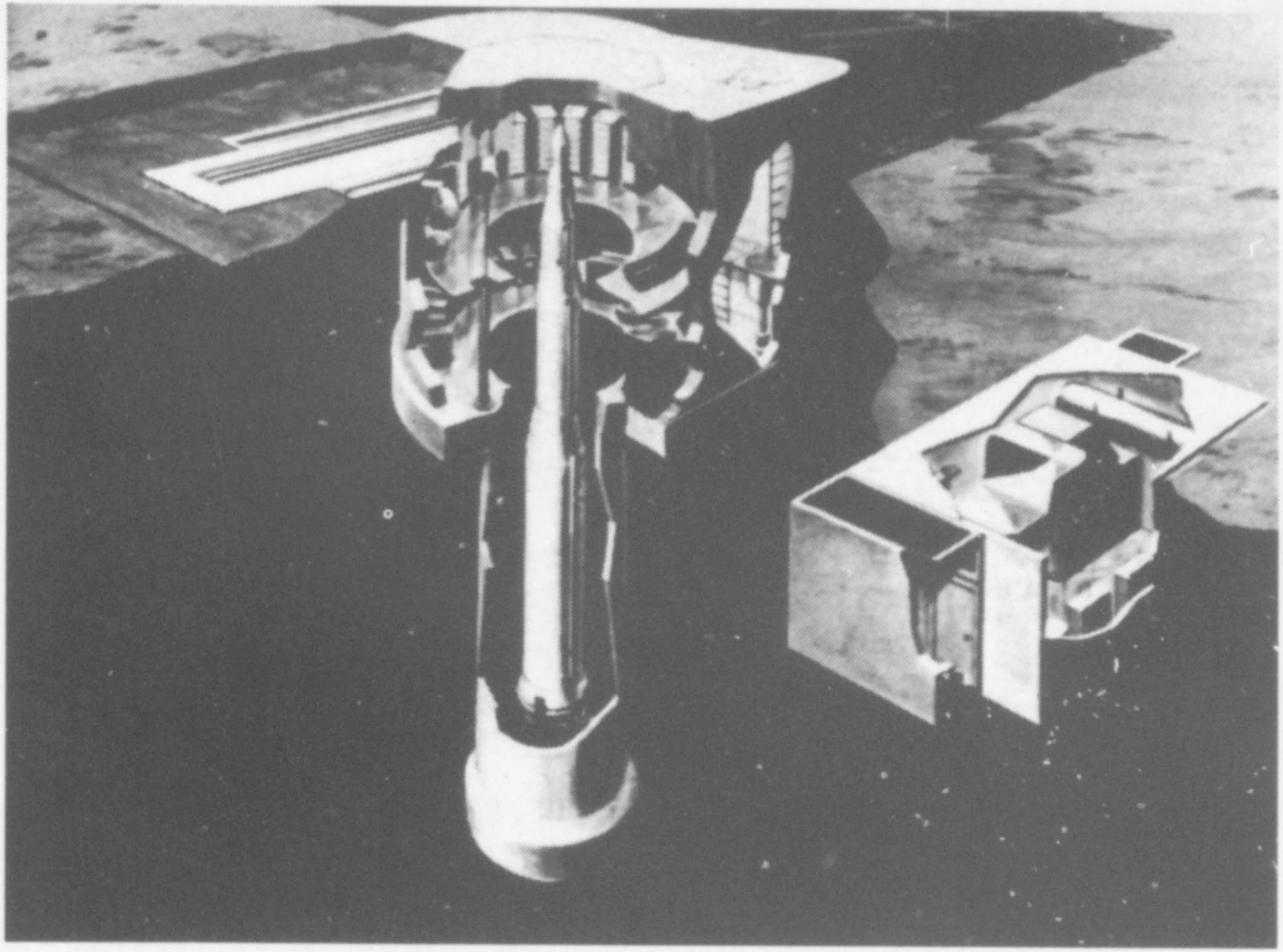


Figure 1-3. A-M SYSTEM LAUNCH FACILITY

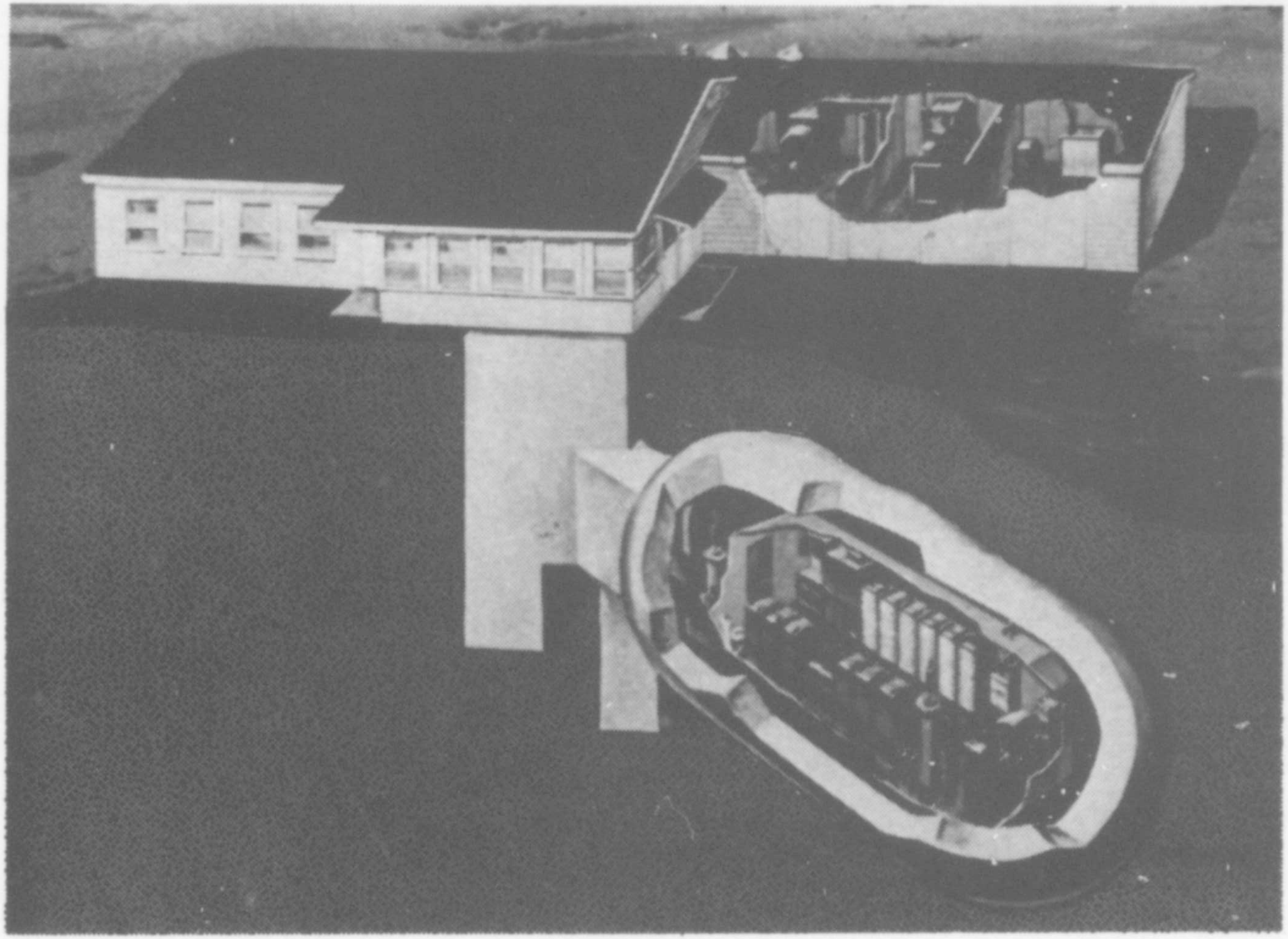


Figure 1-4. A-M SYSTEM LAUNCH CONTROL FACILITY

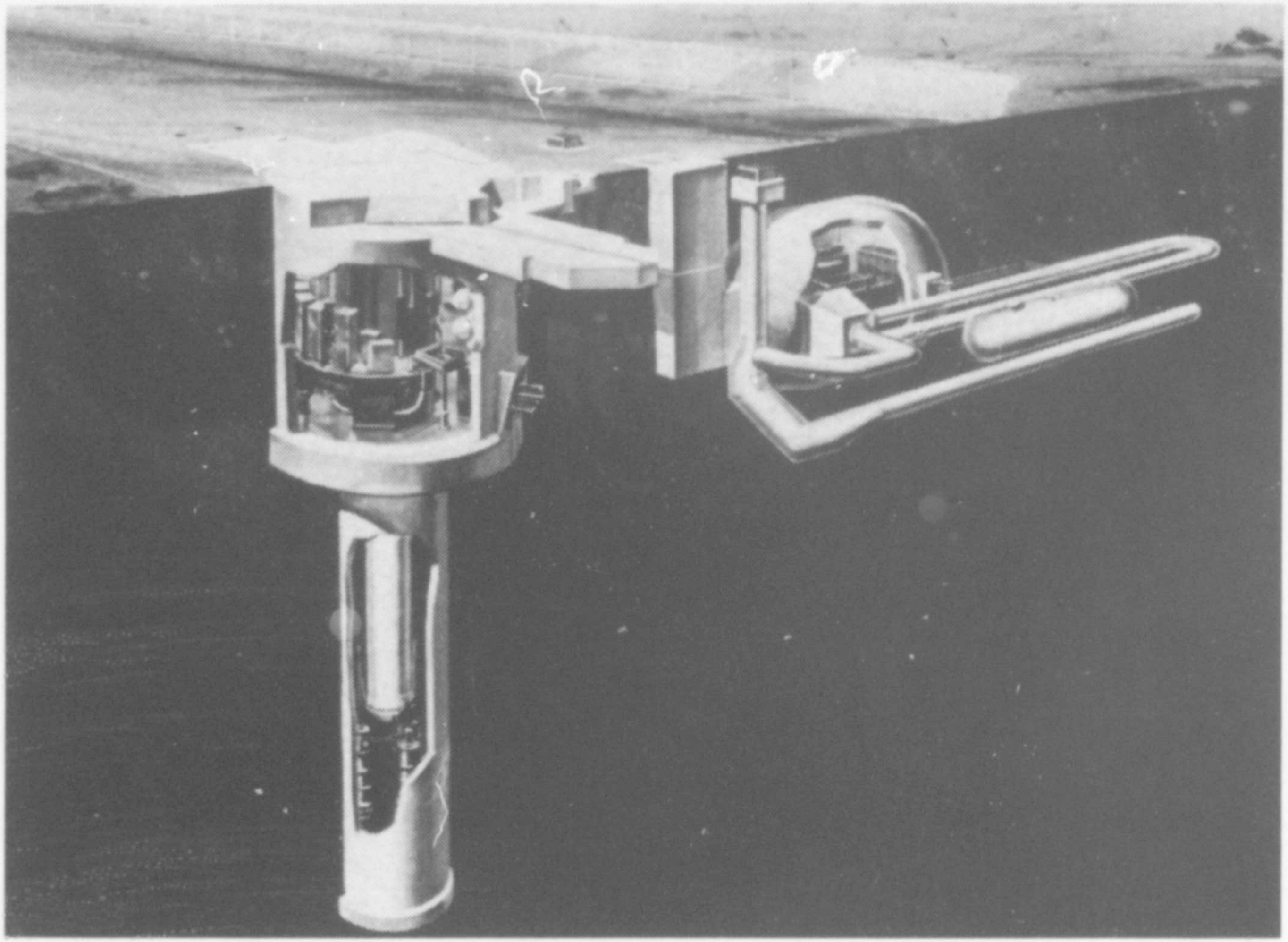


Figure 1-5. B SYSTEM LAUNCH FACILITY

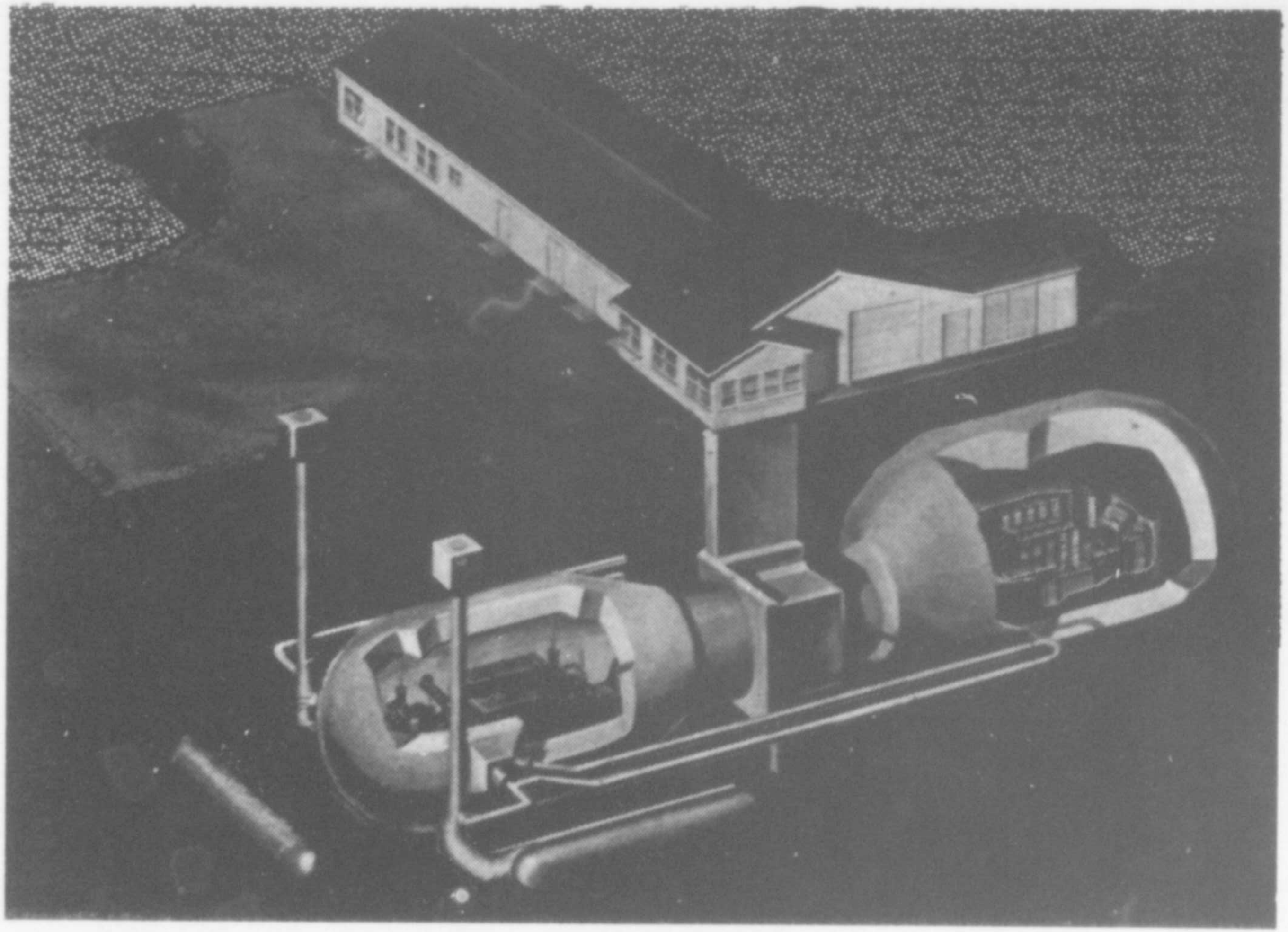
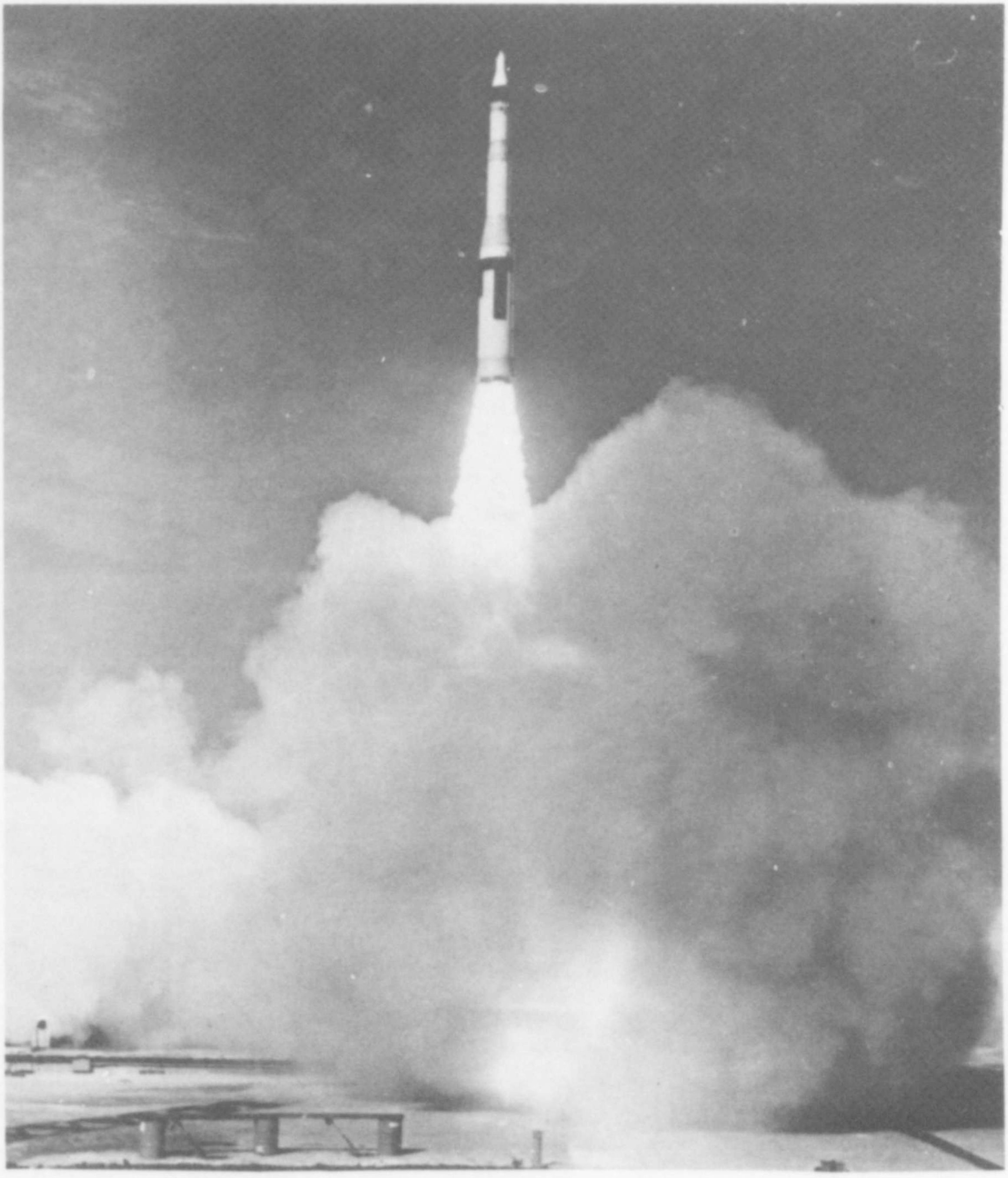


Figure 1-6. B SYSTEM LAUNCH CONTROL FACILITY



THE FIRST LAUNCH OF A MINUTEMAN MISSILE CONTAINING ALL THREE STAGES WAS ACCOMPLISHED AT CAPE KENNEDY ON FEBRUARY 1, 1961. THE LAUNCH RESULTED IN THE MOST SUCCESSFUL FIRST FLIGHT EVER ACCOMPLISHED IN UNITED STATES MISSILE HISTORY.

Figure 1-7. MINUTEMAN FIRST LAUNCH

propellant and were capable of less than one mile of flight. The purpose of this effort was to test the operational ground system through missile ignition. Ground system failures were uncovered and fixed through this series.

b. In 1968 the development of a comprehensive ground test for use at the operational bases was begun. The goal of this test was a complete end-to-end checkout of the ground system under realistic operational conditions, but short of missile ignition. The initial concept, designated Modified Operational Missile System (MOMS), was developed and successfully accomplished on five flights of ten missiles each. It should be noted that this development did not involve the actual launching of missiles, but just launch simulation. A follow-on to MOMS has now been developed and is called Simulated Electronic Launch MINUTEMAN (SELM). SELM will be used in OBL for simulating the launch of those missiles in the flight that will not actually be launched.

c. In 1970 Congress authorized funds for the development of hardware to support a MINUTEMAN II operational base launch program. The hardware items required were an OBL reentry vehicle for MINUTEMAN missiles and a Mobile Range Safety System; the OBL reentry vehicle and Mobile Range Safety System together are labeled the OBL Safety System (OBLSS).

d. The OBL reentry vehicle provides for tracking the missile and the capability to destruct the missile upon ground command. These same capabilities, plus diagnostic telemetry, exist with Vandenberg configured missiles for operational testing; however, for Vandenberg tests, the MINUTEMAN missiles are fitted with an additional section that causes them to be heavier and longer than operational MINUTEMAN missiles. In contrast, the OBL reentry vehicle is designed to match the weight, length, and shape of the nuclear warhead section it replaces. The development of a Mobile Range Safety System was required since no range safety systems existed that could be readily moved to an inland site.

e. There has been one ground test and three flight tests of the OBL Safety System. A static proof test of the destruct capability of the OBL reentry vehicle was performed on 9 November 1970 at White Sands Missile Range, New Mexico. The test successfully demonstrated the propellant detonation and stage fragmentation capabilities of the destruct system as shown in Figure 1-8. Two proof tests were performed at Vandenberg utilizing both the OBL reentry vehicle and the Mobile Range Safety System. The first of the Vandenberg tests, referred to as GIANT PATRIOT R&D Launch No. 1, was a performance checkout of the OBL Safety System. The OBL reentry vehicle and Mobile Range Safety System were not relied on for destruct or tracking but were cycled through their operations during the flight as a performance test. This verified the acceptability of the OBL system. GIANT PATRIOT R&D Launch No. 2 was the first launch that utilized the OBL reentry vehicle and Mobile Range Safety System as an operational system. The test terminated with the planned destruct 52 seconds into first stage flight, demonstrating that the Mobile Range Safety System could activate the destruct mechanism onboard and destroy the missile (Ref. 1-1, 1-2). Figure 1-9 is a photograph of this launch.

f. The OBL Safety System has also been used for an operational test at Vandenberg on 27 March 1974. The missile experienced no aberration and the OBL reentry vehicle was successfully delivered to the target area. The Mobile Range Safety System successfully tracked the OBL reentry vehicle beyond the programmed point of separation.

g. On 29 March 1974, congressional approval was granted to proceed with preparations to conduct OBL. Subsequently, a survey team was sent to Wing I in Montana to select potential sites for OBL. As a result of preliminary studies eight candidate launch facilities had been identified: S-37, -38, and -40, and G-3, -4, -5, -6, and -7. The site survey team selected launch facility S-40 from the 564th Strategic Missile Squadron and launch facilities G-3, -4, and -5 from the 12th Strategic Missile Squadron for the OBL launch facilities.

B. TEST DESCRIPTION

1. General Discussion

a. The OBL concept calls for a total of eight MINUTEMAN II launches. Four launches are scheduled for the winter of 1975 (Jan - April) and four the following winter from a different location, if possible. The second group of four night launches will be discussed in an environmental statement at a later date.

19 NOV 1970 OBLSS DESTRUCT ORDNANCE SUCCESSFULLY DESTROYS A COMPLETE MINUTEMAN II, WHITE SANDS MISSILE RANGE, NEW MEXICO

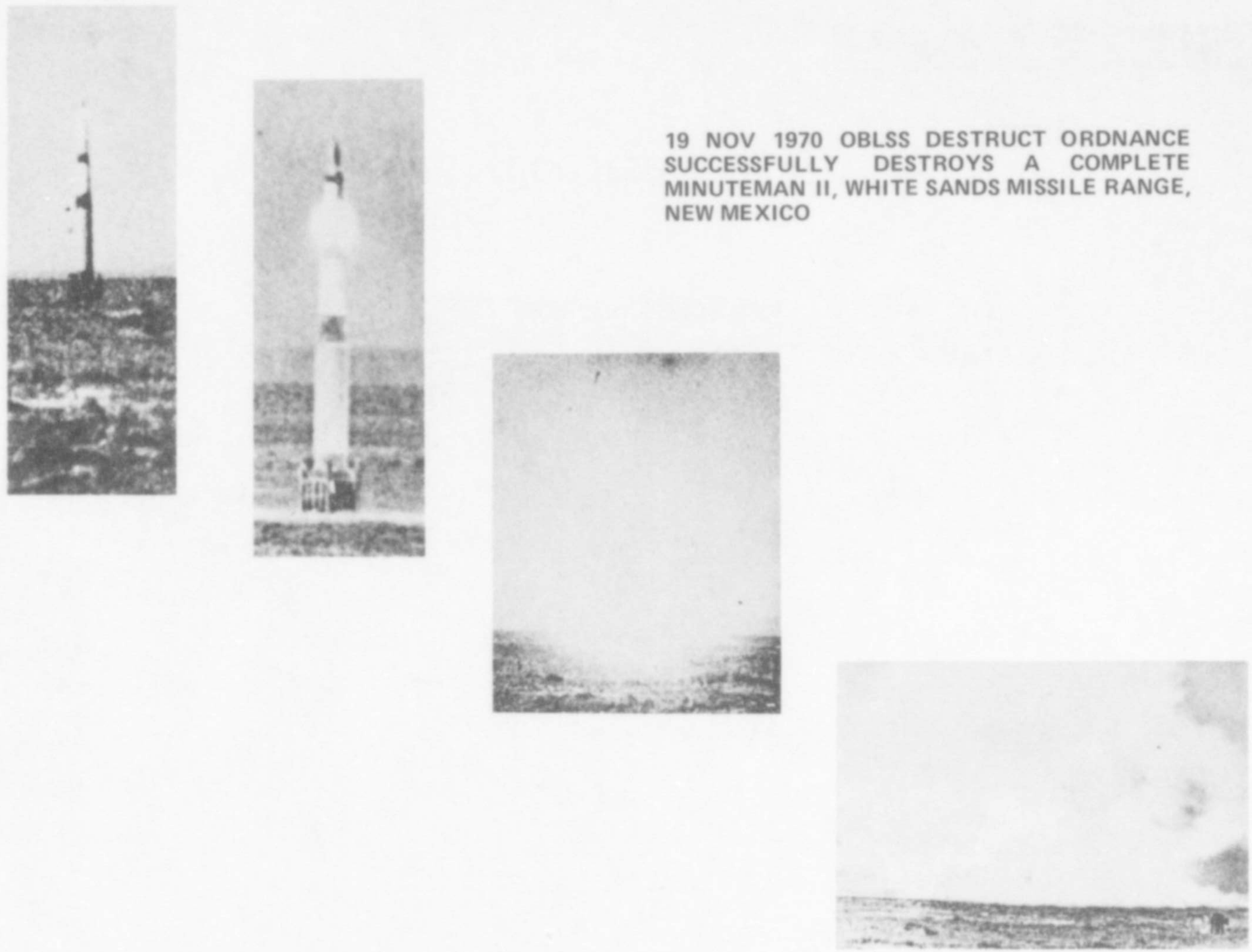
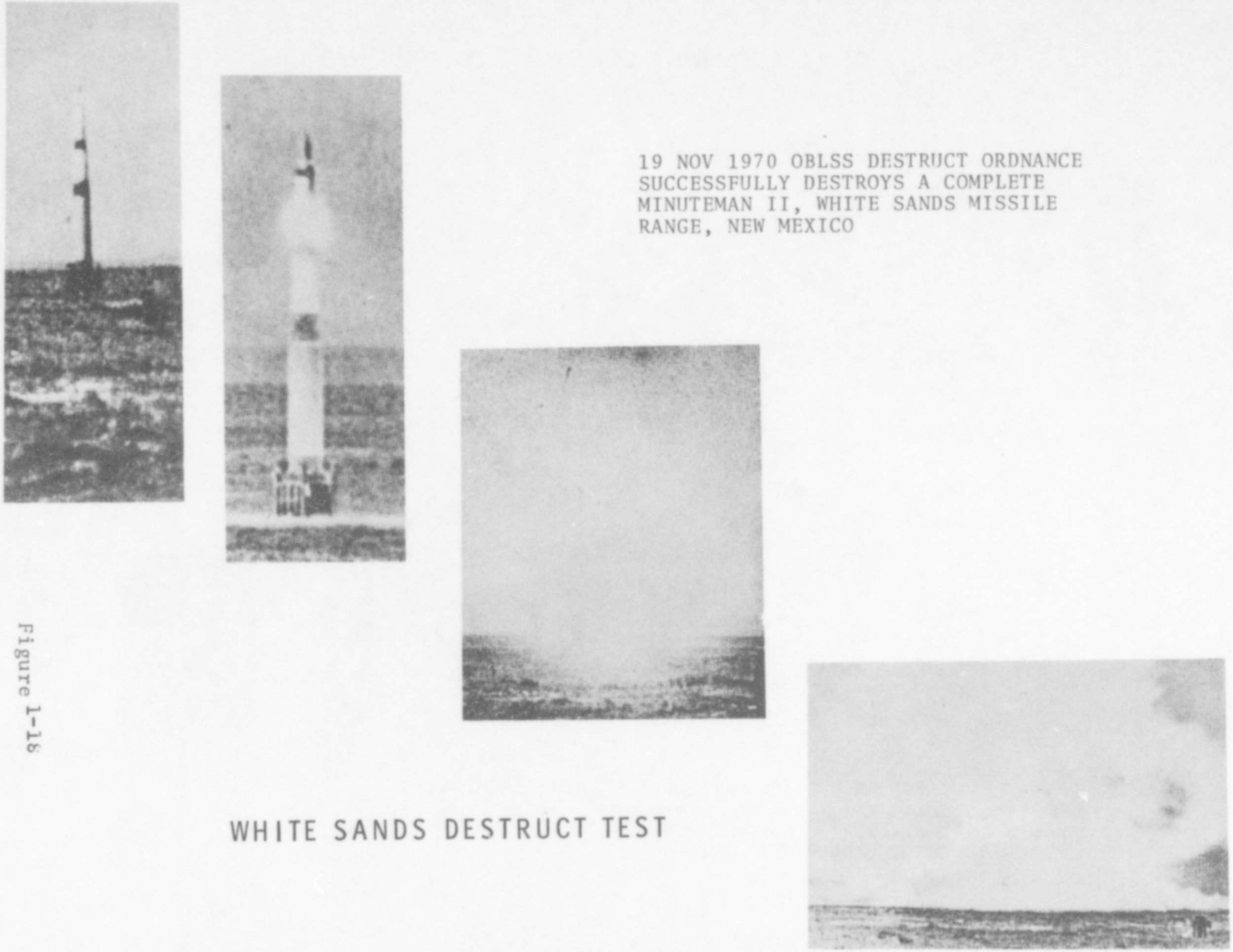


Figure 1-8. WHITE SANDS DESTRUCT TEST

19 NOV 1970 OBLSS DESTRUCT ORDNANCE SUCCESSFULLY DESTROYS A COMPLETE MINUTEMAN II, WHITE SANDS MISSILE RANGE, NEW MEXICO



WHITE SANDS DESTRUCT TEST

Figure 1-18

Figure 1-9. GIANT PATRIOT R&D LAUNCH NO. 2

b. Flight S of the 564th Strategic Missile Squadron (Figure 1-2) will be tested in January 1975 followed by Flight G of the 12th Strategic Missile Squadron (Figure 1-2) approximately two months later. All launches will be performed at night. One launch will be made from Flight S and three launches from Flight G. Flight S and Flight G are referred to as SIERRA and GOLF, respectively.

c. Under the OBL concept, the flight test missiles will remain in the silos with their physical and electrical environment undisturbed. Only two alterations of the missiles will be permitted, both for range safety purposes: the nuclear warheads will be removed, and replaced by the OBL reentry vehicle; and the Stage I/II panels, which normally would be dropped from the missile during flight, will be retained. A range safety countdown will be conducted during which officials will evaluate the safety criteria in the flight corridors and the "GO" status of the destruct devices in the OBL reentry vehicles. Once cleared by flight safety, an order from SAC Headquarters will direct the missile combat crews to launch. Provisions are made within the system to hold launch at any time during the countdown until lift-off.

d. Total involvement of each squadron will be exercised in the test sequence, including command and control capabilities. One or three (depending on whether the launches are from SIERRA or GOLF, respectively) of the missiles in the flight will be fitted with the OBL reentry vehicle; the seven or nine remaining missiles will have nuclear warheads removed and warhead simulators connected along with Simulated Electronic Launch MINUTEMAN (SELM) test sets. SELM permits a complete test of critical ground equipment from countdown to the first stage ignition signal, without a live launch. All SELM-configured launch facilities will be tested along with the OBL launches. The remaining 40 missiles of the test squadron will not react to the OBL test-unique launch commands.

e. After the launch of the first OBL missile from a flight, the seven or nine SELM-configured missiles will continue with their countdowns until completed. For SIERRA, this will represent the complete test; for GOLF the test sequence will continue as follows. SELM test results from the first launch will be gathered, inspections made, and the test range cleared. The second GOLF launch will occur several days after the first. The same sequence of events will be followed until the third GOLF missile is launched.

f. All OBL missiles will travel to a lagoon impact at Canton Island in the Phoenix Islands group. Flight paths will cross sparsely populated areas of Montana, Idaho, Oregon, Washington, and California.

2. <u>Mission and Objectives</u>

a. The OBL mission is to launch four MINUTEMAN II missiles from separate operatio[illegible]nch facilities in Wing I, Malmstrom AFB, to a target in the Can[illegible]Atoll Lagoon, Phoenix Islands. Additionally, the remaining launch facilities in the OBL test flights will be SELM-tested.

b. The objectives of the OBL launches will be to:

(1) Demonstrate the capability of the operational MINUTEMAN Weapon System (WS-133B and WS-133A-M) to deliver a test warhead to a designated target in response to a valid order. The missile will be modified as necessary only for nuclear and range safety. Data acquired from this operation can be realistically applied to the operational weapon system.

(2) Demonstrate the operational launch control system. Launch will be commanded by combat-ready crews in the participating launch control center in response to a valid test execution order from Headquarters SAC.

(3) Determine the effects of launch on an operational launch facility. The launch facilities will be representative of all WS-133B and WS-133A-M launch facilities.

(4) Verify modeling of launch region geodetics and gravity effects as well as in-flight gravity effects.

(5) Verify correctness of the targeting parameters used in the operational targeting program.

(6) Provide launch reliability data for war planning factors through OBL/SELM testing.

(7) Provide detection of failure modes for system improvement.

c. An operationally realistic test environment is essential to attain the test objectives. Airborne systems will be operationally deployed missiles with the nuclear warhead replaced by test reentry vehicles. Ground facilities, equipment, and configurations will be those of the operational force. The test missiles and guidance systems will be those on strategic alert in the selected test launch facilities. All planning in support of GIANT PATRIOT is oriented to the genuine tactical environment. The only deviations from this policy will be those essential to maintaining a safe operation.

3. Launch Sites

a. The locations of the OBL launch sites are tabulated in terms of latitude and longitude and shown on a Montana state map in Figure 1-10. (The launch areas are shown in greater detail in later figures, e.g., Figures 1-23 and 1-24.) The first launch will be from launch facility S-40 of the 564th Strategic Missile Squadron, and the following three launches from launch facilities G-3, -4, and -5 of the 12th Strategic Missile Squadron.

b. S-40 is a B system launch facility (Figure 1-5) whereas G-3, -4, and -5 are A-M system launch facilities (Figure 1-3). The geographical relationship of Flight S and G to other flights in Wing I and to Malmstrom AFB is shown in Figure 1-2.

4. Missiles

a. The test missiles will be the MINUTEMAN IIs on strategic alert in operational launch facilities. The nuclear warheads will be replaced by the OBL reentry vehicle. Figure 1-11 shows the sections of the operational MINUTEMAN II and the section that will be replaced by the OBL reentry vehicle. The MINUTEMAN II is approximately 55 feet long and 5.5 feet in diameter. MINUTEMAN II modifications for operational testing are also shown in Figure 1-11 for comparison.

b. The OBL reentry vehicle is shown in Figure 1-12. The weight kit is employed to make the weight of the OBL reentry vehicle equal to that of the nuclear reentry vehicle. It is apparent also from Figure 1-11 that the shape of the OBL reentry vehicle is the same as that of the nuclear reentry vehicle. These two factors – weight and shape – being virtually identical in the OBL and operational missiles assures that the flight characteristics of the test missiles will closely simulate those of operational missiles.

LAUNCH FACILITY	LATITUDE	LONGITUDE
S-40	48°8.5′	111°51.1′
G-3	47°23.8′	111°53.1′
G-4	47°20.5′	111°47.4′
G-5	47°18.3′	111°54.3′

Figure 1-10. OBL LAUNCH FACILITY LOCATIONS

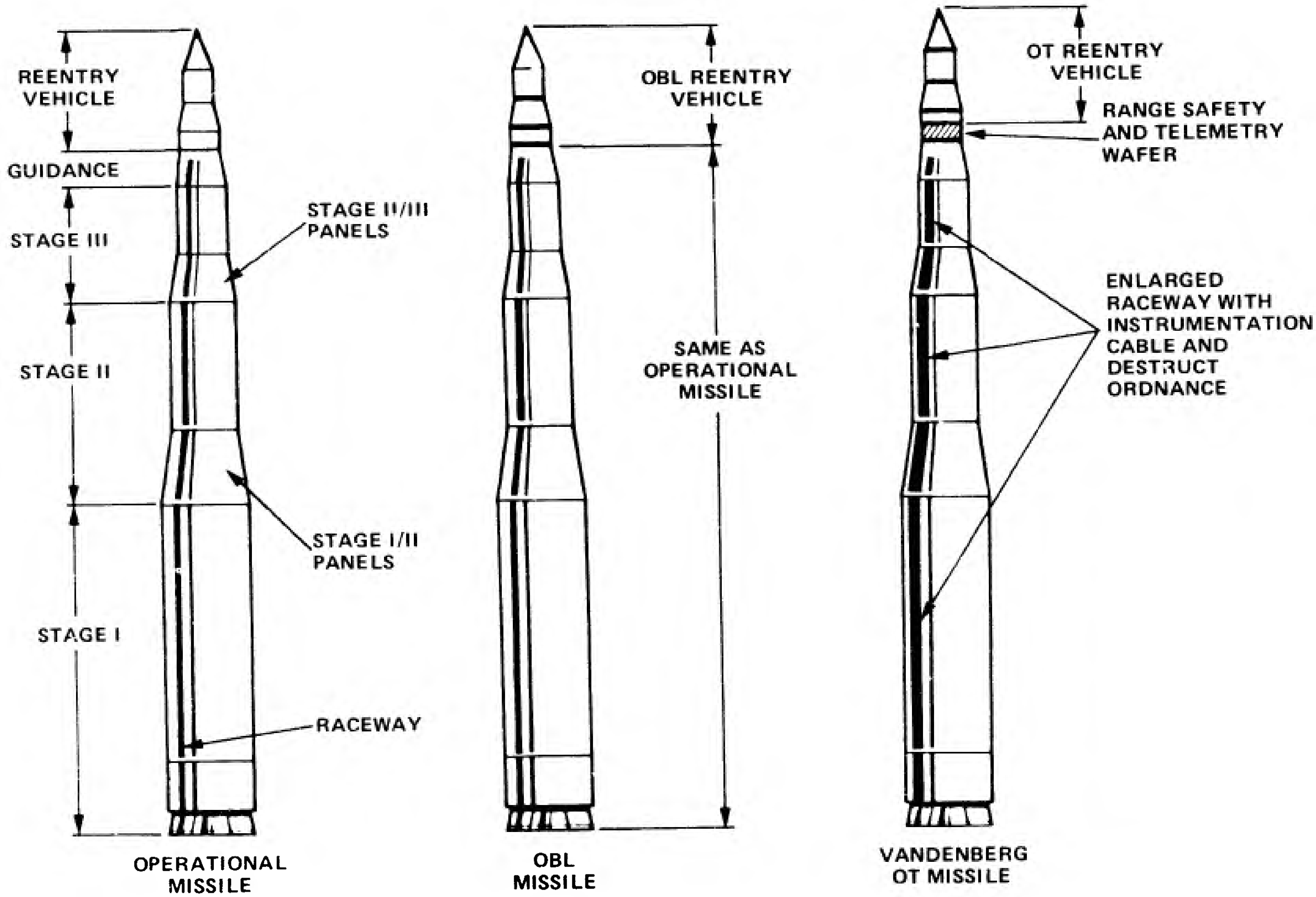


Figure 1-11. MINUTEMAN II MISSILE CONFIGURATIONS

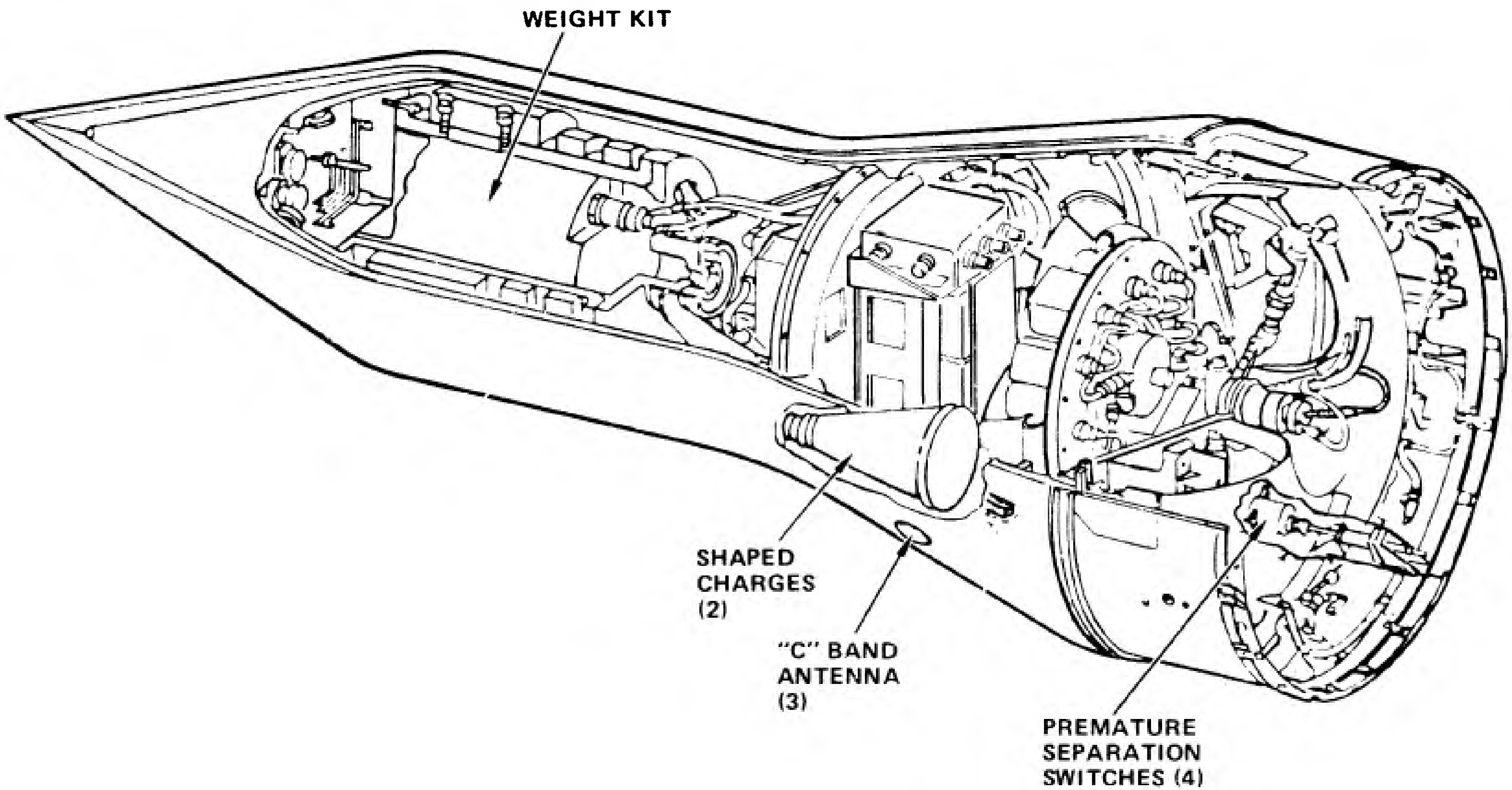


Figure 1-12. OBL REENTRY VEHICLE

c. There are two shaped charges in the OBL reentry vehicle (Figure 1-12) which can be detonated by ground command, resulting in destruction of the missile. The total missile would be destroyed by a chain reaction initiated by the shaped charges; the chain reaction will carry through to every section of the in-flight missile that is intact at the time the command is issued.

d. There are three C-band antennas in the OBL reentry vehicle (Figure 1-12) which are used to transmit signals to earth so that the path of the missile can be tracked, and to receive the destruct command if it is issued.

e. The premature separation switches, shown in Figure 1-12, are automatic destruct-triggering devices. If the missile malfunctions to the extent that it attempts to pull itself apart, it must be destructed before reentry vehicle separation occurs; otherwise the chain reaction detonation path would be broken and there would be no way to cause the lower stages to destruct. The premature separation switches are safety devices which ensure that a dramatically malfunctioning missile is exploded into small fragments before it has the chance to separate into sections.

f. All the remaining elements of Figure 1-12 are electronics packages and cabling used for processing signals transmitted to and received from earth. For example, there are two C-band receivers that decode the signals sent from earth to determine if a destruct is being ordered or if it is a routine command to transmit another tracking pulse back to earth.

5. <u>Trajectories</u>

a. Figure 1-13 shows a nominal Instantaneous Impact Prediction (IIP) trajectory from Wing I to Canton Island for OBL launches. There are actually two types of trajectories that are of interest: (1) the present position (PP) trajectory, i.e., altitude, latitude, and longitude as a function of time; and (2) the IIP trajectory. The IIP is the trajectory generated by: 1) assuming that all missile power is lost; 2) determining the point of impact on earth under the conditions of 1); and 3) repeating the procedure for each point in the missile's actual trajectory. The result is a ground trace of missile impact points that is

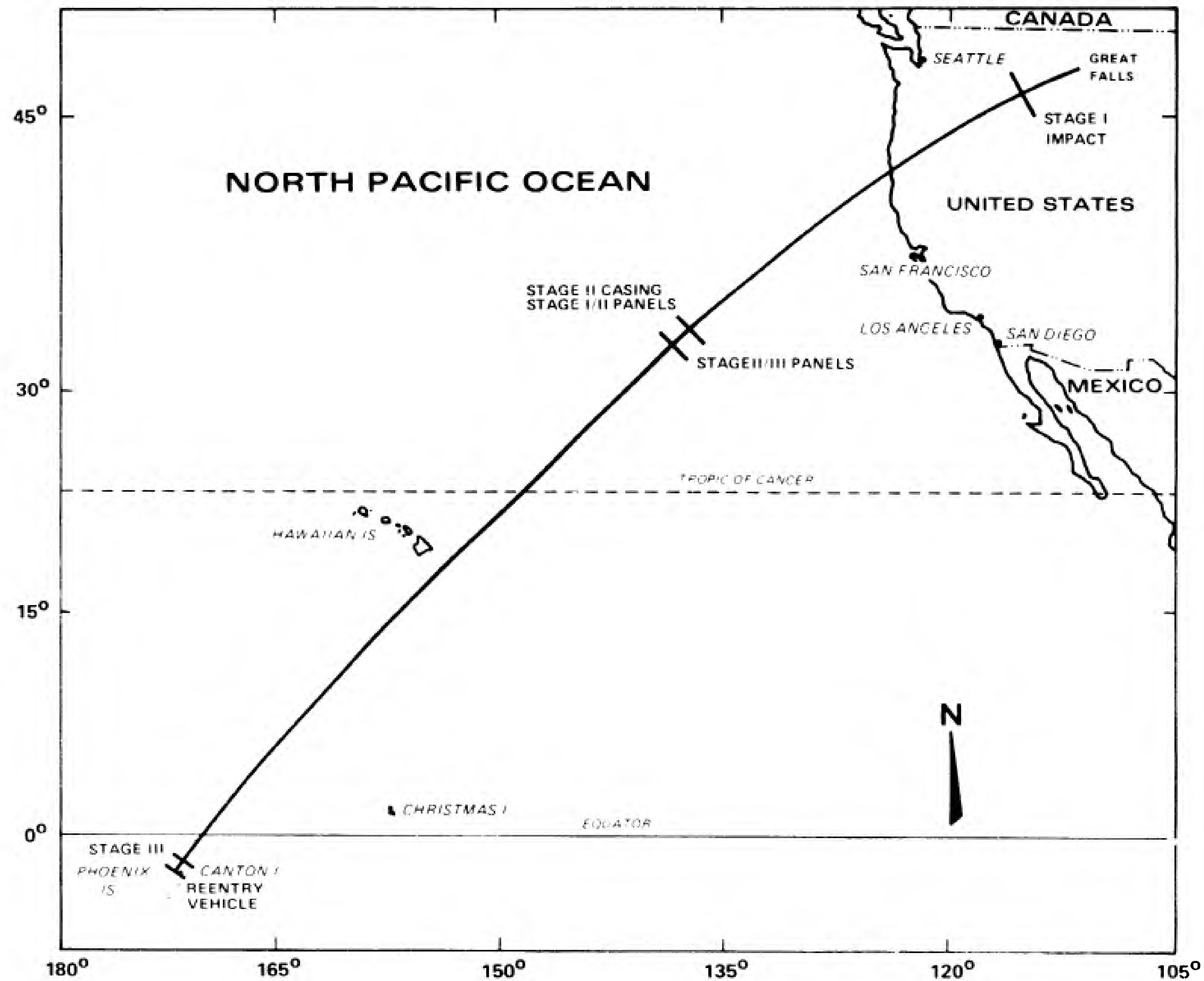


Figure 1-13. A NOMINAL OBL TRAJECTORY — WING I TO CANTON ISLAND

correlated to the actual path that the missile follows. The relevance of the IIP trajectory is that it provides a baseline for determining where the missile or missile debris will land if missile destruct is necessary.

b. Since the exact path that a particular missile follows is known only after that fact, it is standard procedure to define nominal trajectories and destruct corridors. Small, unavoidable deviations in propellant burn time, rate of burn, and other factors will cause an actual trajectory to make slight deviations from the nominal. The deviations are accommodated by defining a corridor within which the predicted impact point is expected to travel. Lateral and vertical deviations are accomodated in the derivation of the destruct corridor. The destruct corridors for OBL are approximately 10 miles wide over Montana and Idaho, and approximately 50 miles wide at the Pacific coast boundary of the continental United States. Figure 1-14 shows the destruct corridors for the S-40 launch. For GOLF site, the destruct corridor is the same width, centered on the nominal IIP trajectory.

c. Figure 1-14 is a view of nominal IIP trajectories over the continental United States for Wing I OBL launch from the four SIERRA and GOLF launch facilities. The trajectories cross sparsely populated areas of Montana, Idaho, Oregon, Washington and California. The Stage I casing will impact on the continental United States as shown in Figs 1-13 and 1-14. The OBL reentry vehicle, Stage II and III casings, and four Stage II/III interstage panels will impact in the Pacific Ocean as shown in Figure 1-13. International warnings will be issued to ships and aircraft concerning the Pacific Ocean impact areas as an additional safety measure.

d. Figure 1-15 shows a cross-sectional view of a nominal OBL trajectory. As indicated in Figure 1-15, Stage I will impact approximately 200 miles* downrange from the launch site. Figure 1-15 contains other notable data. Successful firing of Stages I and II and approximately 102 seconds of burn will permit the missiles to clear the continental United States. The altitudes of the trajectories are characteristic of ICBMs, but dramatically large when compared to anything except ICBMs or NASA-type spacecraft launchers. For example, Figure 1-15 shows the relationship of the OBL missile altitudes, the earth's atmosphere, and a typical U. S. satellite.

e. Another notable feature of Figure 1-15 is that Stage III burnout is completed just 300 miles downrange or approximately 500 miles before the missile exits the continental United

*Throughout this document, all distances referred to in miles are in statute miles.

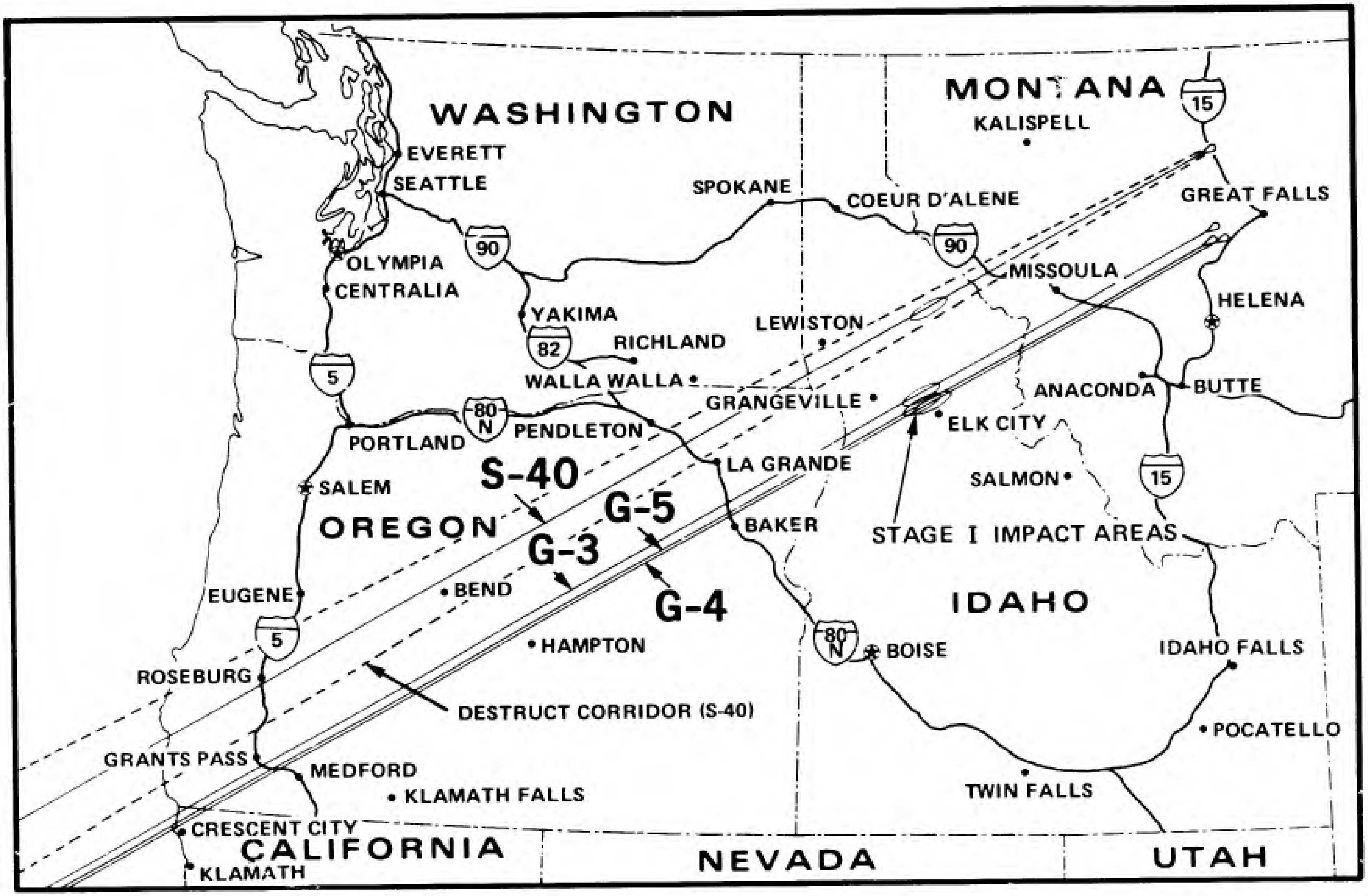


Figure 1-14. NOMINAL OBL IIP TRAJECTORIES OVER CONTINENTAL UNITED STATES

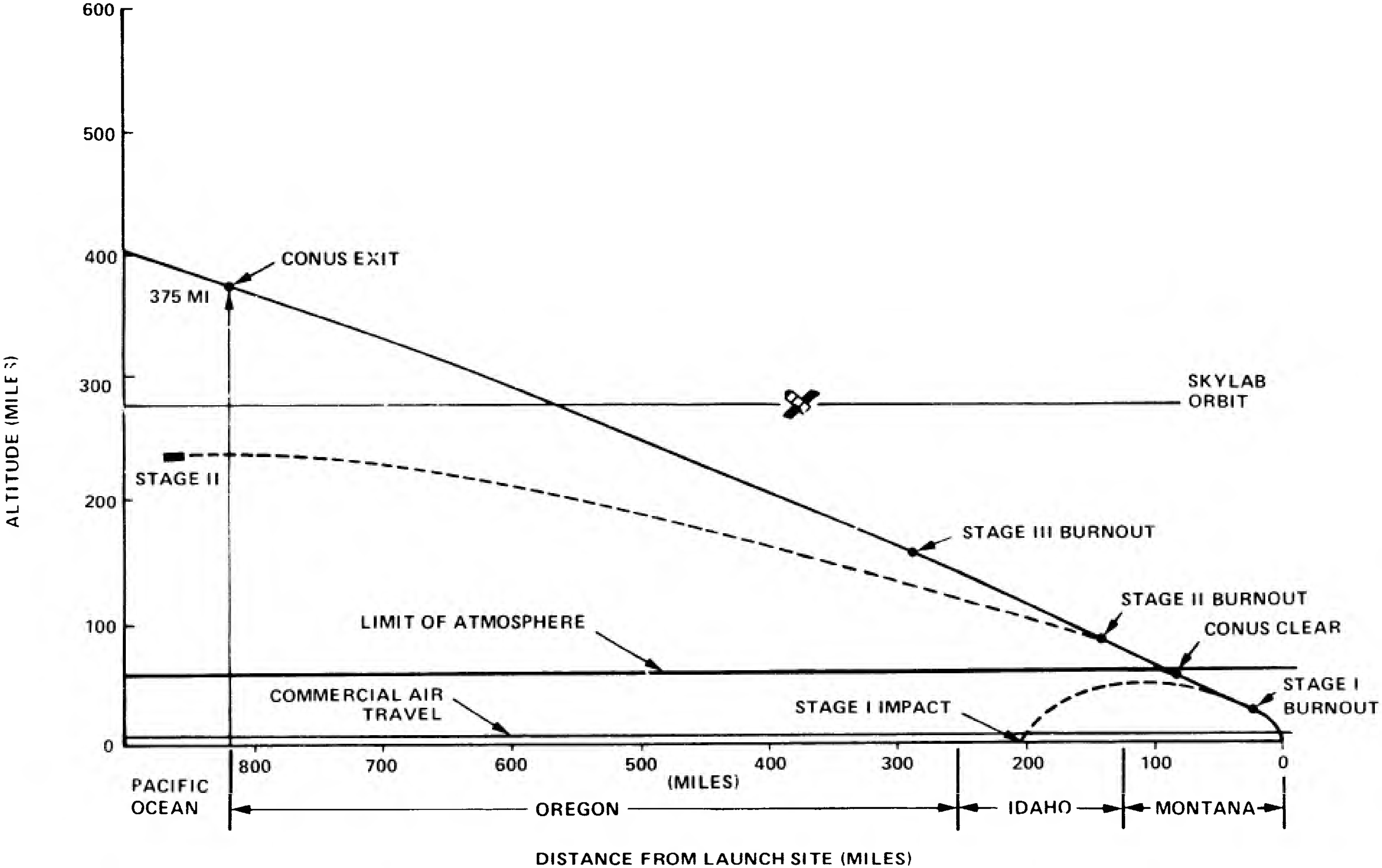


Figure 1-15. NOMINAL OBL TRAJECTORY IN CROSS-SECTION

States. The remainder of the path of the missile is completely determined at Stage III burnout. This characteristic of ICBM launches is the working knowledge of military and civilian aerospace scientists and technicians, but sometimes confusing to the public. It has several implications, two of which are: an accurate method for determining the largest part of the flight path from a relatively short initial section must be available; and for range safety purposes the missile need be tracked only during a relatively short initial segment of the trajectory, since after it has completed powered flight there are no measures available to change its course.

f. The missile trajectory for the entire flight can be determined with extreme accuracy from the data gained from monitoring its path up to Stage III burnout. The method used is to calculate the instantaneous impact point (IIP) referred to previously every tenth of a second after radar acquisition. The calculations are performed by computer using thoroughly tested routines and based on positional information provided by the tracking radars of the range safety system. Range safety personnel are not so much concerned with where the missile is, but rather where it would impact if power were removed. This information is provided by displaying the IIP trajectory on a viewing screen for the range safety personnel. Each tenth of a second the IIP display is updated; this appears on the display as a small segment added to the end of the IIP trajectory each tenth of a second. This trajectory monitoring procedure is used for all MINUTEMAN operational tests from Vandenberg.

g. The impact areas for the Stage I casings are shown in Figure 1-14. The Stage I impact areas are elliptical with dimensions of 26.5 miles long measured along the trajectory and 5.75 miles wide. The impact areas are those areas in which the probability of the actual impact occuring is 99.7 percent.

h. The missile weight as a function of its position along the flight path is shown in Figure 1-16. Most of the weight of the missile at lift-off is attributable to the propellant. Since the propellant is totally consumed during the first 300 miles of flight, the weight of the missile for 80 to 90 percent of its flight is dramatically less than its weight at lift-off.

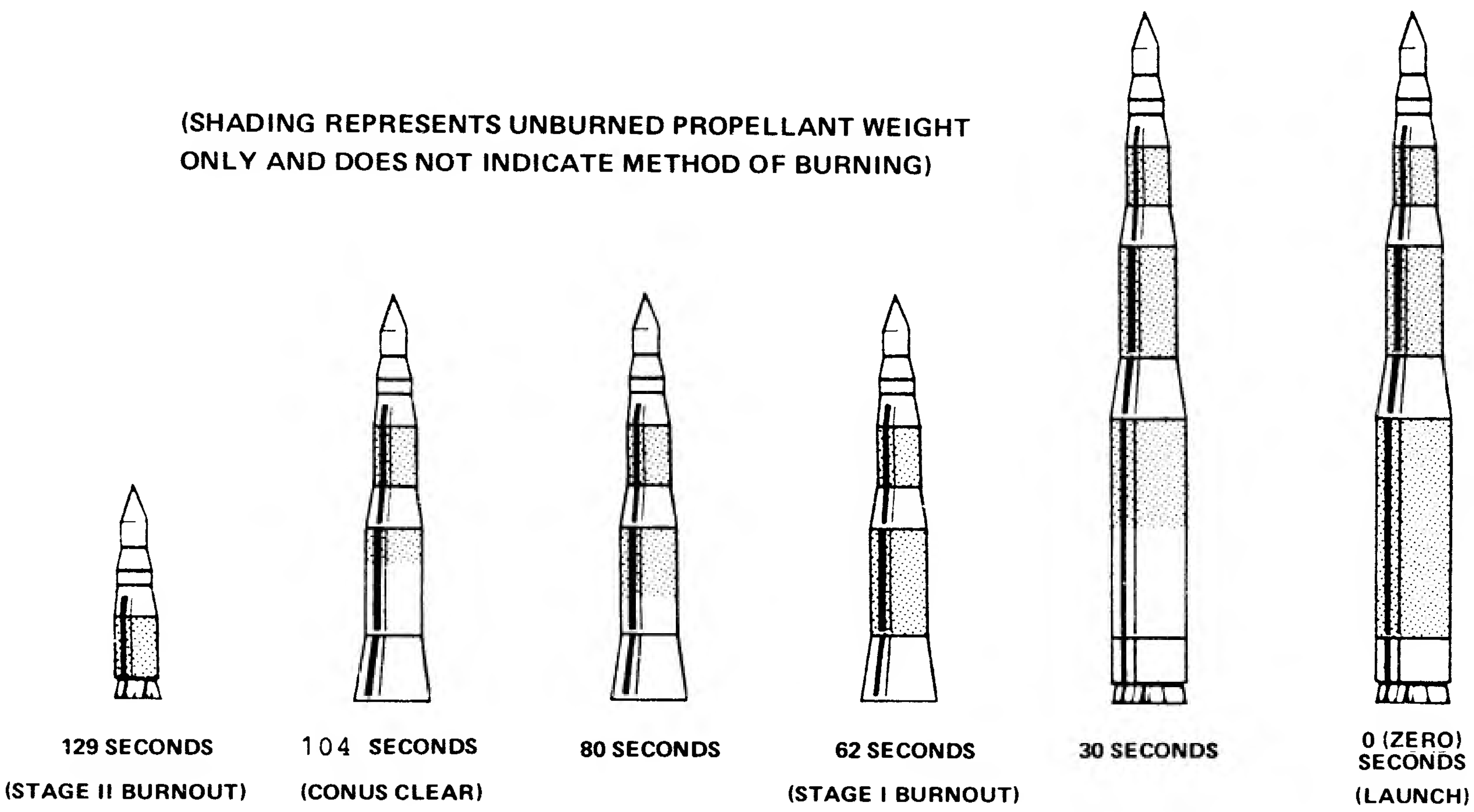


Figure 1-16. MISSILE SIZE AND WEIGHT REDUCTION DURING OBL FLIGHT

CONUS Clear is now 104 seconds average. (Reference Table 1-4 pg 1-54)

6. <u>Command and Control</u>

a. The OBL tests will be performed on a flight-by-flight basis, first SIERRA and then GOLF. The control of launching will be conducted by the combat crews located at the launch control facility of the flight under test. The procedures that they follow will be the same as if it were an actual launch in time of national emergency, except that provisions are made within the system to hold actual launch at any time during the countdown until lift-off. The command to launch will originate at SAC Headquarters, Offutt AFB and will be transmitted to the launch crew over the operational communications network.

b. Once a missile is launched in a strategic engagement, there is no further control over it. However, in the case of OBL, and by means of the OBL reentry vehicle, a command link is maintained between test personnel (not the combat crews) and the missile. This command link is associated with range safety and is discussed below.

7. <u>Range Safety Operations</u>

a. The OBL missiles will be tracked from lift-off to beyond Stage III burnout by the Mobile Range Safety System. (Ref. 1-3). For safety purposes the uprange segment of the trajectory is the only relevant segment, because after Stage III burnout the flight path of the missile cannot be altered. The reentry vehicle will also be tracked from Canton Island to determine the impact accuracy. For data collection purposes, other downrange tracking may be performed by radars located at Vandenberg; Point Pillar, California; Hawaii; and Canton Island. The decision regarding downrange tracking has not been made, but it will in no way affect the environmental impact of the program.

b. The Mobile Range Safety System (MRSS) was developed for OBL by redesigning, combining, and condensing the elements of the Vandenberg test range safety system (Ref. 1-4, 1-5). This has resulted in a transportable range safety system with the capabilities to stop the launch during countdown, perform optical and radar tracking, and to command-destruct the OBL missiles if necessary. The MRSS equipment is distributed over several sites, and will be described on a site-by-site- basis. Table 1-1 lists the various MRSS sites by function and

Table 1-1. MRSS COMPONENTS AND LOCATION SUMMARY

SITE DESCRIPTION			EQUIPMENT AT SITE		
TITLE	FUNCTIONS PERFORMED AT SITE	LOCATION	TITLE	NO PER LOCATION	FUNCTIONS PERFORMED
Command Control Area (CCA)	Monitor, control, and track missile; issue destruct command if necessary	1) Benton Bench (for SIERRA launch) 2) Shaw Butte (for GOLF launch)	Early Launch Terminator (ELT) Van	1	Transmits destruct message to OBL reentry vehicle if necessary; houses a range safety officer during launch.
			Monitor and Control Van (M&C)	1	Monitor and checkout of OBL reentry vehicle prior to launch; houses SAC launch director during launch.
			Beacon Test Van (BTV)	1	Prior to launch it supports ground checkout functions of the ELT and M&C Vans.
			Cine-Sextant System	1	Optical tracking and recording; takes photographs.
			Tracking & Command Decoding Subsystem (T&CDS) Van	1	Supports checkout of main hardware at Command Control Area prior to launch.
			Support Vans	2	Supply, office, and maintenance areas.
			Power Generator	1	Electrical power with backup for Command Control Area.
Main Radar Site (MRS)	Track missile, calculate IIPs, issue destruct command if necessary	1) Butte (for both SIERRA and GOLF launches)	AN/MPS-36 Radars	2	Acquisition at approximately T+50 and track; transmit destruct command to OBL reentry vehicle if necessary
			Range Safety Van (RSV)	1	Calculate and display IIP; issue destruct command if necessary; houses range safety officers.
			Cine-Sextant System	1	Optical tracking and recording, takes photographs.
			Boresite Tower	1	Used for alignment of AN/MPS-36 radar.
			Mobile Beacon Test Van	1	Supports checkout of main hardware at MRS prior to launch
			Tracking & Command Decoding Subsystem (T&CDS) Van	1	Supports checkout of main hardware at the MRS prior to launch.
			Frequency Shift Reflector	1	Checkout of radar command codes.
			Support Trailers	2	Supply, office, and maintenance area.
			Power Generators	1	Electrical power with backup for MRS.
Microwave Repeater Sites	Relay data between CCAs and MRS	1) Peisher's Peak 2) Mount Belmont 3) Sawmill Peak 4) Andersen Bench	Microwave Repeaters	1	Relay data between CCAs, MRS, and/or other microwave repeaters
Skyscreen Sites	Optical Track	At each OBL Launch Facility	Azimuth Vertical Wire Skyscreen Van	1	Located uprange of the Launch Facility, just outside the Hazard Corridor to monitor the azimuth of the missile until the AN/MPS-36 acquires track; connected by radio link to range safety officers at CCA.
			Profile Vertical Wire Skyscreen Van	1	Located cross range from the Launch Facility just outside the Hazard Corridor to monitor the profile of the missile trajectory until the AN/MPS-36 acquires track, connected by radio link to range safety officers at CCA.

the MRSS equipment located at each site. Figure 1-17 shows the location of each of the sites listed in Table 1-1. The three major MRSS sites are the two Command Control Areas located near the launch facilities, and the Main Radar Site located approximately 100 to 150 miles downrange from the launch facilities.

c. Initial tracking is performed by the two Vertical Wire Skyscreens located close to the launch facility as shown in Figure 1-18. A voice communication link (with backup) exists between the personnel operating the skyscreens and the Range Safety Officer in the Early Launch Terminator van at the Command Control Area for each launch facility. If the missile were to deviate from its planned flight path during the early period when the skyscreens are performing the tracking function, destruct recommendation would be sent from the skyscreen operators to the Range Safety Officer in the Early Launch Terminator. The Range Safety Officer would then transmit the destruct signal to the OBL reentry vehicle. The primary roles of the skyscreens and Early Launch Terminator in tracking and missile destruct last for approximately the first 50 seconds of flight. After that time they provide a backup method to the main radar site Range Safety Officer to destruct the missile if necessary.

d. During the early seconds of flight, the radars at the Main Radar Site are awaiting acquisition time to track the missile. Once the Range Safety Officer at the Main Radar Site is satisfied that the radars are accurately tracking the missile, the responsibility for safety throughout the remainder of powered flight is transferred from the skyscreen sites and Early Launch Terminator to the Range Safety Officer at the the Main Radar Site.

e. The instantaneous impact prediction (IIP) trajectories are calculated and displayed in the Range Safety Van at the Main Radar Site. The Range Safety Officer makes his destruct decision based on the IIP trajectory. If destruct is necessary, the command is sent to the OBL reentry vehicle by means of data included within the Main Radar Site radar pulses.

f. The four microwave repeaters described and shown in Table 1-1 and Figure 1-17 are required to relay messages between the Main Radar Site and the Command Control Areas; the use of repeaters for such purposes is common and serves the same role

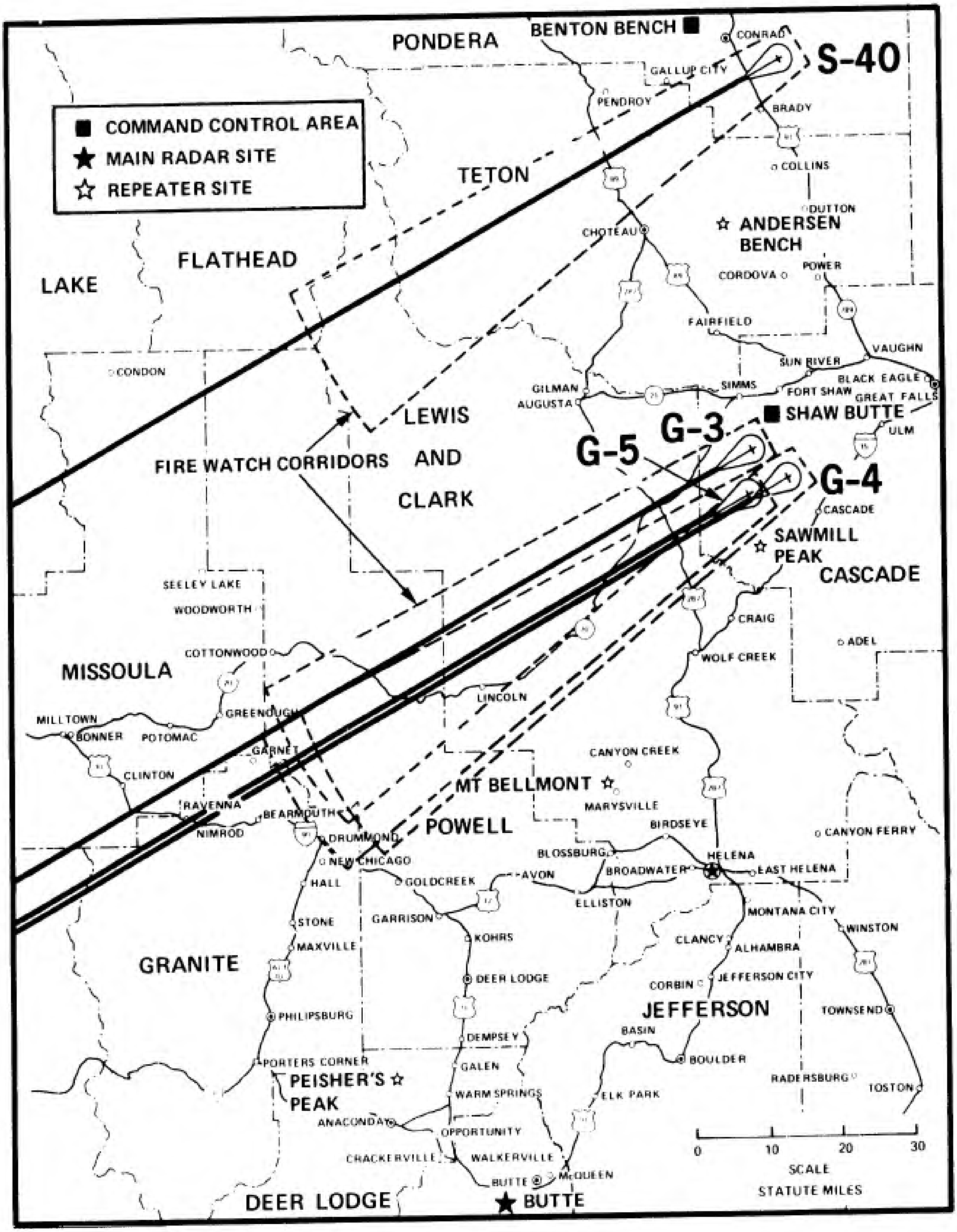


Figure 1-17. FIRE WATCH CORRIDORS AND MRSS SITES FOR OBL

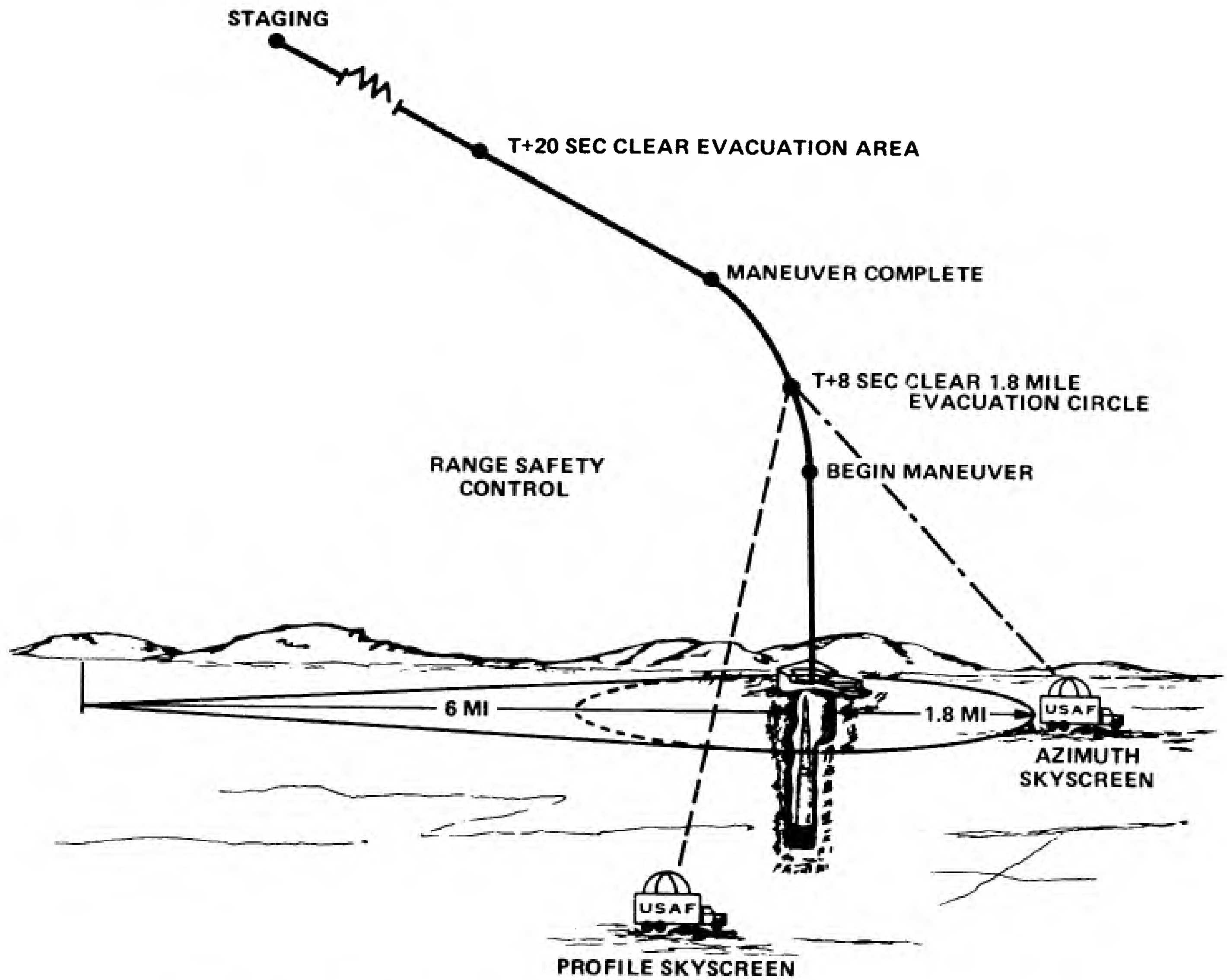


Figure 1-18. SKYSCREEN LOCATIONS

for OBL that the AT&T repeater stations serve for relaying telephone messages between cities and across country.

g. There are two Command Control Areas, one for SIERRA and one for GOLF, which are located at Benton Bench and Shaw Butte, Montana, respectively. Only one Main Radar Site is required for all launches, whether from SIERRA or GOLF; it is located at Butte, Montana.

h. The Mobile Range Safety System has been extensively tested at Vandenberg as discussed in the Introduction. The latest launch operation test occurred in March 1974 with a launch of an OBL reentry vehicle-equipped MINUTEMAN II from Vandenberg; all range safety operations were performed by the Mobile Range Safety System that will be used for OBL launches. The launch was a total success.

8. Recovery Procedures

a. All the sections of the OBL MINUTEMAN II will fall back to earth either over the continental United States (CONUS) or the Pacific Ocean. These sections and where they will fall are as follows:

1. Stage I Casing (CONUS).
2. Stage II Casing (Pacific).
3. Stage II/III Interstage Panels (Pacific).
4. Stage III Casing (Pacific).
5. OBL Reentry Vehicle (Pacific).

The impact areas for the Stage I casing for each OBL launch have been determined and are shown in Figure 1-14. Although recovery of the casings is not imperative, an attempt at recovery will be made by deploying helicopters into the impact areas after each launch.

b. The Stage I/II panels will remain with the Stage II casing to impact. No attempt will be made to recover the Stage II and Stage III casings or the panels. The OBL reentry vehicle will be tracked to its impact point, and helicoptors and divers will be deployed to recover it.

c. In the event the missile must be destroyed, special recovery procedures are provided. The area of impact will be known by means of the instantaneous impact prediction (IIP) display in the Range Safety Van at the Main Radar Site. Teams will be deployed to the area of impact to recover all debris. If a destruct is necessary prior to the first 52 seconds of flight, it is possible that small pieces of burning propellant will fall back to earth; thus, the recovery team located in areas corresponding to such destructs will be accompanied by firefighting units. A destruct after 52 seconds of flight will result in only non-burning inert debris returning to earth. The range over which this debris can fall is large, and recovery of all the pieces may be impractical.

C. SAFETY PROVISIONS

1. Basic Provisions

a. The safety provisions for OBL launches are separated into three categories for purposes of discussion: basic provisions; special provisions for normal launch debris; and special provisions for abnormal launch debris. The subject categories of the basic provisions are:

1. Nuclear safety.
2. Inadvertent launch.
3. The Mobile Range Safety System.
4. Airways.
5. Sealanes.
6. Meteorological conditions.

b. Nuclear Safety

Nuclear safety will be assured within the OBL flights (SIERRA and GOLF) by removing all nuclear warheads and replacing them with either OBL Reentry Vehicles or Simulated Electronic Launch MINUTEMAN (SELM) test sets. Nuclear safety for non-OBL flights in Wing I will be realized by ensuring that the nuclear armed non-test missiles will not respond to OBL test commands. The detailed nuclear safety provisions are documented in a nuclear safety annex to the GIANT PATRIOT Operations Plan. All nuclear safety plans and provisions must be approved by Nuclear Weapons System Safety Group. The review and approval procedures for OBL nuclear safety are the same as those that have been used in the past to assure nuclear safety.

c. Inadvertent Launch

The protection against inadvertent launch for OBL is identical to that implemented for our present MINUTEMAN force, since the operational approach of OBL is to exercise the prescribed strategic alert procedures of the existing force.

d. MRSS

The Mobile Range Safety System is by name and in fact a basic safety provision system. Its overall operation has been described under Test Description-Range Safety Operations. Its role as a safety provision is to destruct the OBL missiles if they deviate too greatly from their nominal flight paths. The criterion for destruct early in the flight, when destruct is under the control of the Range Safety Officers at the skyscreens and Early Launch Terminator Van is unacceptable deviation from expected profile and azimuth flight paths.

e. After approximately the first 50 seconds of flight, the Range Safety Officer at the Main Radar Site assumes responsibility for the remainder of the powered flight. His criteria for destruct are based on deviation of the IIP from the good missile corridor and the protection of population. Incorporation of the latter criterion is referred to as selective destruct. The display used for making destruct decisions at the Main Radar Site is more complicated than that at the Command Control Area. A representative display is shown in Figure 1-19. The instantaneous impact prediction (IIP) track tells the Range Safety Officer where the debris would impact. (Reference Figures 3-22, 23 and 24 for debris cloud characteristics).

f. In accordance with standard Vandenberg proceudres, impact probability contours to be used by the Range Safety Officer at the Main Radar Site will be prepared for the OBL trajectories. Risk ellipses will be developed with the aid of safety analysis. By conducting a series of hazard studies to obtain risk levels along the flight path, a series of contours are generated representing various risk levels. Each contour represents a level of risk at a particular area. Contours of this type will be generated to identify risk levels at densely populated areas. If the IIP indicates that debris will fall on a population center, the Range Safety Officer may wait until

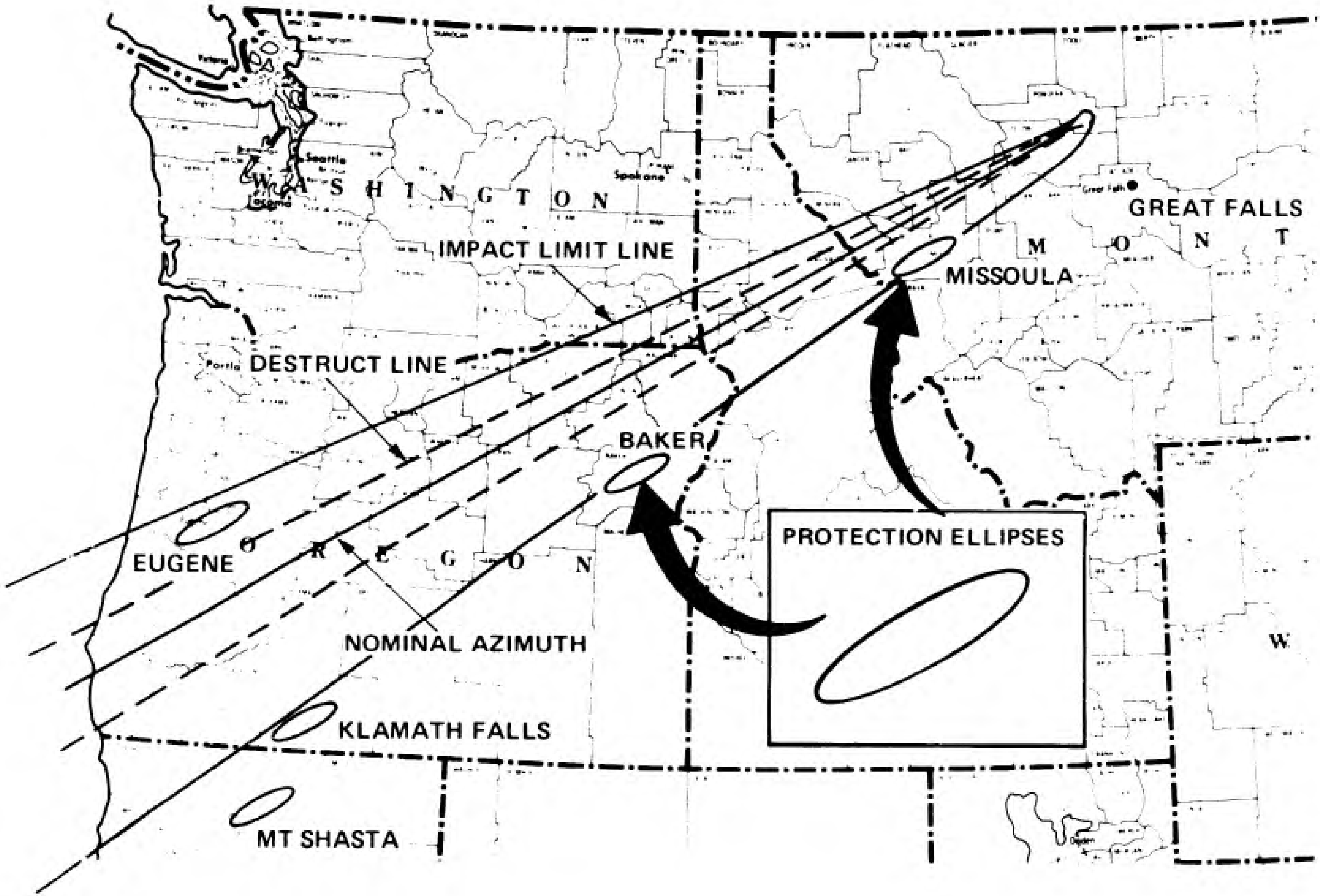


Figure 1-19. REPRESENTATIVE SELECTIVE DESTRUCT PROTECTION CONTOURS

one IIP moves beyond or otherwise outside the populated area, and then issue the destruct command.

g. Airways

Safety provisions for airways fall into two classifications: (1) military and commercial aviation and (2) general aviation. The pertinent distinction between these two classes is that military and commercial flights are by predetermined filed flight plans on airways, whereas general aviation flights may be unfiled, unknown, and off airways.

h. Military and commercial aviation safety procedures are coordinated between the Space and Missile Test Center (SAMTEC) and the Air Route Traffic Control Centers for the affected areas. The Air Route Traffic Control Centers that coordinate flights over the Pacific are located in Honolulu, Hawaii and Oakland, California. These centers will be involved in OBL airway protection since the OBL trajectories do cross the Pacific. The Honolulu and Oakland centers have been involved in the previous launches from Vandenberg and are therefore familiar with the procedures.

i. Other Air Route Traffic Control Centers will be involved in OBL to cover the blocks of airspace over the continental U.S. affected by OBL launches. Figure 1-20 shows the airspace affected by the OBL missiles and Stage I casings over the continental U.S. The additional centers are located at Seattle, Washington; Great Falls, Montana; and Salt Lake City, Utah. A SAMTEC representative will be located at the Great Falls center during countdown to coordinate between range personnel and air traffic controllers.

j. Notification procedures have been developed for military and commercial aviation and will consist of issuing international and domestic flight and hazard area NOTAMs (i.e., Notice to Airmen) to the aviation community seven days before launch. The NOTAMs will describe the affected areas, the date of launch, and the time period during which the launch is expected to occur. Approximately one hour before each launch a real-time notification will be issued by means of the Air Route Traffic Control Centers. The traffic controllers will order delays, rerouting, or whatever is necessary to preclude the possibility that a military, commercial or general aviation

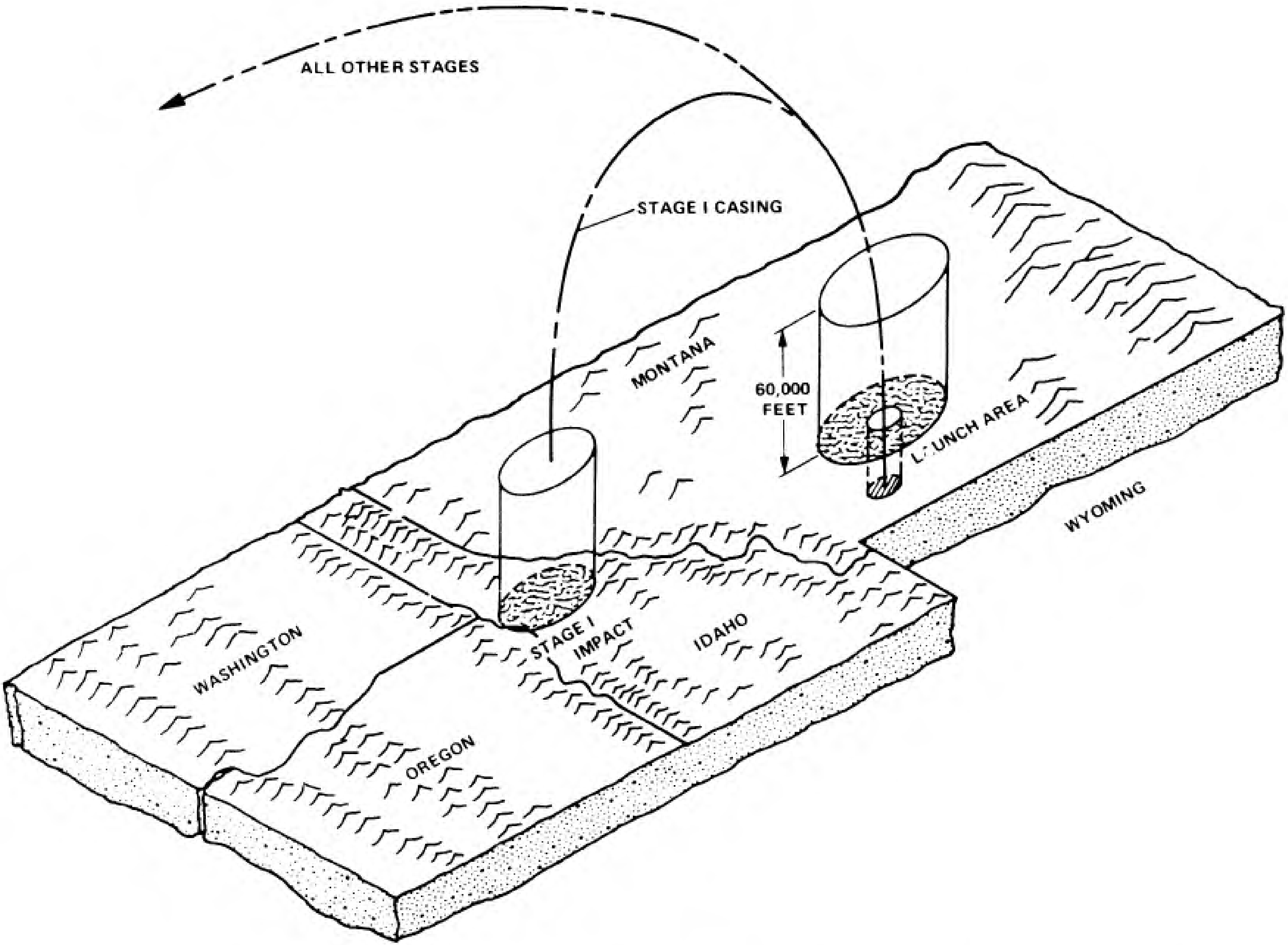


Figure 1-20. AIRSPACE BLOCKS OVER CONTINENTAL U.S. AFFECTED BY OBL

aircraft will violate the affected airspace during launch, including non-nominal destruct situations.

k. General aviation centers within affected areas will receive OBL familiarization briefings starting three months prior to the operation. Area news media will be advised of the briefings and encouraged to publicize the OBL operation and briefings. These general aviation centers will also be notified seven days before launch by means of a Fixed Base Operator Bulletins referred to as FBO bulletins. The FBO bulletin will contain essentially the same information as the NOTAM. In addition, SAMTEC intends to have shopping market type flyers distributed to the cockpit or pilot of each general aviation aircraft located at airports in the affected areas. The FBO bulletins and the flyers issued by the FAA area office will advise pilots to check with their Flight Service Stations prior to takeoff. The Flight Service Stations will be continually advised of the status of the OBL launches.

l. As a final measure, the blocks of airspace depicited in Figure 1-20 will be constantly searched prior to liftoff to detect intruders. If an errant aircraft is detected, the countdown will be put on hold until it again becomes safe to launch.

m. The plan summarized has been presented to and accepted by the Department of Transportation. It is not really a new plan in that it has been used for 10 to 15 years for Vandenberg launches. It does, however, involve Air Route Traffic Control Centers and airports that have not previously been involved in launch operations.

n. Sealanes

Procedures similar to those for airways are used for sealanes; Notice to Mariners (NOTEMARS) and HYDROPACs replace NOTAMs and the Defense Mapping Agency Hydrographic Centers (CDMAHC) replaces the Air Traffic Control Centers. The NOTEMARS and HYDROPACs are issued 10 days prior to launch. Captains of all commercial vessles throughout the world are made aware of the hazards by these notices prior to departure from port. Other mariners are notified by broadcast over the Coast Guard Broadcast Warning and Navy Mercast radio channels, and advised to circumvent impact areas during the time of launch. Additionally, prior to each launch a check is made to determine if there are any ships within the nominal debris impact areas by utilizing the Contact Area Summary Position Estimate Report (CASPER). These procedures are routinely implemented for launches from Vandenberg.

o. It should be noted regarding both airways and sealanes that therehave been over 1200 major launch operations conducted from Vandenberg during the past 14 years, and there has never been a case of personal injury caused by a launch.

p. Meteorological Constraints

Specific weather criteria will be established including go/no-go weather criteria. This criteria will include wind velocity and direction versus altitude and visibility restrictions. Visibility restrictions are required to insure that the skyscreen operators can evaluate missile performance until after the radars have acquired target and the Range Safety Officer has instantaneous impact prediction (IIP) information available. Visibility to 50,000 feet is required.

2. <u>Normal Launch Debris - Special Provisions</u>

a. The fundamental safety provision regarding normal launch debris, i.e., reentry objects that result from a normal launch, has been to select launch facilities for which the reentry objects will fall on sparsely populated land. The greatest concern is the physical impact of the Stage I casing, which is 24 feet long, 5.5 feet in diameter, and weighs 4800 pounds. The casing will be free of propellant and explosive gases when it impacts and, therefore, it will not explode upon or after impact. The Stage I casing impact areas for launches from the selected OBL sites are shown in Figures 1-14, 1-21, and 1-22. The impact areas are high in the Bitterroot Mountains and only sparcely populated during the winter months.

b. The Stage I impact area is 5.75 X 26.5 miles. This area will be evacuated prior to launch. Population surveys performed as part of the OBL Hazards Analysis of Appendix C indicate that, for the winter months, three of the impact areas are uninhabited (Newsome is uninhabited in winter) and the fourth (G-5) is inhabited by 19 people.

c. The Stage II casing with Stage I/II panels attached, Stage II/III panels, Stage III casing, and the OBL reentry vehicle will impact in the Pacific Ocean. The impact areas in the Pacific are cleared prior to launch as discussed previously.

LABEL	LATITUDE	LONGITUDE
a	46° 44.46′	115° 30.67′

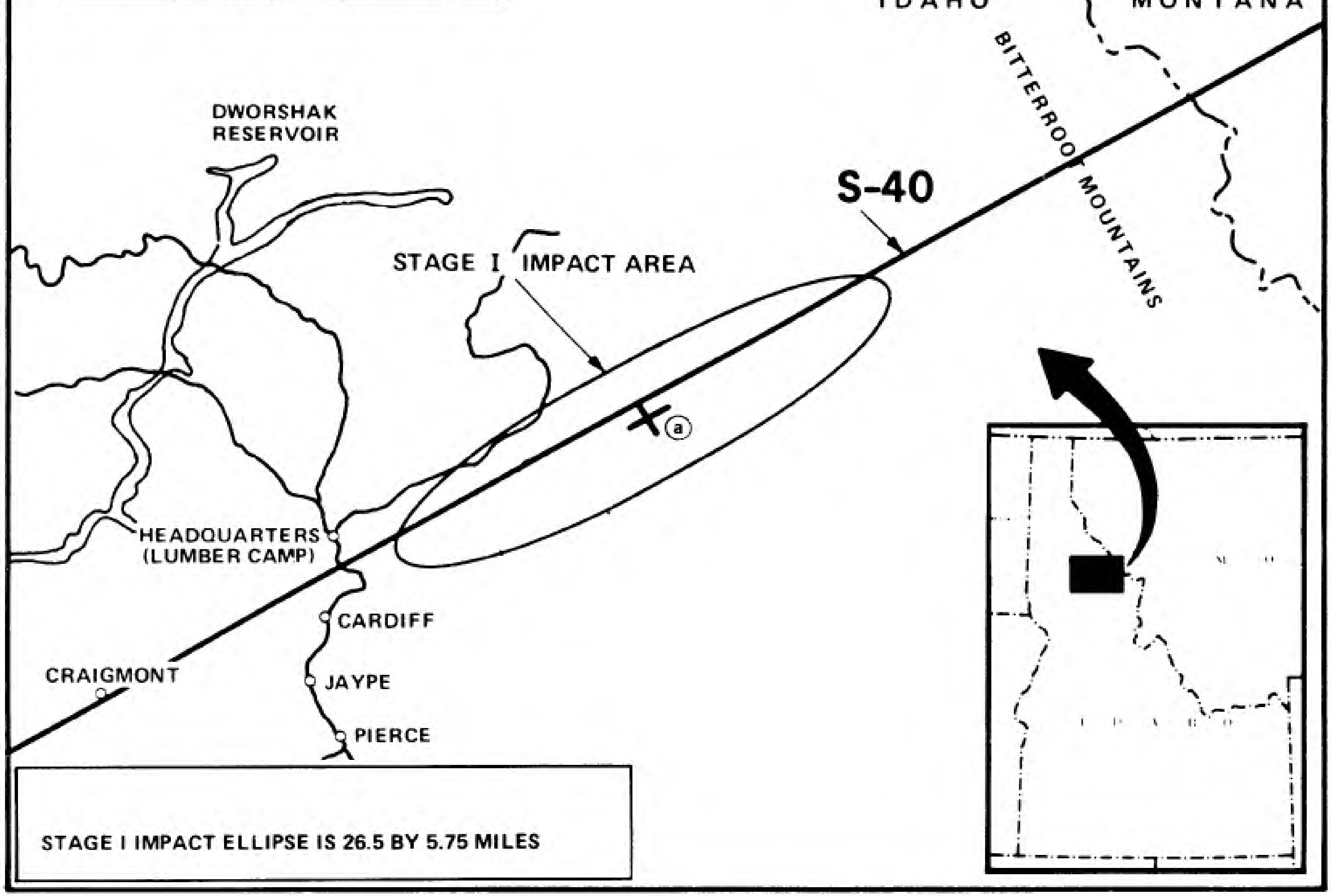
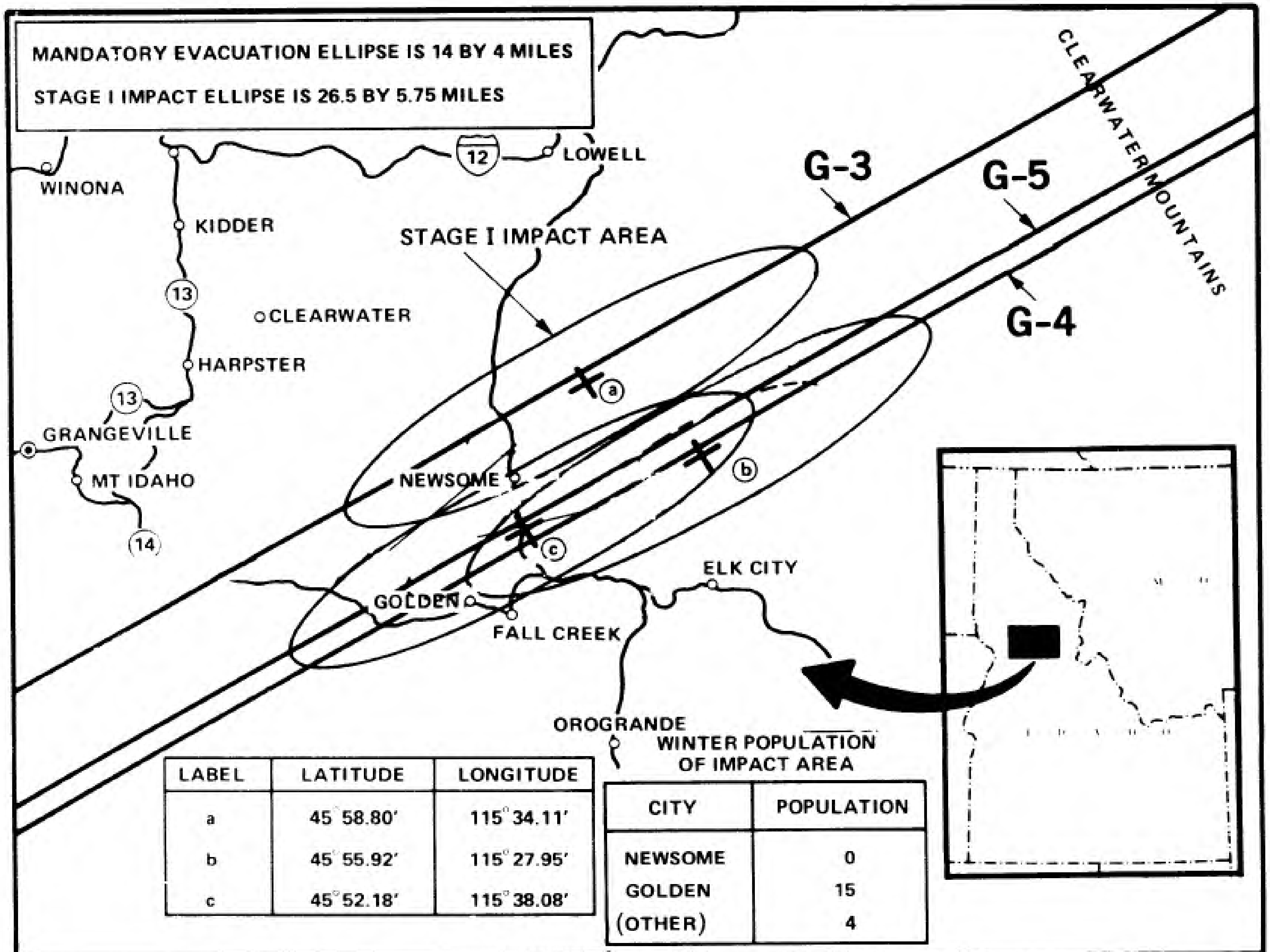


Figure 1-21. S-40 STAGE I CASING IMPACT AREA



LABEL	LATITUDE	LONGITUDE
a	45°58.80′	115°34.11′
b	45°55.92′	115°27.95′
c	45°52.18′	115°38.08′

CITY	POPULATION
NEWSOME	0
GOLDEN	15
(OTHER)	4

Figure 1-22. GOLF STAGE I CASING IMPACT AREAS

3. Abnormal Launch Debris - Special Provisions

a. If an OBL Launch is abnormal, e.g., the missile grossly malfunctions or simply drifts off course, the missile will be destroyed. MINUTEMAN II missiles weigh approximately 70,000 pounds at lift-off; therefore, an early destruct can produce a considerable quantity of debris (Ref. 1-6). Special attention has been directed to this problem in the planning of OBL.

b. Hazard Corridors

The greatest hazards exist if the missile must be destructed within the first 8 seconds of flight. Not much propellent has had a chance to burn away during this time and the missile is relatively close to the ground. There are, however, factors which work in favor of safety during this period; since the missile is not traveling very rapidly, and since it is not very high, the debris that results from destruct will tend to fall back to earth in a predictable, confined area around the launch facility. This debris area has been determined by the Space and Missile Test Center (SAMTEC) and established as a hazard corridor. The hazard corridors for each of the SIERRA and GOLF launch facilities are shown in Figures 1-23 and 1-24. They extend approximately 6 miles downrange and 1.8 miles radially about each launch site, resulting in a teardrop shape. As a safety precaution, all civilian personnel will be evacuated from the hazard corridor for each OBL launch.

c. Fire Watch Corridors

A second time frame of special significance is the first 52 seconds of flight. After the first 8 seconds of flight, the debris dispersion pattern resulting from a destruct is larger and less dense and, therefore, much less of an impact hazard than the debris produced by a destruct during the first 8 seconds of flight. However, up to the first 52 seconds of flight there is a possibility that a destruct will result in small fragments of burning propellant and inert debris returning to the ground. The burning fragments could be a fire hazard. The areas over which the debris would fall for the first 52 seconds have been determined for each OBL launch facility and are referred to as fire watch corridors. The fire watch corridors are shown in Figures 1-17, 1-23 and 1-24. The fire watch corridors extend 73 miles downrange and are

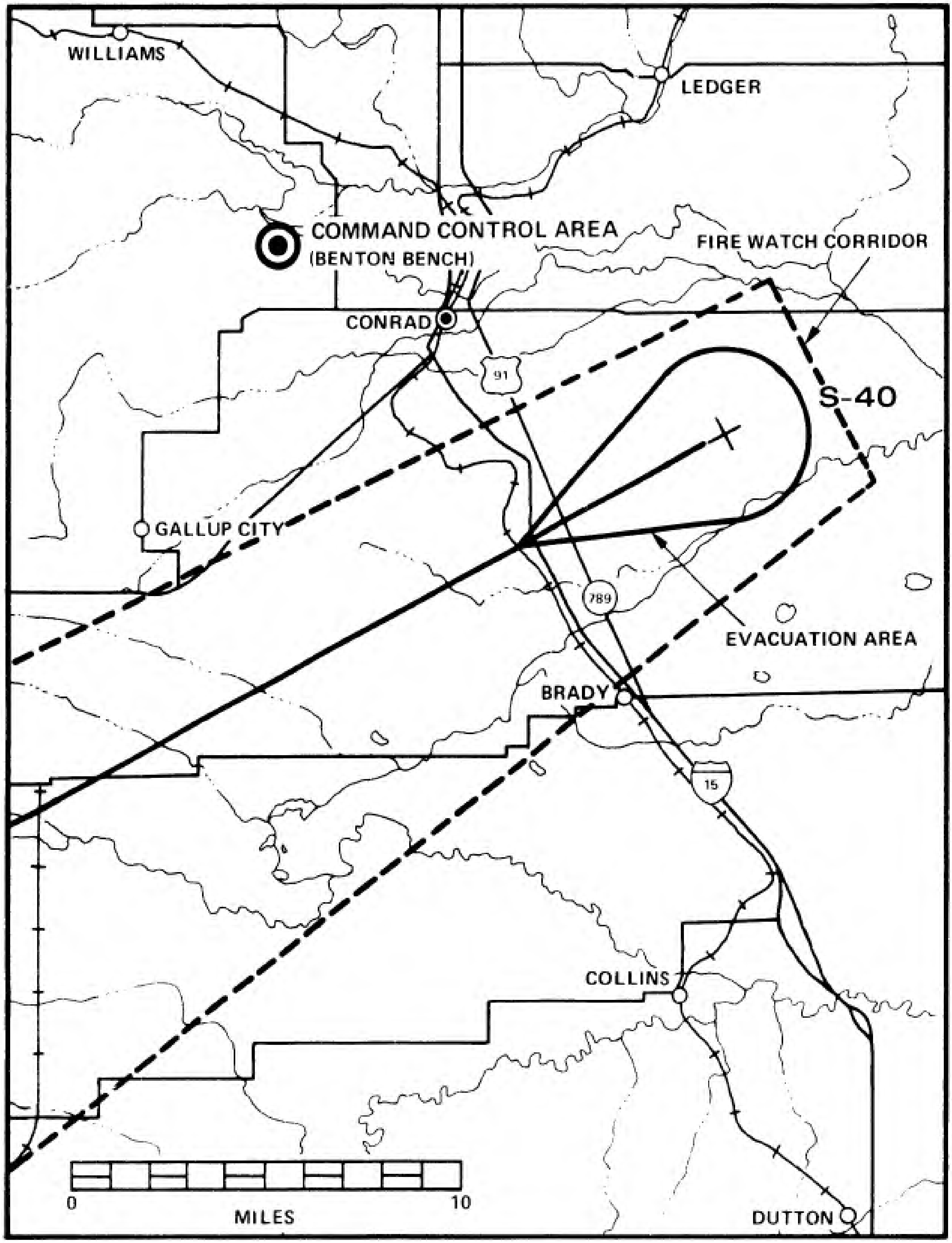


Figure 1-23. S-40 HAZARD AREA AND FIRE WATCH CORRIDOR

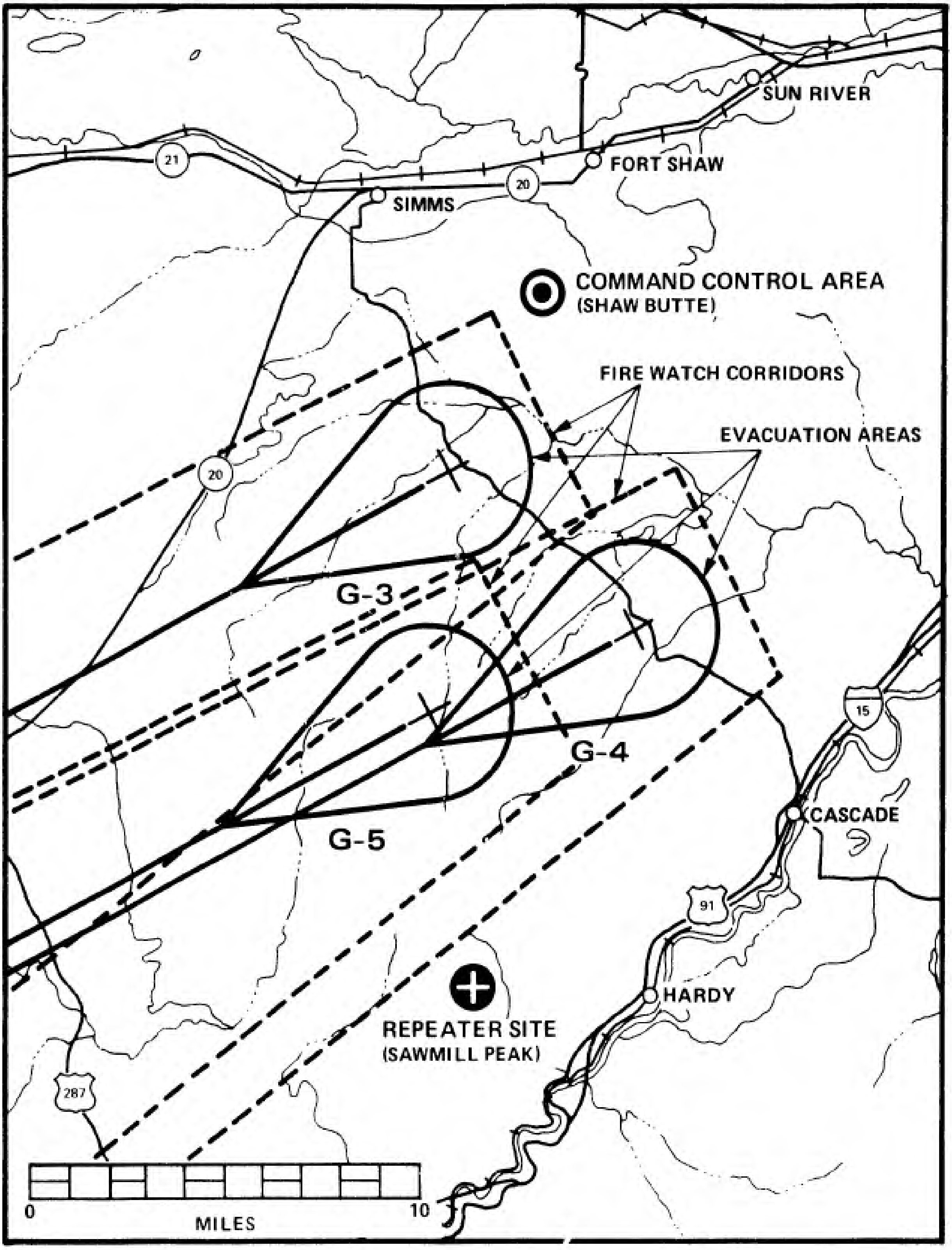


Figure 1-24. GOLF HAZARD AREAS AND FIRE WATCH CORRIDORS

approximately 21 miles wide at their widest point. Evacuation of personnel will not be necessary in the fire watch corridors. However, there are special provisions established for firefighting in these areas, one of which is the Modular Airborne Fire Fighting System (MAFFS). It should be noted that the possibility of an extensive fire even in the unlikely event a missile must be destroyed is very small because of the winter launch date. The fire index in the test area is low during the winter months, which is one of the reasons for selecting winter launch dates.

d. MAFFS

The Modular Airborne Fire Fighting System (MAFFS) utilizes C-130 aircraft fitted with firefighting equipment capable of dispersing 3000 gallons of water or fire retardant per aircraft. MAFFS aircraft are shown in Figures 1-25 and 1-26. For OBL launches the MAFFS aircraft will be stationed at the Boise Interagency Fire Center. MAFFS has been used previously to fight forest fires in western Montana and is accepted by both the United States Fire Service and the United States Air Force as an operationally safe and suitable system for combating forest fires.

e. Missile destruct after the first 52 seconds of flight will pose a hazard in the form of inert debris impact, but not a fire haz... l. The hazard of impacting debris caused by destruct this late in flight as been evaluated in the OBL hazards study presented in Appendix C

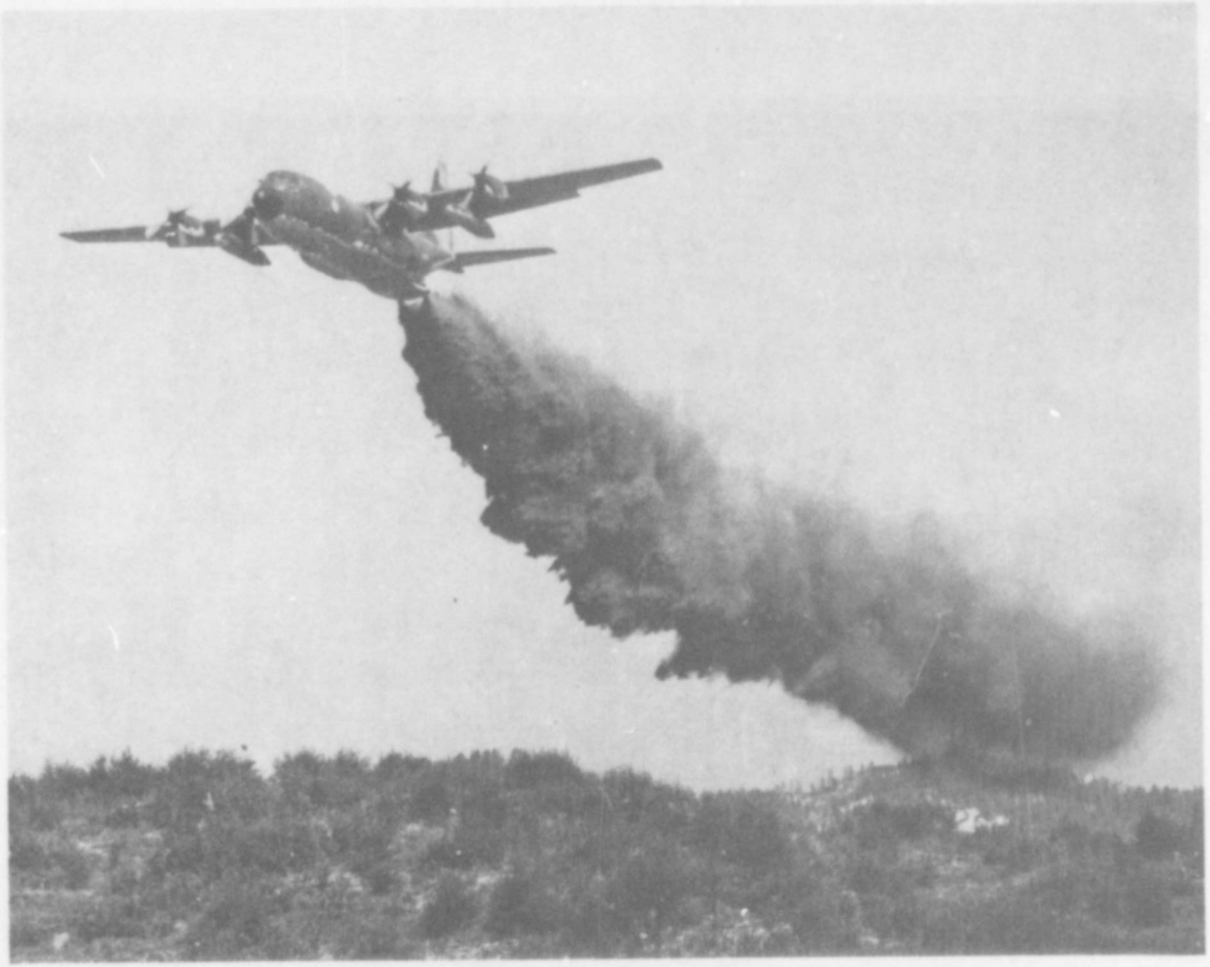


Figure 1-25. INFLIGHT DISCHARGE OF FIRE RETARDANT FROM MAFFS AIRCRAFT

Figure A-7. Exterior View of Reservicing.

Figure A-8. Inflight Discharge of Fire Retardant.

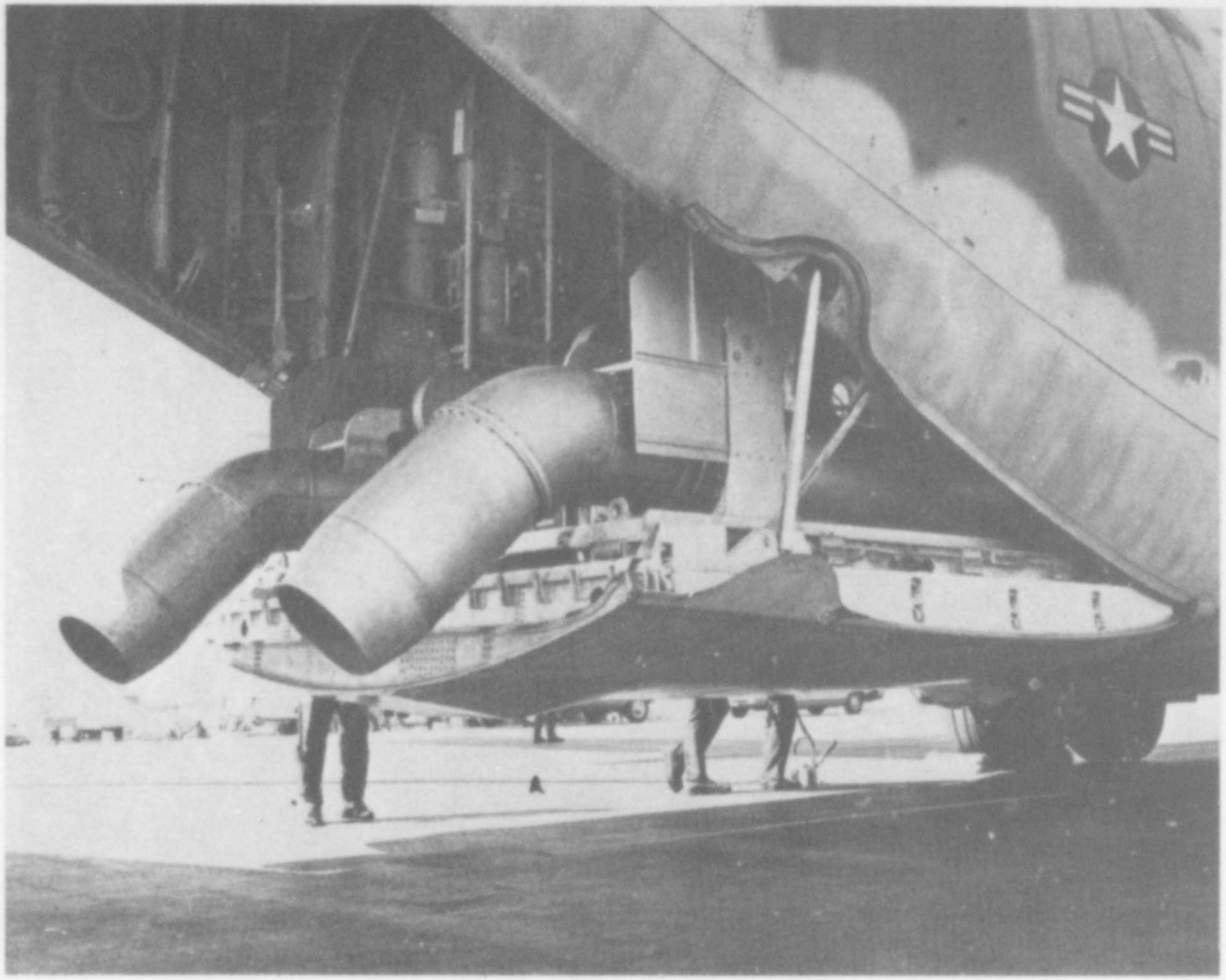


Figure 1-26. SIDE VIEW OF MAFFS PARABOLIC NOZZLES INSTALLED IN C-130 AIRCRAFT

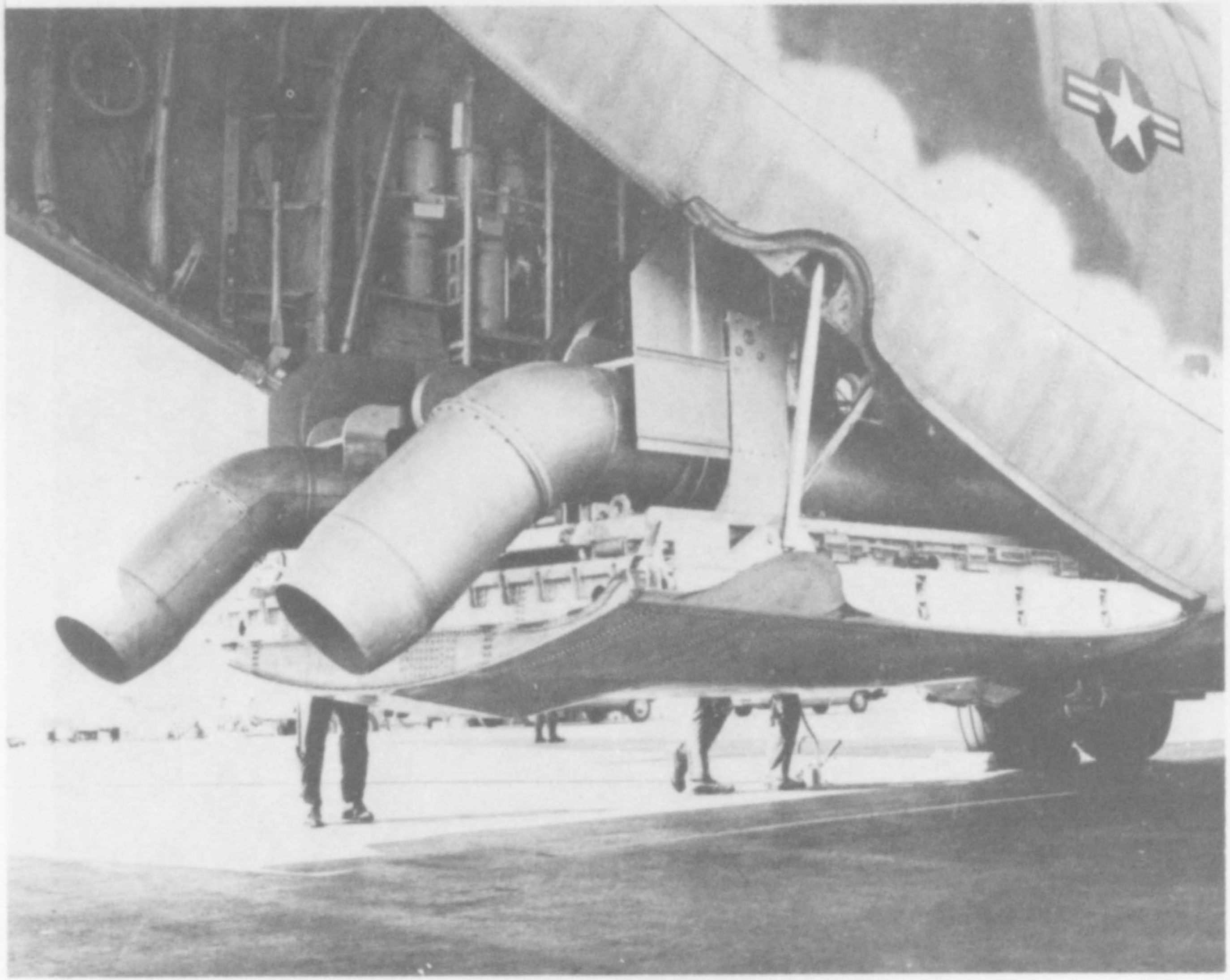


Figure A-5. Side View of Parabolic Nozzles Installed in C-130 Aircraft.

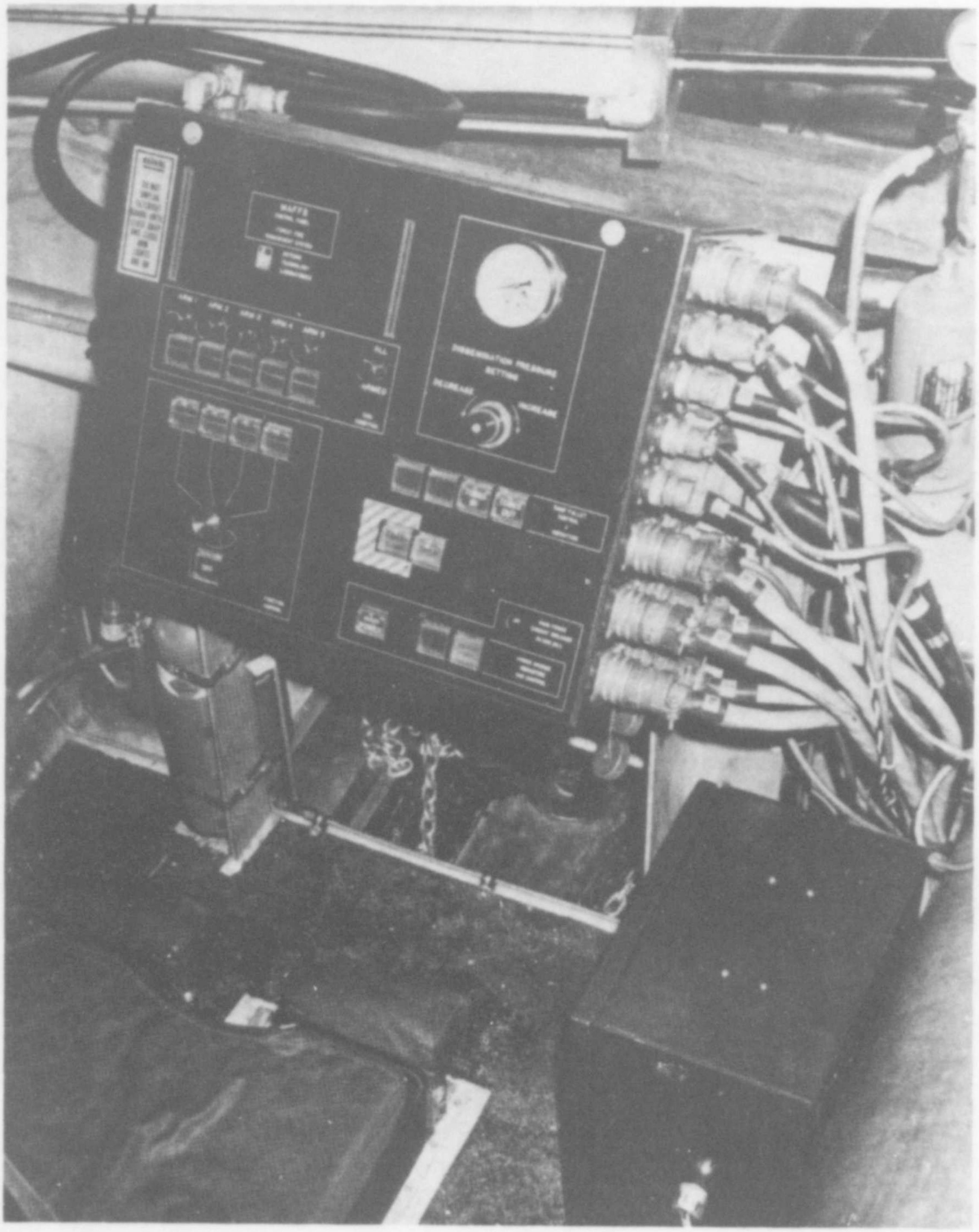


Figure A-6. Operator's Console Mounted on Control Pallet.

D. HAZARDS SUMMARY

1. General Discussion

a. The launch of any missile presents a certain degree of hazard. The hazards can be minimized by proper planning and addition of safety constraints on the manner in which the operations are performed. For OBL the hazards are separated into two categories: normal or successful launch; and abnormal or failed launch.

b. During the planning for OBL preliminary candidate launch sites were selected by establishing virtually unpopulated impact areas for the first stage and relating that area through trajectory information to prospective launch sites. A preliminary hazard study was performed to assist in final selection of safe launch sites and trajectories. The results of the preliminary hazard study together with instrumentation site requirements were used to select the SIERRA and GOLF sites that will be used for OBL.

c. The hazard study considered the hazards of flight over the Continental United States, mid range over the Pacific Ocean and in the target area. There is virtually zero permanent population in the Pacific flight corridor, and the safety provisions for OBL will assure that there is no transient population, i.e. personnel on aircraft and sea vessels, present during launch. The hazards associated with the Stage II casing and Stage II/III panels are considered to be negligible, since launching from Montana insures that these pieces will impact in cleared areas of the ocean approximately 700 miles off the west coast. The hazards associated with re-entry at Canton Island are also negligible. This environmental statement does not contain a target area hazards summary since no member of the general public will be in the target area.

d. Subsequently a detailed hazard analysis performed for SIERRA and GOLF sites resulted in the final selection of S-40, G-3, G-4, and G-5 as safe launch sites. Appendix C contains the details of that analysis; subsequent paragraphs present the central results and comments which should be read before attempting a review of Appendix C.

e. The hazard analysis for OBL is thus confined to evaluating the hazards associated with Stage I casing impact and the debris that would be produced if missile destruct were necessary. Special terminology is used in discussing these hazards. Hazards analyses are necessarily probabilistic. For example, a simple impact point for Stage I casing cannot be identified because exact wind conditions, point of release from the missile, and other factors that affect the impact trajectory vary with each launch. The hazard analysis determines the most probable point of impact, and an area for which the probability of impact is 99.7 percent. This area is an ellipse which is termed "three-sigma ellipse (a mathematical term).

f. A second term which requires definition is the probability of impact (abbreviated PI). The probability of impact is the probability that one or more missile debris fragments will impact within the land area of a given location.

g. The probability of injury (casualty), abbreviated EC, is the probability of injury to the population within a given location.

2. Normal Launch

The Stage I casing is 24 feet long, 5.5 feet in diameter, and weighs 4800 pounds. It will impact in one piece at approximately 166 miles per hour. Since it will be empty, there is no possibility of an explosion. The hazard results from a direct or close proximity hit of the casing.

Three-sigma ellipses for the Stage I casings are shown in Figs. 1-21 and 1-22. These ellipses are 26.5 miles long and 5.75 miles wide. The Stage I/II panels drop areas have been deleted from consideration; it was determined that the panels will be retained with Stage II. The panels will remain a part of the second stage and will drop in the Pacific Ocean. Population surveys performed as part of the OBL hazard analysis indicated that during the winter months three of the Stage I impact areas are uninhabited and the fourth (G-5) is inhabited by 19 people. Evacuation of all personnel will result in a negligible probability of injury for all normal launches.

3. Abnormal Launch

a. Section I. B. 7 describes the destruct action that may be taken if the missile fails to follow the intended launch trajectory. The determination of the hazards which can result from an aborted launch represents a complex process involving an enormous number of calculations. A computer program called SAFETE3 is routinely used to perform these repetitious calculations. The hazard analysis for this environmental statement is based on the specific trajectories for the planned missile flights, all known failure information, the established reliability of the missile destruct system, complete population data, prevailing winds, and the abort criteria which govern the Range Safety Officer's actions. The program calculates the probability of impact of missile debris in all areas endangered by destruct of the missile and the probability that an injury might occur in populated areas in which debris may impact.

b. Only the hazards resulting from first and second stage flight are evaluated by this analysis, because the instantaneous impact point of the missile leaves the North American land mass during second stage flight. The spent second stage and panels falls in broad ocean areas, and the spent third stage falls in the ocean areas near the Canton Island target.

c. Appendix C summarizes the results of twelve separate computer program SAFETE3 runs; three runs were required for each of the planned missile launches (S-40, G-3, G-4 and G-5) since the total population data for an overland launch cannot be accommodated in a single run. The total probability of an injury resulting from the impact of missile debris (EC) for a given launch then becomes the sum of the EC's for the three runs; these sums are shown in Table 1-2. The EC is expressed as the expected number of injuries per one million (10^6) launches.

d. The information presented in Appendix C is further summarized in Table 1-3 to indicate a measure of the risk to individuals and the possibility of an impact on a house. Table 1-3 presents this information for all cities which show a risk equal to or greater than one chance in ten billion; in addition the table identifies the specific launch site which exhibits the maximum risk to a given location.

The values for EC reflect the results of careful planning for the GIANT PATRIOT launches and are considerably less than initially anticipated for the OBL launch.

Table 1-2. HAZARD SUMMARY (DESTRUCT CASE)

Launch Site	Total EC (Injuries per Million Launches)
S-40	21.23
G-3	31.10
G-4	28.87
G-5	30.82

Table 1-3. HAZARDS TO INDIVIDUALS AND HOUSES

City	State	Launch Site	Probability of Impact on a House (chances per billion)	Probability of Injury to a Individual (chances per billion)
Alberton	Montana	S-40	0.145	0.047
Corvallis	Montana	G-4	0.178	0.055
Hamilton	Montana	G-4	0.110	0.034
Lincoln	Montana	G-5	25.102	29.985
Stevensville	Montana	G-5	1.463	0.943
St. Iguatius	Montana	S-40	6.806	3.675
Victor	Montana	G-4	2.048	0.858
Craigmont	Idaho	S-40	0.100	0.031
Elk River	Idaho	S-40	0.100	0.029

Table 1-3. HAZARDS TO INDIVIDUALS AND HOUSES (Cont'd)

City	State	Launch Site	Probability of Impact on a House (chances per billion)	Probability of Impact on an Individual (chances per billion)
Julaietta	Idaho	S-40	0.231	0.184
Kendrick	Idaho	S-40	0.139	0.052
Lapwai	Idaho	S-40	0.113	0.025
Lumber Camp	Idaho	S-40	0.115	0.037
Orofino	Idaho	S-40	0.315	0.149
Riggins	Idaho	G-5	0.106	0.028
Applegate	Oregon	G-3	0.289	0.109
Baker	Oregon	G-4	0.134	0.046
Bates	Oregon	G-4	0.428	0.211
Bend	Oregon	S-40	0.190	0.066
Canyon City	Oregon	G-4	0.357	0.130
Cave Junction	Oregon	G-3	0.265	0.096
Central Point	Oregon	G-4	0.150	0.052
Central Point West	Oregon	G-4	0.141	0.050
Chemult	Oregon	G-3	0.253	0.093
Dillard	Oregon	S-40	0.296	0.111
Glide	Oregon	S-40	0.259	0.094
Gold Hill	Oregon	G-5	0.297	0.112
Green	Oregon	S-40	0.304	0.115
John Day	Oregon	G-5	0.352	0.127
Joseph	Oregon	G-3	0.484	0.155
Kinzua	Oregon	S-40	0.355	0.134
Mt. Vernon	Oregon	G-3	0.357	0.130
Myrtle Creek	Oregon	S-40	0.149	0.051
North Powder	Oregon	G-3	0.517	0.196
Prairie City	Oregon	G-5	0.310	0.099
Prineville	Oregon	S-40	0.219	0.077
Prospect	Oregon	G-5	0.270	0.097
Redmond	Oregon	S-40	0.246	0.089
Rogue River	Oregon	G-3	0.278	0.102
Roseburg	Oregon	S-40	0.179	0.062
Shady Cove	Oregon	G-3	0.262	0.080
White City	Oregon	G-4	0.193	0.066
Winston	Oregon	S-40	0.291	0.113

e. Appendix C includes precise predictions of the time interval during missile flight in which a destruct action would cause missile debris to impact on each location. By noting the earliest and latest times (TMIN and TMAX) at which debris impacts on cities and counties of a given state, a table showing the overall time interval of concern for each state was developed. The earliest times correspond to the heaviest fragment and the latest times correspond to the least dense fragments.

Table 1-4. HAZARD INTERVALS

State	Launch Site			
	S-40	G-3	G-4	G-5
Montana	0 - 74.6*	0 - 73.7	0 - 73.0	0 - 72.6
Idaho	49.7 - 83.0	47.9 - 81.6	47.9 - 81.8	47.5 - 81.4
Oregon	63.0 - 102.2	66.7 - 99.9	67.0 - 100.1	66.0 - 99.7
Washington	54.5 - 90.7	52.1 - 89.4	52.8 - 89.6	52.3 - 89.3
California	86.1 - 106.1**	84.2 - 104.7**	84.4 - 105.0**	83.9 - 104.5**

*All intervals refer to time in seconds after launch.
**Previously advertised value of approximately 102 seconds was based on an estimate launch site location and statistical winds. Tabulated values are calculated for specific sites and launch conditions.

f. The probability of an injury to that portion of the population of a given state affected by each launch is summarized in Table 1-5. This table is a summation, by state, of the values of EC given in Appendix C. It may be noted that in all cases the total value is less than approximately 20 chances in a million for an injury.

Table 1-5. PROBABILITY OF AN INJURY PER STATE

State	Expected Injuries per Million Launches			
	Launch Sites			
	S-40	G-3	G-4	G-5
Montana	4.370	20.511	18.302	20.467
Idaho	8.157	2.211	2.896	2.814
Oregon	8.601	8.231	7.378	7.370
Washington	0.093	0	0	0
California	0.004	0.154	0.291	0.274

g. The significance of the hazards listed in Table 1-3 can best be understood by comparing a missile launch with the risk associated with a commonplace event. The comparison can be based upon the probability of injury per exposure. For example, the risk to an individual from traveling 1.8 miles to the grocery store. Several commonplace events are presented in Table 1-6. It is evident that the highest risk from missile failure extracted from Table 1-3 is much less than most common everyday risks.

Table 1-6. CHANCE OF INJURY PER EXPOSURE

Event	Chance of Injury
Auto Travel to Grocery Store (1.8 miles)*	1 in one million
Royal Flush fromFirst Five Cards	1.5 in one million
Missile Launch from G-5 for Individual in Lincoln, Montana	3.0 in one hundred million

*Reference "Accident Facts - 1973", National Safety Council

II. EXISTING ENVIRONMENT

A. LAUNCH AREA

1. General

Although Malmstrom AFB is located five miles east of Great Falls, Montana, the missile launch facilities are located a considerable distance from the metropolitan area. The launch sites for OBL are located in the SIERRA and GOLF flights of MINUTEMAN field WING I. The three GOLF sites (G-3, G-4, G-5) are located approximately 25 miles southwest of Great Falls. The SIERRA site (S-40) is located approximately 55 miles northwest of Great Falls. The exact launch site locations are shown in Figures 2-1 and 2-2. Photographs of these launch sites looking west down the proposed flight paths for early spring conditions are presented in Figures 2-3 through 2-6. Photographs of the surrounding terrain are presented in Figures 2-7 through 2-10. As illustrated, the launch site areas are sparsely populated and consist primarily of open prairie and agricultural land used for wheat and for cattle ranching. The launch areas discussed in this section include the launch facility plus the hazard areas for each site.

2. Topography

a. GOLF Sites

The GOLF sites lie west of the upper Missouri River at the base of the eastern foothills of the Rocky Mountains. The topography of the area for the three GOLF sites is characterized by broad valleys separated by steep reliefed hills or buttes. The elevation of the region ranges from approximately 3440 feet to 5830 feet above sea level. The underlying geology of the area is characterized by bedded sedimentary rock including minor coal seams that have been folded into anticlinal and synclinal structures. Square Butte to the north is the most prominant landform in the immediate region and represents the remnant of a large synclinal depression.

b. SIERRA Site

The topography of the SIERRA site area is characterized by rolling to almost flat glacial till at an elevation of approximately 3600 feet. The drainage of this area is poorly developed as is common with

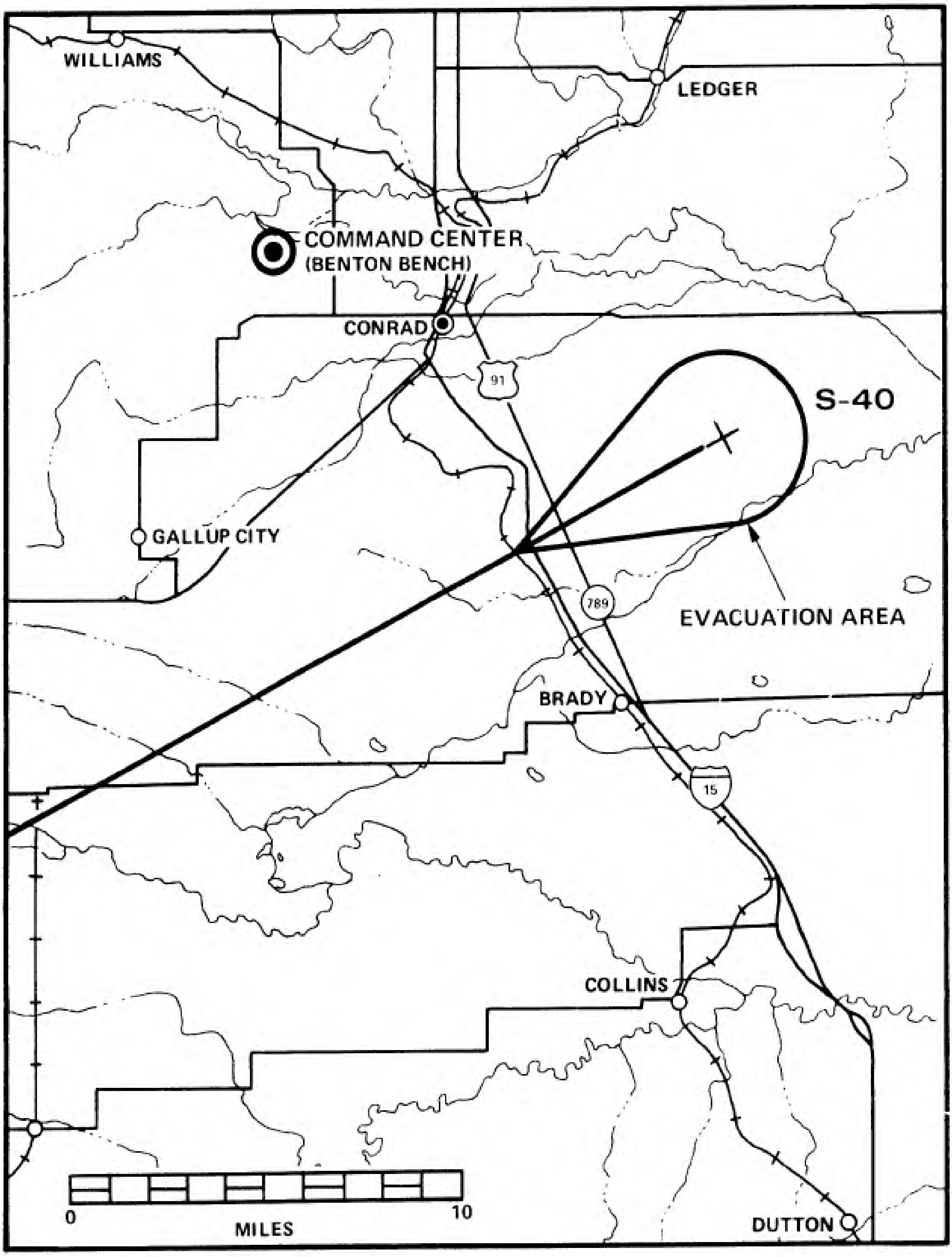


Figure 2-1. S-40 LAUNCH HAZARD AREA

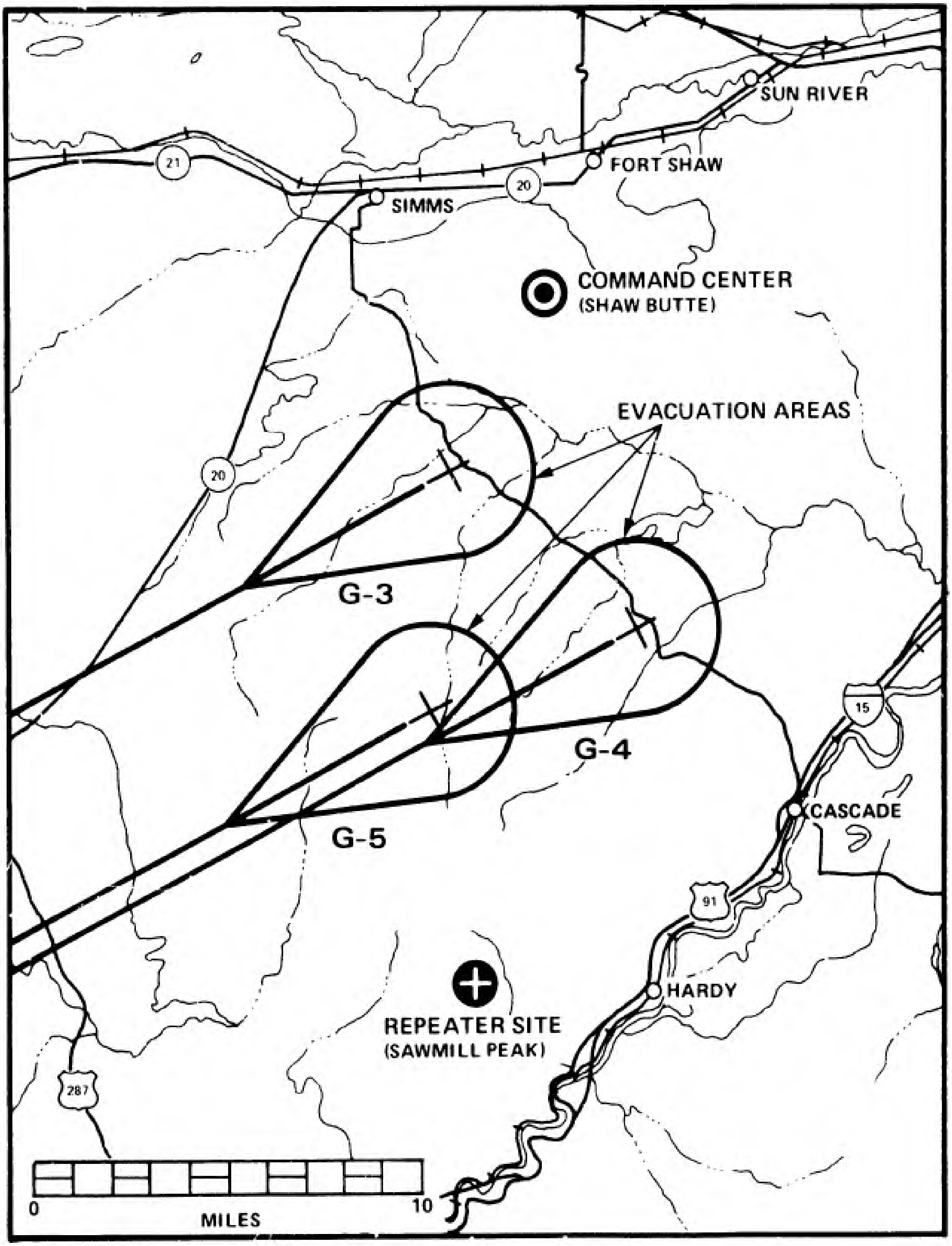


Figure 2-2. GOLF LAUNCH HAZARD AREAS

young glacial tills. Where drainage has developed, shallow ephemeral streams exist and are locally known as coulees.

3. Winter Climate

Winter climate for the launch sites is aptly typified by the Great Falls region meterological data for the winter of 1971-1972 (Ref. 2-25) presented in Table 2-1. The 30-year mean monthly climate data for Great Falls is also presented. The climate is essentially subarctic with extremely stable conditions in the lower atmosphere. A feature of the winter climate is the occasional warm westerly Chinook wind which tends to melt the snow cover periodically. Mean temperatures remain cool through April (< 40° F). The climate for the GOLF sites is slightly cooler and wetter since the sites are at a higher elevation than Great Falls.

Table 2-1. MONTHLY CLIMATIC DATA FOR GREAT FALLS, MONTANA

Lat. 47° 29' N.; Long. 111° 22' W

(Winter Dec. 71 - Apr. 72) Elevation 1115 Meters

Months	Pressure		Temperature				Precipitation		
	Mean Station mb	Mean Sea Level mb	Mean °C	Mean °F	Mean 30 yr. °C	Mean 30 yr. °F	No. of days > 1 mm	Total mm	30 yr. Mean mm
Dec. 71	882.8	1015.3	-7.8	(17.96)	-2.6	(27.32)	8	38	16
Jan. 72	883.6	1017.6	-10.7	(12.74)	-5.5	(22.10)	12	37	15
Feb. 72	884.9	1017.1	-5.3	(22.46)	-4.6	(23.72)	4	16	19
Mar. 72	885.2	1014.7	3.5	(38.3)	-0.7	(30.74)	7	26	24
Apr. 72	885.2	1013.8	5.8	(42.44)	6.5	(43.70)	7	20	25

Source: Monthly Climatic Data for the World
National Oceanic and Atmospheric Administration
Environmental Data Services
Asheville, N. C.

Vols. 24-25, 1971-1972

Figure 2-3. LAUNCH FACILITY SIERRA 40 LOOKING WEST

Figure 2-4. LAUNCH FACILITY GOLF 3 LOOKING WEST

Figure 2-5. LAUNCH FACILITY GOLF 4 LOOKING WEST

Figure 2-6. LAUNCH FACILITY GOLF 5 LOOKING WEST

a. Land use around GOLF 3 is primarily range with some wheat fields.

b. Range and sparsely forested slopes near GOLF 3.

c. Range land to the north of GOLF 3.

Figure 2-7. GOLF 3 LAUNCH AREA

a. Wheat fields and range lands surrounding GOLF 4.

b. Square Butte, wheat fields and range lands to north of GOLF 4.

c. Forests on hillslopes to south and east of GOLF 4.

Figure 2-8. GOLF 4 LAUNCH AREA

a. GOLF 5 is located in midst of range land used for grazing of cattle.

b. Sparsely forested slopes near GOLF 5.

c. Of historic interest is Saint Peter's Mission to the west of GOLF 5.

Figure 2-9. GOLF 5 LAUNCH AREA

a. SIERRA 40 located in midst of wheat fields.

b. Wheat fields and town of Conrad to the west of SIERRA 40.

c. Wheat fields characteristic of the surrounding environment.

Figure 2-10. SIERRA 40 LAUNCH AREA

4. Water Resources

a. GOLF Sites

Surface waters in the GOLF launch site area include the Dearborn River and a number of smaller streams and ponds. The streams in this area flow generally southeast to the Missouri River. The Missouri River follows a meandering course to the northeast through Great Falls. At a site 10 miles northeast of Great Falls the Missouri has a drainage area of 15 million acres and an average annual discharge of 5 million acre feet (Ref. 2-21). The smaller streams which flow year round are Little Muddy Creek and Little Trout Creek. Also, there are several ephemeral or intermittent streams. These include Birdtail Creek, St. John's Creek, Lepley Creek, Sullivan Creek and Hardgrove Creek. In very wet years, a dam on the Little Muddy Creek creates what is known as the Rocky Reef Reservoir 2 miles north of launch facility (LF) G-4. The reservoir has been dry the last several years and currently exists as an alkali flat. Also, in wet years a number of small ponds may form. These are currently dry.

b. SIERRA Site

Surface waters in the launch site area are the Pondera Coulee, Maucki Coulee, and South Pondera Coulee. These coulees flow east through the SIERRA launch site area to the Marias River. There are several small earthen dams in the launch area placed across the coulees to provide water for stock and crop irrigation. Numerous ponds are found 5 to 10 miles south and southeast of the launch site during wet years. Most of these are currently dry. Major bodies of water in the surrounding area are the Tiber Reservoir 20 miles northeast of S-40 on the Marias River and Lake Francis 22 miles northwest of the site.

5. Vegetation

a. GOLF Sites

The vegetation surrounding the GOLF sites is a mixture of short grass prairie, grain fields (primarily wheat) and scattered stands of timber. To the northeast of G-3 and G-4 the vegetation is an almost equal mixture of grain fields and short grass prairie. The "short grass" prairie is classified as Grama-needle grass-wheat grass whose major constituents are Boutelous gracilis, Stipa comata, S. viridula, Agropyron smithii, and A. spicatum. To the southwest of these two sites the vegetation is almost entirely short grass prairie. The vegetation around G-5 is predominantly short grass prairie with scattered stands of yellow pine mixed with some fir. The scattered stands of trees persist on steep slopes where snow has accumulated and provides a moisture source, or along the strike or exposure of water bearing rock.

b. SIERRA Site

Most of the land surrounding the Sierra site is cultivated in grain. The principal crop is wheat, with some barley and alfalfa. The natural vegetation is limited primarily to roadway environs and vacant fields. Isolated areas of short grass prairie account for less than 10% of the vegetation.

c. Soils

The soils supporting the vegetation in both the SIERRA and GOLF areas are classified as Chernozems. These Chernozems consist of a nearly black, easily crumbled, humus-rich surface layer, and a subsurface layer characterized by a slight to moderate accumulation of clays and salts.

6. Wildlife

Wildlife in the launch site areas consists of numerous species of birds and a more limited number of species of mammals. Game birds include grouse, quail, prairie chickens, plovers and mourning doves. In addition, there are sparrows, meadowlarks, killdeer, hawks and numerous other small birds. There have been some infrequent eagle sightings in the Brady Dutton area. The only large mammals that are present are the pronghorn antelope and deer. Other mammals include ground squirrels, pocket gophers, mice, rabbits, skunk, foxes, badger, and beavers. Prairie dogs are overly abundant. Wildlife is more abundant in the GOLF Sites since there is more natural habitat available. The only endangered wildlife species in Montana is the black-footed ferret (Mustela nigripes) which may be found in association with prairie dog colonies. The population center of the ferret is in neighboring South Dakota. No reported sightings of the ferret in western Montana have been made for many years.

7. Land Use

a. Population

The estimated population within the evacuation area is shown below for the four sites:

	G-3	G-4	G-5	S-40
Within evacuation area:	12	8	24	27

Most of the inhabitants in the launch site area are either directly employed in agriculture or servicing the agriculture community.

b. Agriculture

The land around the SIERRA site consists almost entirely of farms (~ 90%). The farms (about one farm for every 2 square miles) are primarily planted in grains (wheat, alfalfa, barley) though some pasture does exist. Dry farming of wheat accounts for most of the present agricultural land use; however, the acreage of irrigated wheatland is increasing. A large grain elevator located about 2000 ft. north of S-40 is used to store locally harvested wheat. The land southwest of the GOLF sites is about 90% open short grass prairie, the remainder in cultivated grains. To the northeast, the land is about half open prairie and half cultivated grains. Much of the short grass prairie is used for cattle grazing, primarily Black Angus.

c. Facilities

(1) SIERRA Site

Interstate Highway 15 and Federal Highway 91 cross the western portion of the S-40 hazard area. Also, branches of the Great Northern and Montana Western railroads and an underground pipe line (oil) cross the area parallel to the highways. Interstate 15, a four-lane, dual highway, is the major route through this area from Great Falls to the northwest part of Montana.

(2) GOLF Sites

No major highways pass through the GOLF launch area, although Interstate 15 passes just southeast of the area along the Missouri River. The Great Northern Railway also parallels the river. A gravel road passes north through G-3 and G-4 connecting the towns of Cascade and Simms.

d. Historical

The 1972 Federal Register of Historic Places (Ref. 2-16) does not list any historic sites in the GOLF and SIERRA areas. Of local historic interest is a pioneer mission named Saint Peter's Mission, located about 2800 feet west of G-5. No impact is anticipated for a normal launch. Contact was made with the Montana State Historic Preservation Office (Chief of Recreation and Parks Division in Montana); he did not know of any other points of historic interest in the proposed launch areas.

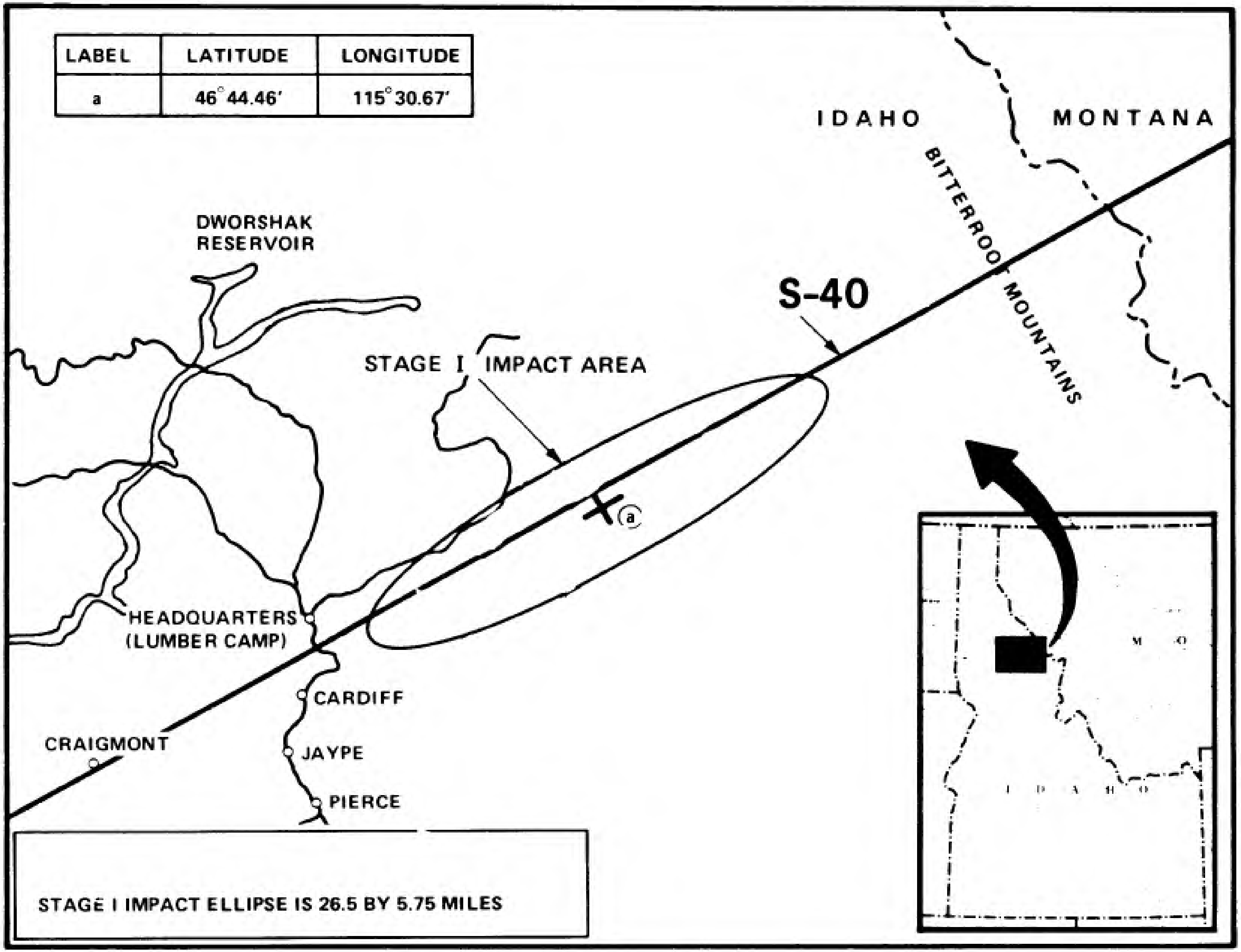
B. FIRST STAGE DROP AREA

1. General

The first stage drop areas for the GOLF and SIERRA launches are located in remote and sparsely populated areas of Idaho. The GOLF first stage drop areas are well within the boundaries of the Nez Perce National Forest, while the SIERRA first stage drop area is in the Clearwater National Forest east of Lewiston. Exact locations of the first stage drop areas are shown in Figures 2-11 and 2-12. Representative photographs of the SIERRA first stage drop area are shown in Figure 2-13. Photographs of terrain representative of the GOLF drop areas are shown in Figure 2-10.

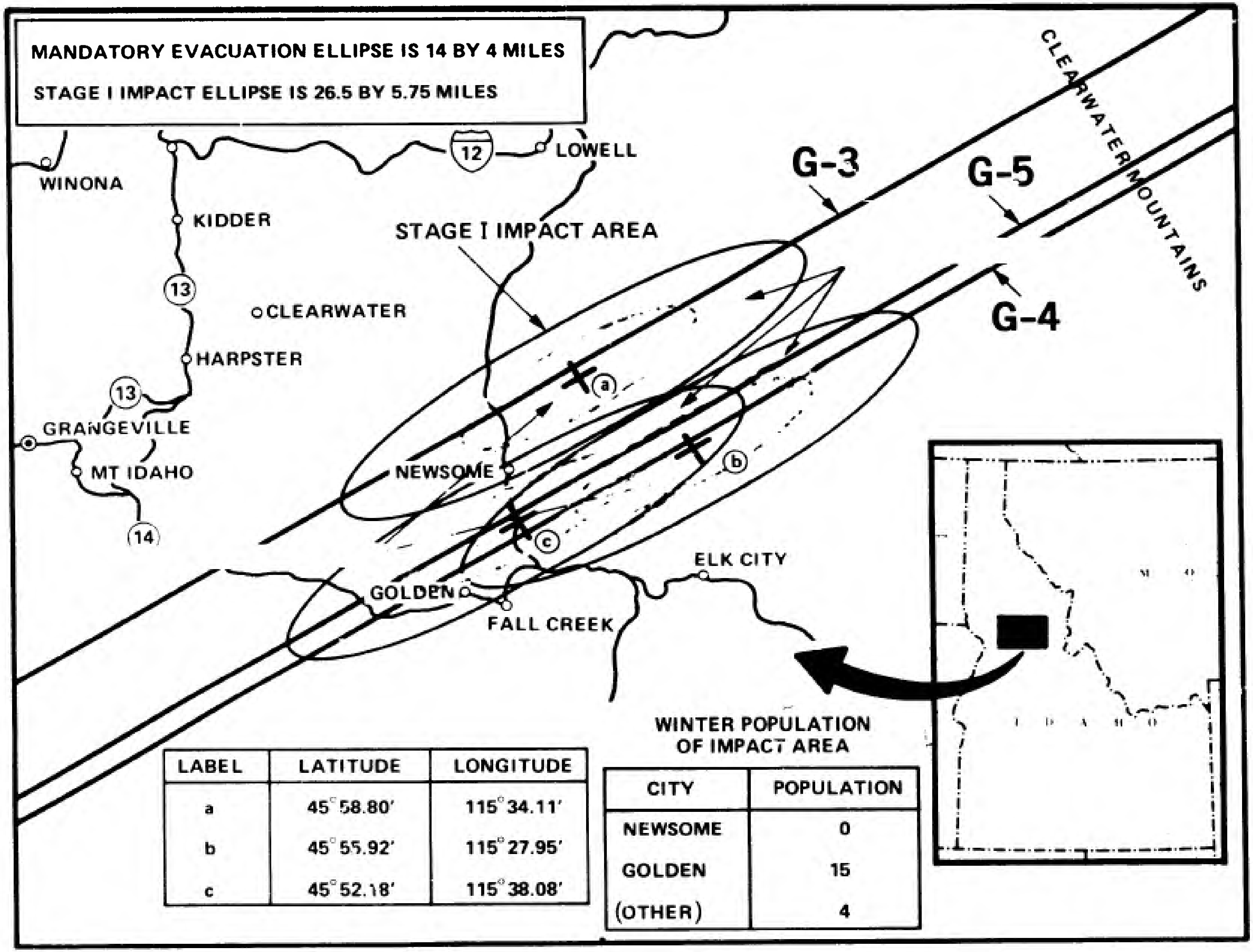
2. Topography

The GOLF and SIERRA first stage drop areas lie on the west slope of the Rocky Mountains in an area of steep relief and heavily forested slopes and ridges. The elevation of these rugged mountainous



LABEL	LATITUDE	LONGITUDE
a	46° 44.46′	115° 30.67′

Figure 2-11. S-40 STAGE I CASING IMPACT AREA



LABEL	LATITUDE	LONGITUDE
a	45° 58.80′	115° 34.11′
b	45° 55.92′	115° 27.95′
c	45° 52.18′	115° 38.08′

WINTER POPULATION OF IMPACT AREA

CITY	POPULATION
NEWSOME	0
GOLDEN	15
(OTHER)	4

Figure 2-12. GOLF STAGE I CASING IMPACT AREAS

a. Snow covered mountains of Clearwater National Forest, Idaho.

b. Moscow Bar Ridge in Clearwater National Forest, Idaho. Note cleared area in lower right corner.

Figure 2-13. FIRST STAGE DROP AREA FOR SIERRA LAUNCH SITE

First Stage Drop
Area for Golf 3, 4
and 5

First Stage Drop Area

Figure 2-14. FIRST STAGE DROP AREA
FOR GOLF LAUNCH SITES

areas ranges from 2600 feet above sea level in the canyon bottoms to peaks in excess of 6000 feet above sea level. The bedrock is granitic and the drainage pattern developed in these regions is dendritic, which is typical of drainage developing on granite surfaces.

3. Climate

The winter climate of the Northern Rocky Mountain Region is characterized by cold weather and heavy snowfalls. Snow tends to remain on the ground more or less the entire winter period at elevations greater than 4,000 feet. Snowfall ranges from 30 inches to 207 inches and mean temperature for the winter months ranges from stations as low as $17^{\circ}F$ to stations as high as $34^{\circ}F$, depending in both cases upon elevation, exposure, local topography and vegetative characteristics of the site (Ref. 2-20).

4. Water Resources

a. GOLF Sites

The principal streams draining the GOLF first stage drop area are the south fork of the Clearwater River; and Newsome Creek, Big Elk Creek and American River which flow into the south fork of the Clearwater River. These waters drain to the west to the Clearwater River, which flows through Lewiston to the Snake River.

b. SIERRA Site

The principal streams draining the SIERRA first stage drop area are the north fork of the Clearwater River and Orofino Creek. Just to the northwest of the area lies the Dwarshak Reservoir on the north fork of the Clearwater River. The reservoir is used for flood control.

5. Vegetation and Wildlife

a. The principal vegetation of the area is Douglas Fir Forest, populated with abundant wildlife. When surveyed in May of 1974 the area was still snowbound with fire out conditions existing.

b. Endangered and threatened species in the general region (Ref. 2-22) are the grizzly bear (Ursus arctos horribilis) and the Northern Rocky Mountain wolf (Canis lupus irremotus). The endangered grizzly bear (approximately 1000 left) is widely scattered in the more remote regions of the Rockies. The Northern Rocky Mountain wolf was thought extinct for several years. A small number of recent sightings have been made of the species in very remote regions of the Rockies.

6. Land Use

a. Population

Figure 2-12 shows the localities of Golden and Newsome as being within the impact areas. Only Golden has a year-round population (which are recommended to be evacuated for the G-5 launch.) Newsome is a forestry center which is not occupied during the January-April period. The populations within the ellipses for the first stage drop areas are:

	G-3	G-4	G-5	S-40
Impact Ellipse	0	0	19	0
Evacuation Ellipse	0	0	0	0

b. Logging

Principal use of the land is logging. Portions of the S-40 first stage drop area is logged or being logged off. Logging is a year-round operation in this region. Workers are bussed into the region each day and are scattered over a large portion of the region.

c. Facilities

(1) SIERRA Site

State Highway 11, a two-lane paved road, is the only major road into the area. The highway connects Headquarters with the town of Weippe to the south. Several spur tracks of the Northern Pacific Railroad which service the lumber industry are in the SIERRA first stage drop area. These spurs are used principally to transport logs to the lumber mill at Headquarters.

(2) GOLF Sites

There are no paved highways into or through the GOLF drop areas. In the past gold mining was active in the region and many of the mining sites are still easily recognizable. Lookout towers are present on various high points. These are only manned during the summer.

d. Historical

The 1972 Federal Register of Historic Places (Ref. 2-16) does not list any historic sites in the GOLF and SIERRA first stage drop areas. During site survey, no points of local historic interest were noted. Contact was also made with the Idaho Historical Society who did not know of any points of historic value in the first stage drop areas.

C. FLIGHT PATH AREA

1. General

a. The OBL flight paths are over the states of Montana, Idaho and Oregon. As is evident from the ground traces (see Figure 1-14) the missile flight paths in a normal launch pass over Western Montana, Idaho (between Moscow to the North and Boise to the South), over Oregon near John Day, and passing out of Oregon over the Pacific Ocean in the vicinity of Gold Beach. The flight path corridor includes the surrounding region of possible impact points in case of missile failure. For a normal launch, this general flight corridor is not impacted. The description is provided to assess impacts in case of a failed mission and to provide an overview of the environment for the OBL launch.

Since the flight path traverses such a vast region, the existing environment of the flight path corridor region is divided and described according to the following five distinct physiographic regions (shown in Figure 2-15.)

1) Northern Great Plains
2) Northern Rocky Mountains
3) Columbia Plateau
4) Cascade Mountain
5) Pacific Border

For each region, the existing environment is described according to climate, water resources, vegetation, wildlife, and land use.

2. Northern Great Plains

a. General

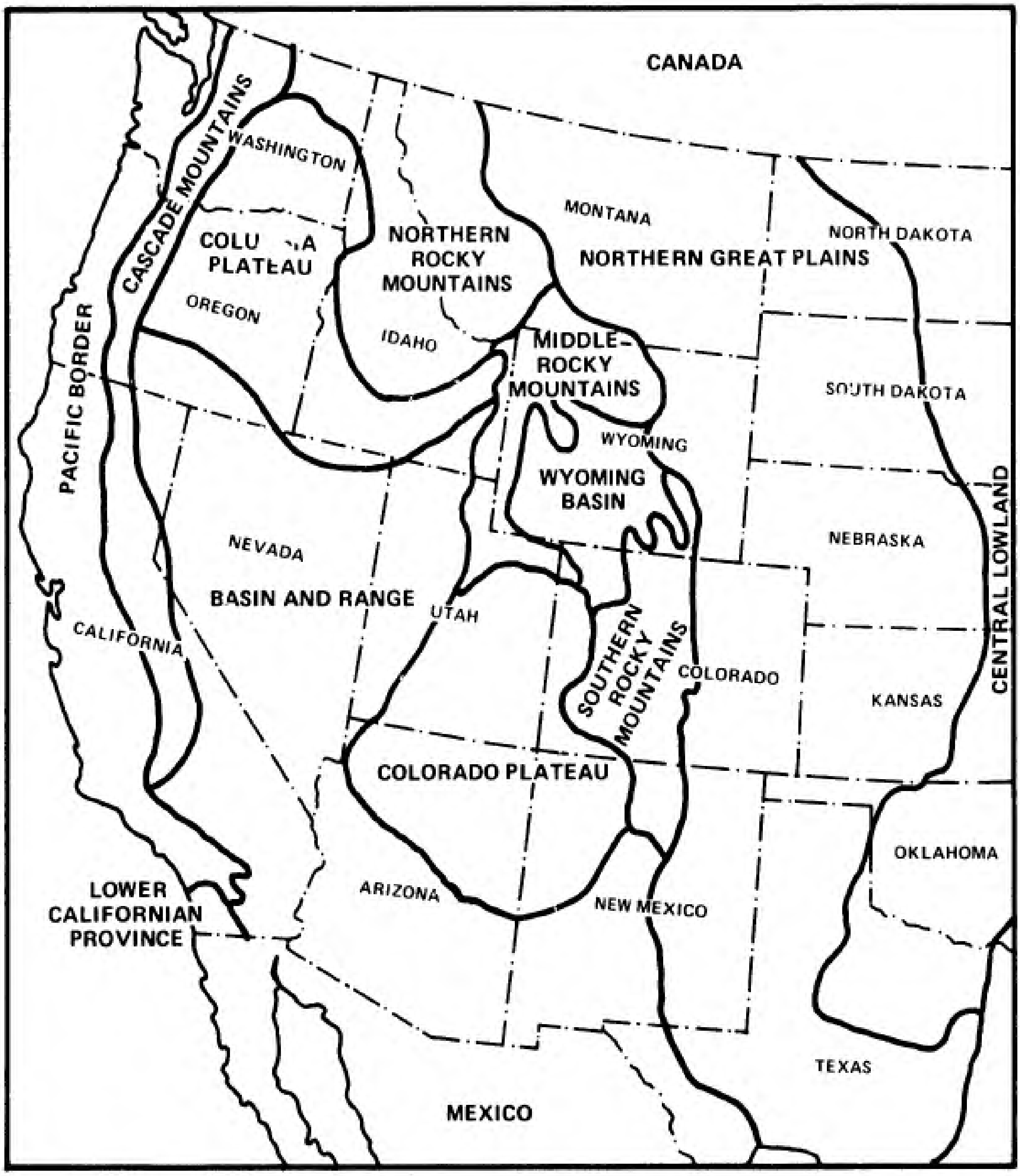
The Northern Great Plains Region, as delineated by the map in Figure 2-15, is the northwestern-most margin of the Great Plains in Montana. Except for the relatively low relief area around Great Falls, the region is characterized by grassy hills and broad valleys that are more or less barren of any forest cover. The regional economy is based on agriculture, ranching, copper and coal mining, oil, and gas production. The following is a general description of the environment upon which possible impacts may occur.

b. Winter Climate

Winter climate for the Great Falls region is aptly typified by the meterological data for winter of 1971-1972 and the 30-year mean monthly climate data (Ref. 2-25) presented earlier in Table 2-1. It is essentially a subarctic climate, dominated by the continuing intlux of the cold anticyclonic continental polar air masses (shown in Figure 2-16) that extend southward over the central part of the 48 conterminous states during the winter months (Ref. 2-26). The effect of the presence of such an anticylonic air mass is to produce extremely stable conditions in the lower stratum of the troposphere thus slowing dispersion of exhaust fumes. Due to the inability of the cold air to hold large volumes of water in the vapor phase, the regional precipitation is on the average less than an inch per month and generally occurs as snow when a new influx of cold air is passing over. A feature of the winter climate which is typical of the east slope of the Rocky Mountains is the occasional westerly or Chinook wind that flows down the east slope of the Rockies, warming at the dry adiabatic rate (see Figures 2-17 and 2-18). As a result of these warm Chinook winds, winter snows are melted periodically.

c. Water Resources

The region is noted for an abundance of high quality artesian wells. One well in particular named Giant Well (also known as Giant Springs) produces an estimated 448,220 acre feet per year (Ref. 2-8).



OBL Flight Paths are over the following regions:

1) Northern Great Plains
2) Northern Rocky Mountains
3) Columbia Plateau
4) Cascade Mountains
5) Pacific Border

Figure 2-15. Physiographic Regions of the Western United States.

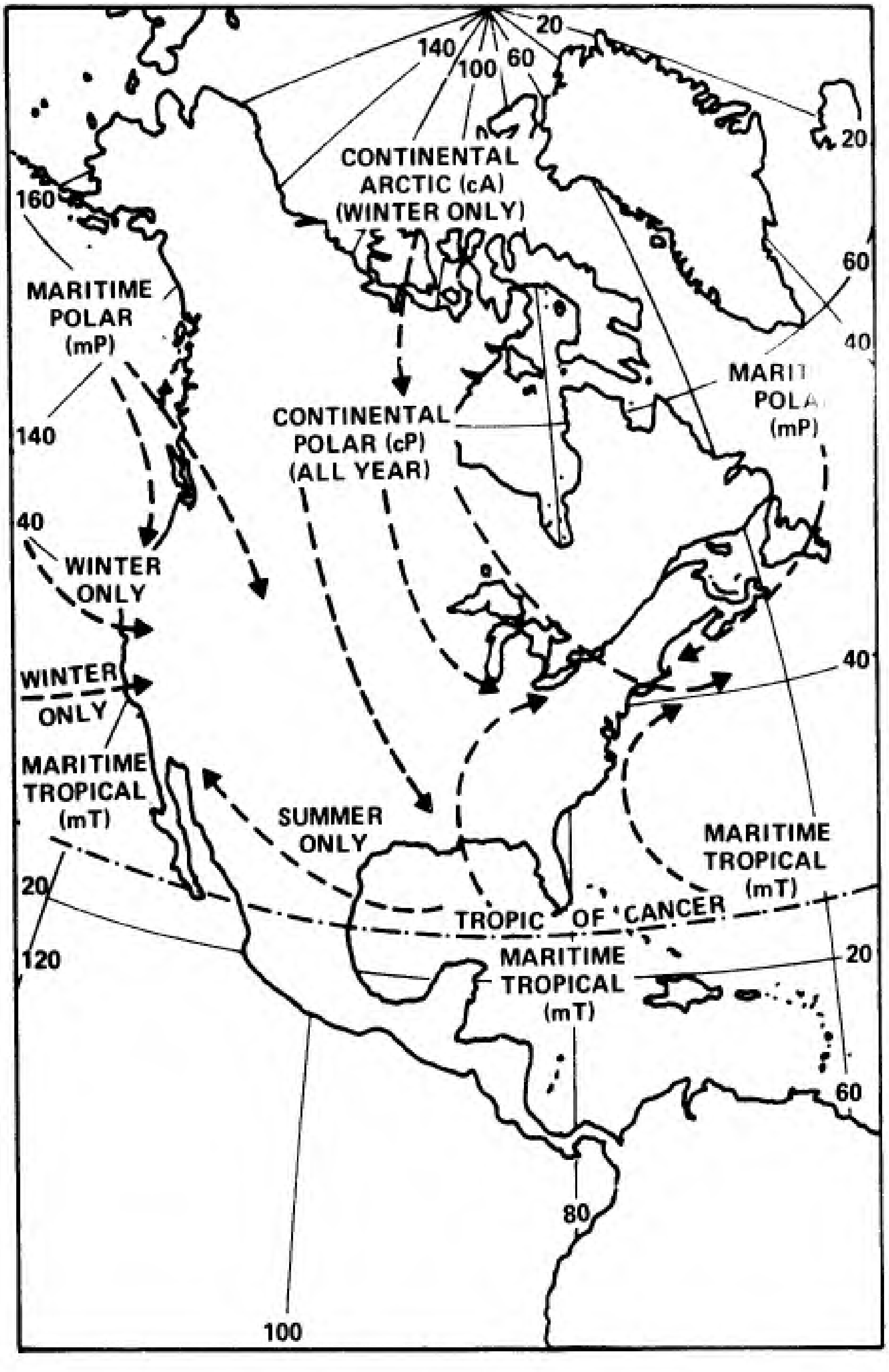


Figure 2-16. PRINCIPAL AIR MASSES AFFECTING NORTH AMERICA

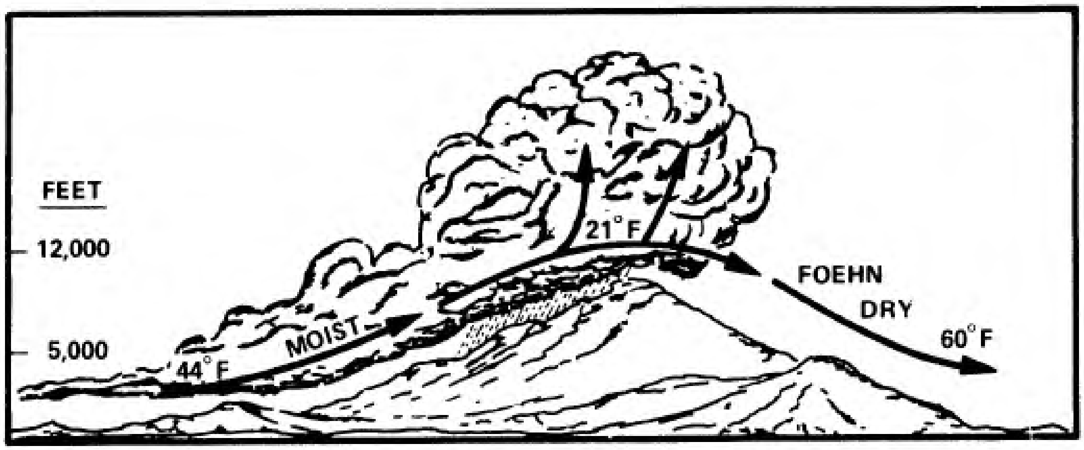


Figure 2-17 The Chinook or Föhn wind. (From Kuenen, P. H., Realms of Water, Copyright © 1955 by John Wiley and Sons.)

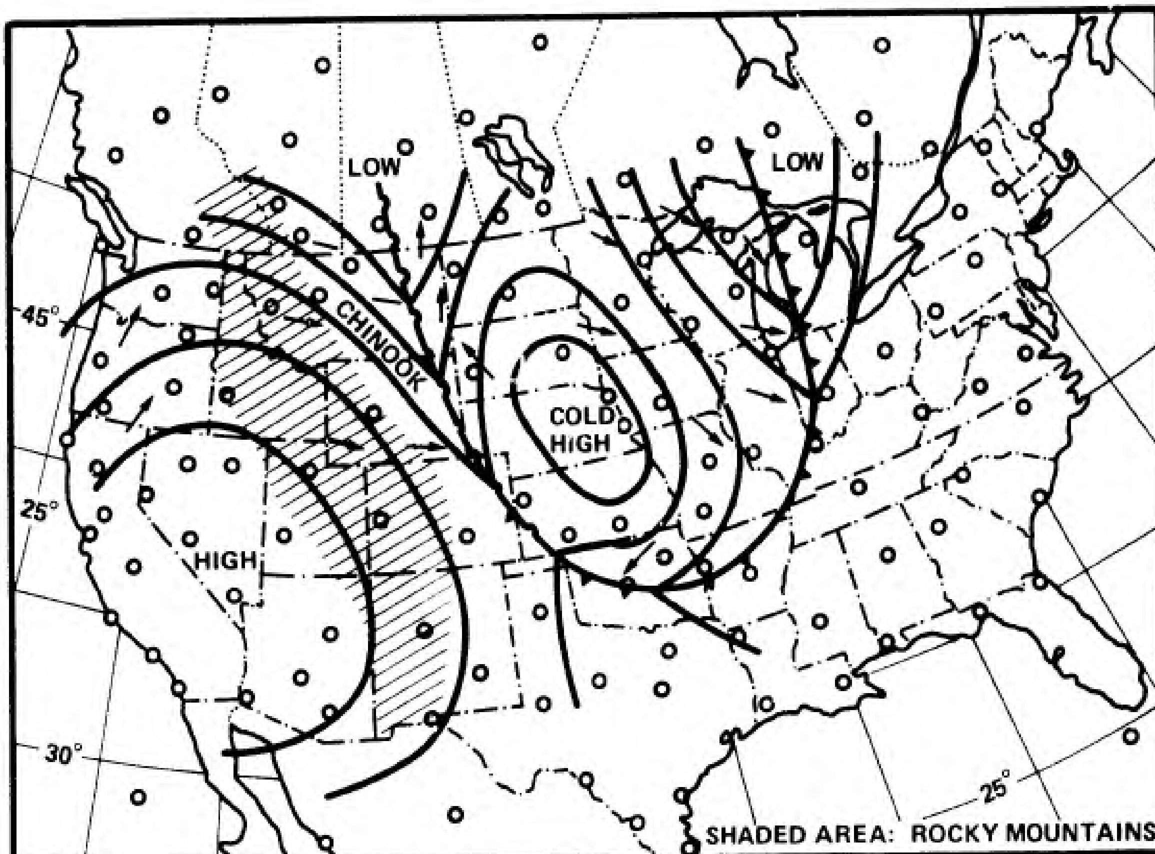


Figure 2-18 Diagram of a synoptic situation inducing the Chinook (Föhn) wind down the east slope of the Rockies. (From Rumney, G. R., Climatology and the World's Climates, 1968, the Macmillan Company.)

These wells contribute significantly to the overall discharge of the drainage basin. The area is drained by the Missouri River to which the lesser Teton River and Sun River are principal tributaries. The Missouri River at a site 10 miles northeast of Great Falls has a drainage area of 14,906,880 acres and an average annual discharge of 4,998,000 acre feet (Ref. 2-21). The annual precipitation for the region is roughly 13 inches, or 16,397,568 acre feet, of which roughly 70 percent is lost to evapotranspiration. Roughly half of the 13 inches falls between May 1 and July 31 and is lost to either evaporation immediately or transpiration. During the winter, most of the precipitation is lost by sublimation of snow directly into the atmosphere or as a result of the Chinook winds which increase in frequency with the approach of spring.

d. Vegetation

The natural vegetation of the Northern Great Plains is classified as Grama-needle grass-wheat grass (Ref. 2-11), but is more commonly known as the "short grass" prairie type (Ref. 2-5) characteristic of the semiarid environs of the western fringe of the Great Plains. In the agricultural areas adjacent to Great Falls much of the land is cultivated in grain or hay. In the area of extensive agriculture, the natural vegetation is limited to roadway environs and vacant fields; however, in the area of rolling hills, the short grass prairie persists. During the winter, the ground beneath the prairies are frozen and the grasses are generally blanketed in snow. Shrubs and trees are, for the most part, restricted to riparian environs. However, as one approaches the eastern slope of the Rockies, an ecotone or overlap of the forest community and the prairie community occurs and those same shrubs and trees once restricted to riparian environs are found interspersed with patches of prairie. The Popular tremoloides, Pinus Ponderosa, and Artemisia are the characteristic constituents.

e. Wildlife

The wildlife of the northern short grass prairies is somewhat limited, having few forms which are peculiar to the area alone. Most of the forms which inhabit the prairie region either extend into the eastern forest region or into the plains region, or in some cases, into the Rocky Mountain foothills. This region has very few amphibians and reptiles. The single endangered and threatened wildlife in the general region is the black-footed ferret (Ref. 2-22). This is a large weasel with black feet and face mask which is found in grassland habitation in association with prairie dog colonies. The population center of the ferret is in neighboring South Dakota.

3. Northern Rocky Mountains

a. General

The geology of the Northern Rocky Mountain Region is characterized by the Idaho Batholith. This is a massive uplifted body of granite-like rock which covers an estimated area of 16,000 square miles (Ref. 2-23). The characteristic rock is quartz monozonite with minor associations of granodiorite and other granites. River erosion, both prior to and after glaciation, has produced a dendritic drainage pattern. However, the landforms originally produced by this river erosion have been greatly altered in some areas by past glaciation.

b. Climate and Water Resources

The winter climate of the Northern Rocky Mountain Region is characterized by cold weather and large snowfalls. Snow tends to remain on the ground more or less the entire winter period at elevations greater than 4000 feet. Snowfall ranges from 30 inches to 207 inches and mean temperature for the winter months ranges from stations as low as 17° F to stations as high as 34° F, depending in both cases upon elevation, exposure, local topography and vegetative characteristics of the site (Ref. 2-20). As a result of the large snowfalls, the region contributes millions of acre feet of water to the Snake, Columbia, and Salmon Rivers.

c. Vegetation

The vegetation of the Northern Rocky Mountains in most areas is coniferous forest. Several attempts to classify or describe the vegetation of the region have resulted in the recognition of zones of vegetation that change with increasing altitude (Ref. 2-11). These zones reflect the gradual change in limiting factors (i.e., temperature, precipitation, soil) with the increased altitude. Depending upon where one examines the vegetation of the region, as many as six zones may be identified according to their floristic components (Ref. 2-7). A seventh zone, which is much less extensive than the other six is the

Alpine Meadows and Fell Fields (rock and boulder fields) of the highest elevations. These areas are usually dominated by grasses and sedges (grass-like plants which grow in dense tufts in moist areas) which range from being very dense at the moist sites to almost barren in the drier windswept passes. The Alpine Meadows are reknown for their wild flowers. The vegetation is of primary importance to the watersheds it inhabits, since the presence of the forest retards the rate of spring melting of winter snows by shading it from the sunlight and reducing the circulation of warm air. This results in fire out conditions which minimizes any fire hazard.

d. Wildlife

Wildlife in the Northern Rocky Mountains is strongly influenced by altitude. The region can be characterized by four life zones (in order of increasing altitude): 1) Transition, 2) Canadian, 3) Hudsonion, and 4) Artic Alpine. These zones produce a great variety and abundance of wildlife. Endangered and threatened species in the region (Ref. 2-22) are the grizzly bear (Ursus arctos horribilis), Northern Rocky Mountain wolf (Canis lupus irremotus), black-footed ferret (Mustela nigripes), and the Artic greyling (Thymallus articus). The endangered grizzly bear (approximately 1000 left) is widely scattered in the more remote regions of the Rockies. The Northern Rocky Mountain wolf was thought completely extinct for several years. A small number of recent sightings have been made of the species in very remote regions of the Rockies. The ferret (see Section II.D.2.c) may be found in association with prairie dog colonies in the foothills of the Rockies. The Arctic greyling is a very uncommon fresh water fish with relict populations primarily in a number of lakes and streams in Montana. The Arctic greyling is neither rare nor endangered in Alaska.

4. Columbia Plateau

a. General

The Columbia Plateau is characterized by vast expanse of basaltic lava flows that were extruded over the surface at varying intervals during the Cenozoic. These basalts vary in thickness from several hundred feet to a thickness in excess of one mile (Ref. 2-10). Isolated groups of extinct volcanoes, ranging in age from early

Tertiary to late Pleistocene protrude above the basalts. Due to the general aridity, landforms common to most arid zones are found on the plateau. These landforms include ancient lake beds with palyas (the flat bottom of an undrained desert basin) at their lowest elevations, river gravels that have filled depressions, and slopes lacking in soil development. Of great agricultural value are the extensive glacial silt deposits. In these areas, particularly in the north, large volumes of wind-transported silt-size material of glacial origin have been overlaid on the basalt flows. These areas have produced exceptionally high quality agricultural soils where grains are the principal crops.

b. Climate

The climate of the Columbia Plateau is cool and semiarid. Winters are cold with an average January temperature of about 32° F. The winter temperatures generally are not as low as those further east in Montana, because the presence of the Cascades and Rocky Mountains tend to block continental polar air masses from effectively entering the region. Due to the plateau being on the leeward side of the Cascades, it receives an average annual precipitation of 10 inches, which is just about evenly distributed through the year. The average snowfall for most of the plateau is about two feet and the snow cover usually exceeds one inch for about 60 days a year. The mountains, of course, may have snow falls exceeding 100 inches.

c. Water Resources

The hydrology of the region is roughly characteristic of a semiarid environment. The rivers generally originate from outside the plateau in the surrounding mountains. However, the layered basalt has strongly influenced the hydrology. Generally lavas extruded on the surface are highly porous and as a result much of the winter precipitation rapidly infiltrates into the ground and ends up in the water table flowing laterally. This porosity naturally contributes to the aridity by essentially allowing the overlying soil to drain rapidly before the plants can effectively utilize it. This ground water eventually reaches an impermeable layer of dense basalt or some sedimentary rocks and begins to move with a stronger lateral component and eventually reappears as spring along the side of some river cut gorge. One such group of springs along a 40-mile stretch near Twin Falls discharges about 4,000,000 acre feet of water into the Snake River annually. Ground water movement along aquafirs is an important source of water to rivers such as the Snake and Columbia River passing through the region. On the whole, water quality, whether it be ground water from wells or waters from the river, is not of very high quality. They are hard, alkaline, calcium-magnesium bicarbonate waters. Dissolved solids range from 300 ppm to in excess of 500 ppm. Most of the wells in the area range from 100 to 500 feet deep and in the case of Idaho Falls, they are 1,600 feet deep, with an average of 300 ppm dissolved solids. Principal reservoirs in the region are Brownlee, Oxbow, Hells Canyon, High Mountain Sheet, Asotin, Little Goose, Ice Harbor and Dworshak, which are along the Snake River and its tributaries.

d. Regional Vegetation

The vegetation of the Columbia Plateau is varied and reflects the relative elevation, exposure, topography and available moisture. In general,though, it all reflects the semiarid environment which is a function of being on the lee side of the Cascades. On the isolated ranges and on the north and northeast slopes of volcanoes there are forest communities similar in zonation to those described for the Northern Rocky Mountain Region. In particular, the lower drier slopes are occupied by the Western Ponderosa Forest which appears to grade rapidly into the Grand Fir-Douglas Fir Forest. The two intermediate forest types (Douglas Fir Forest and Cedar-Hemlock-Pine Forest) are either missing or compressed into narrow, almost indistinguishable belts or zones. However, the forest vegetation types are more or less limited to the mountains. The rest of the Columbia Plateau is characterized by the Sagebrush Steppe which covers most of southern and southwestern Idaho and most of eastern Oregon, except for some restricted areas of Juniper Steppe Woodland on the east slope of the Cascades. The Wheatgrass-Bluegrass Formation is a fairly extensive area limited to an area north of the John Day Basin in the general vicinity of Walla Walla, Washington.

e. Soils

Soils of the Columbia Plateau, ranging from Sierozems (true desert soils) in the south to Chernozems at lower elevations, are poorly developed and characterized by light gray or brown colors and a thin organic surface horizon that is often discontinuous where vegetation is sparce. Generally these arid soils have a calcium carbonate layer within a foot of the surface and are often overlayed on footslopes with a rock or pebble layer called desert pavement, which limits their agricultural use to range grazing. In contrast, Sierozems developed on river terraces and flood plains along portions of the rivers, are excellent agricultural soils. In the north, the extensive glacial silt deposits are the parent material for the development of high quality Chernozems which are important soils for extensive dry farming of grains.

f. Wildlife

The wildlife of the Columbia Plateau which lies between the Cascades and the Rocky Mountains is less varied than these mountain regions, although many species overlap. Endangered and threatened wildlife in this region are the California bighorn (Ovis canadensis californiana) and the American peregrine falcon (Falco penegrinus anatum). (Ref. 2-22). The population of this bighorn sheep has decreased to less than 500, widely scattered in eastern Oregon and northeastern California. The peregrine falcon is a medium-sized hawk with long, pointed wings and a long tail. The population center of this widely scattered but rare bird is in interior Alaska.

5. Cascade Range

a. General

Geology of the central and southern Cascade Mountains is a fairly complex product of volcanism and regional uplift. It is a vast pile of volcanic rocks overlying a folded sedimentary basement rock. Since the Miocene period lava has been successively extruded over the surface, resulting in some areas in an accumulation in excess of two miles. The greater part of these volcanic rocks are either basalt or andisite. Of particular scenic value is Crater Lake National Park. The lake occupies the caldron of an ancient volcano which, after having suffered a series of severe eruptions, collapsed into itself.

b. Climate

The climate of the Cascade Mountains, like the Sierras to the south, is governed by the north-south orientation of the range. The west slope, or windward slope, catches most of the precipitation while the leeward slope receives considerably less. The actual precipitation and mean minimal temperatures for the Cascades at 1000 feet tend to hover around 25^{o} to 35^{o}F, which represents a fairly cool and wet climate where winter fires are a minimal threat.

c. Hydrology

As a result of high precipitation at even the low elevation of 1000 feet, the Cascades are formidable water sheds which provide year-round runoff to the Pacific Ocean. Because of the porosity of the basalts, a large portion of the snow melt infilitrates into the ground, recharging the water table. This recharging of the water table results in a reduced peak spring runoff and allows water to be available for stream flow into late summer and autumn.

d. Vegetation

The vegetation of the Cascade Mountains reflect the climate difference between the west slope and east slope by having the moisture-tolerant plant communities on the west slope and the arid-tolerant plant communities on the east slope. On the lower portions of the east slope is the Juniper Steppe woodland which is characterized by an open, scrub-like vegetation cover with scattered individual junipers ranging from 15 to 30 feet high. At higher elevations is the Ponderosa Shrub forest. At the highest elevations, where deep snow packs and constant winds restrict the distribution of forest cover, the alpine meadows and barrens are found characterized by grasses, sedges, and herbs.

On the west slope, which is characterized by high precipitation both winter and summer, the zonation of the vegetation is more highly developed. At the higher elevations (below the alpine meadows and barrens), the Fir-Hemlock forest formation is found; below that is the Silver Fir-Douglas Fir forest formation, and at the base of the west slope, the Cedar-Hemlock-Douglas Fir forest formation is prevalent.

e. Wildlife

The Cascades contain a great variety of wildlife which is a reflection of the varied habitat. The habitats of the region are typified by various evergreen forests. The only endangered species in this region is the American peregrin falcon (Falco peregrinus anatum). This is a medium-sized hawk with long, pointed wings and a long tail. Only a few scattered birds are found in the Cascades of Oregon and Washington. The population center is Alaska and North-western Canada (Ref. 2-22).

6. Pacific Border

a. General

The Pacific Border Region lies between the Cascade Mountains and the Pacific Ocean. It may be divided into two topographical and two vegetational units. The major divisions of the topography are the Willamette Valley, an area of negative relief running north-south for more than 150 miles; and the Oregon Coast Range, which is an area of mountainous terrain with few peaks over 4000 feet. In fact, much of the area in the Oregon Coast Range is a plateau, representing an erosion surface on a gently dipping strata.

The Willamette Valley, lying between the Cascade Mountains and the Oregon Coast Range, is best defined as a structural depression that is being filled by river deposits from the Cascade Mountains and the Oregon Coast Range. The meandering Willamette River and its tributaries flow northward through the valley, draining much of the west slope of the Cascade Mountains and the east slope of the Oregon Costal Range. Periodic flooding by these rivers has filled the valley with a fine grain sediment. The Oregon Coast Range is, in the simplest description, a gentle arch of sedimentary rock of 40 to 50 miles in width seperating the Williamette Valley from the Pacific Ocean.

b. Winter Climate and Water Resources

The winter climate of the Pacific Border is aptly described as cold and wet. The mean January temperature for the Portland area is 38.5° F and the mean precipitation is 5.4 inches. For Medford, the mean January temperature is 35.4°F and the mean precipitation is 3.3 inches. The product of such high values per month is a considerable discharge of both overland flow and ground water flow of water into the streams, which tend to be perennial. Water problems along the Pacific Border are related to flooding, and domestic and industrial pollution. The natural water quality of this region is ranked among the highest in the nation. Total dissolved solids are generally less than 100 ppm.

c. Vegetation

Three prominent vegetation formations exist along the Pacific Border from Eureka, California to Seattle, Washington. These are the Oregon Oakwoods, the Cedar-Hemlock-Douglas Fir forest, and the Spruce-Cedar-Hemlock Forest. Of the three types, the Oregon Oaks formation has the most limited distribution. It occupies the Willamette Valley between the Oregon Coastal Range and the Cascade Mountains. The other two formations are not as limited and are characteristic components over the entire region.

d. Wildlife

The wildlife of the Pacific Border Region is less varied than that of the Cascade Mountains although many of the species overlap. The single endangered mammal in this region is the Columbia white-tailed deer (Odocoileus virginianus leucurus). This is a medium-sized, white-tailed deer with small, erect antlers and long tail. This animal is near extinction. Remnant populations occur only in the Columbia River lowlands and a small area near Roseburg.

Numerous birds inhabit this region, including a number of gamebirds (mallards, grouse, quail, and pheasant). Endangered birds inhabiting this region are the California brown pelican (Pelecanus occidentalis californicus), Aleutian Canada goose (Branta canadesis leucoparia), and the American peregrine falcon (Falco peregrinus anatum). The brown pelican is a large dark gray-brown water bird with a bare skin pouch on the underside of its long bill It is seen on the Oregon Coast in the late summer and fall. The Aleutian Canada goose is a small brown and gray fowl. Of all the Canadian geese, it has the most pointed bill. This bird stops in the Williiamette Valley on its southward migration. See section II. C. 5. e. for the details of the peregrin falcon.

7. Land Use

a. The trajectories of the OBL missiles are over sparsely populated areas of Montana, Idaho, and Oregon. In addition, very small portions of California and Washington are under the flight paths for launches from some of the sites. The missile trajectories were selected to avoid all major and significant population areas. In the event of an aborted mission, the OBL range safety procedures are designed to avoid populated areas when initiating destruct of an errant missile (See Section I. C.)

b. Airways

Air traffic on the following airway/jet route segments is near the launch and drop areas.

ROUTE	AIRPORTS	PEAK FLOW 24 Hr.	PEAK FLOW Night
J-70/90	Mullan Pass-Lewiston	30	5
J-16	Pendleton-Whitehall	12	2
J-517	Boise-Spokane	16	2
V-253	Lewiston-McCall	10	1
V-187	Lewiston-Missoula	12	0
V-298	Pendleton-McCall	5	1

The remainder of the flight path does not affect airways since the missile is well above the atmosphere.

c. Land utilization for the five states which could potentially be impacted by the OBL program is summarized in Table 2-2. It should be noted that only small, sparsely populated portions of Washington and California will be under the flight paths. The figures presented in Table 2-2 are for entire states, and thus the percentages of undeveloped land for Washington and California would be much higher for the specific areas affected. For all the states of interest, the majority of the land is in farms, range or woodland. The use of farms by type is given in Table 2-3 for the five states. In Montana most of the farming is in livestock and grain (primarily wheat).

d. All five states have large timber reserves, with forestry being a significant segment of the economies. Most of this timber land will be blanketed with snow or will be very wet due to the winter rains (Oregon, northern California) during the planned

Table 2-2. LAND UTILIZATION BY STATE

STATE	Use of Land in Farms								Use of Land Not in Farms			Approximate Total Land Area
	Cropland				Forest & Woodland							
	Used for Crops	Soil Improvement Crop or Idle	Used only For Pasture	Open Permanent Pasture	Pastured	Not Pastured	Other Land	Total Land in Farms	Pasture and Range 1	Woodland and Forest Not Grazed 2	Other Land 3	
Montana	13,797* (14.8)**	833 (.09)	1,031 (1.1)	47,377 (50.8)	1,870 (2.0)	255 (0.3)	671 (0.7)	65,834 (70.6)	10,802 (11.6)	9,489 (10.2)	7,061 (7.6)	93,186
Idaho	4,920 (9.3)	366 (0.7)	696 (1.3)	7,434 (14.0)	1,138 (2.2)	255 (0.5)	493 (0.9)	15,302 (28.9)	21,376 (40.4)	9,957 (18.8)	6,278 (11.9)	52,913
Oregon	4,103 (6.7)	395 (0.6)	927 (1.5)	11,577 (18.8)	2,632 (4.3)	562 (0.9)	313 (0.5)	20,509 (33.3)	20,877 (33.9)	16,749 (27.2)	3,439 (5.6)	61,574
California	8,983 (9.0)	805 (0.8)	2,053 (2.0)	20,450 (20.4)	2,804 (2.8)	599 (0.6)	1,317 (1.3)	37,011 (36.9)	15,589 (15.6)	23,244 (24.2)	24,340 (24.3)	100,184
Washington	6,839 (16.0)	562 (1.3)	784 (1.8)	6,741 (15.8)	3,052 (7.2)	699 (1.6)	376 (0.9)	19,053 (44.6)	3,153 (7.4)	15,398 (36.1)	5,060 (11.9)	42,664

* 1000 acres

** Percent of total land area

1. Land used chiefly for grazing. Includes open or non-forested grazing land, forest and arid woodland grazed, and shrub and brush grazing land.

2. Excludes part of the forested areas in parks, wildlife refuges, military areas, recreation sites, and arid woodland, brushland, and forest land used for grazing.

3. Includes urban, industrial, and non-farm residential areas; parks and wildlife refugres, military lands and roads, railroads, ungrazed desert, rock, swamp, and miscellaneous other areas.

Table 2-3. FARMS, NUMBER AND TYPE BY STATE (1969).

State	All Farms	Total	Cash Grain	Cotton	Other Field Crops	Vege-table	Fruit and Nut	Dairy	Poultry	Live-stock[1]	General	Misc. Farms	With Sales Less than \$2500[2]
Montana	24,951	20,603 (82.6)	6,815 (27.3)	-- --	519 (2.1)	7 (0.1)	36 (0.1)	429 (1.7)	68 (0.3)	11,382 (45.6)	1,097 (4.4)	250 (1.0)	4,348 (17.4)
Idaho	25,475	19,505 (76.6)	3,236 (12.7)	-- --	2,420 (9.5)	130 (0.5)	204 (0.8)	3,288 (12.9)	97 (.4)	6,763 (26.5)	2,983 (11.8)	384 (1.5)	5,970 (23.4)
Oregon	29,063	17,003 (58.5)	1,678 (5.8)	-- --	645 (2.2)	756 (2.6)	2,466 (8.5)	1,542 (5.3)	390 (1.3)	5,929 (20.4)	2,359 (8.1)	1,238 (41.5)	12,060 (41.5)
California	77,875	54,040 (69.4)	2,679 (3.4)	1,450 (1.9)	704 (0.9)	2,262 (2.9)	23,713 (30.5)	3,872 (5.0)	2,048 (2.6)	9,288 (11.9)	3,878 (5.0)	4,146 (5.3)	23,835 (30.6)
Washington	34,033	21,788 (64.0)	4,553 (13.3)	-- --	903 (2.7)	967 (2.8)	4,266 (12.5)	2,545 (7.5)	447 (1.3)	4,986 (14.8)	2,086 (6.1)	1,035 (3.0)	12,245 (36.0)

[1] Excludes dairy and poultry farms; includes ranches.

[2] Includes farms with a value of farm products sold of \$50-\$2499, and a farm operator under 65 who did not work off farm more than 100 days, and part time, part retirement and abnormal farms.

winter launch of OBL. The possibility of fire under these fire out conditions is extremely remote.

e. Mineral and fossil fuel resources in estern Montana are extensive. They include copper deposits, oil and gas fields, and coal fields. Other mineral resources are silver, lead, zinc, manganese, gold, chromium, and iron as well as commerically mined granite, marble and other stone.

f. Historical places and landmarks are widely scattered throughout the five states. No impact on these sites is expected as a result of a normal launch.

g. Portions of the land in the five states are federally owned. Included are national forests, national parks, national wildlife refuges and federal Indian reservations.

III. PROBABLE ENVIRONMENTAL IMPACT

This section of the environmental statement for GIANT PATRIOT discusses the probable effects of major factors related directly to the pre-and post-launch activities and environmental phenomena of the MINUTEMAN II launch from Malmstrom AFB. Topics included are:

A. Support Facilities and construction
B. Missile exhaust
C. Missile noise
D. Missile debris
E. Fire probability
F. Water pollution
G. Socio-economic factors
H. Effect on Air Transportation
I. Effect on Historic Sites
J. Effect on Canton Island

Each area is treated in detail to provide the reader with suffi cient technical information on what is relevant to the launch and also to the environment. Questions addressed in this section relate to both short and long term environmental factors concerning the launch. Safety and hazard analyses were addressed in Sections I. C and I. D.

A. SUPPORT FACILITIES AND CONSTRUCTION

1. Construction

Construction at GIANT PATRIOT support site facilities and communications will consist of preparing gravel roads, erecting a temporary building, addition of power lines, and telephone cable-laying activities. The construction activities are expected to be short term and affect the environment only in a limited and temporary manner. All construction facilities will be used only for the duration of the testing. Following the testing, the land will be restored to its original condition, or facilities may be left if agreeable to the Air Force and the landowners. The types of construction contemplated for the GIANT PATRIOT program will produce no atmospheric or water pollutants. The activity for construction is expected to be dispersed over a wide geographic area in the state of Montana consisting of small number of construction crews involved in road extension, grading of selected sites, a temporary building and installation of power and telephone cable. The construction activity expected can be compared to that of a small housing or ranching development in the area. Minimal modification of the visual environment is expected. Activities will be planned to avoid the disturbance of trees, wildlife, or man.

2. Support Site Preparation, Roads, and Land Use

There are seven support sites for the GIANT PATRIOT Program. These sites will contain only temporary construction which will be above ground and will consist of the following: (See Figure 3-1).

a. Command Control Area

(1) The Benton Bench area has been selected as the Command Control Area (CCA) for the S-40 launch. Benton Bench is located in Township 28N Range 4W of the northwest quarter of Section 23 in Pondera County, Montana. The area required for construction is a rectangular plot approximately 10 miles from the S-40 launch area. The Benton Bench area was selected because no other terrain prominence was close enough to the selected launch facilities to satisfy all requirements for range safety. This area was also the only one surveyed which provided for line of sight communications to the S-40 launch facility. Access to Benton Bench requires no new major road construction as a well-traveled gravel road exists between the site and Conrad, Montana. Total road construction will be one quarter mile of gravel road.

(2) Shaw Butte was selected as the CCA for flights from G-3, G-4 and G-5. This area was selected because of range safety requirements and because it minimizes the requirement for new road construction to the site. All other favorable areas were eliminated because of their physical inaccessibility or because they were virgin territory. Shaw Butte is located in Township 20N Range 2W of the east one-half of Section 27 in the county of Cascade, Montana and is owned by the Burlington and Northern Railroad which has granted formal access to the site. Access to the Shaw Butte area is via gravel road by Seaton Ranch to a field road recently improved for the construction of a railroad repeater station. It has been determined

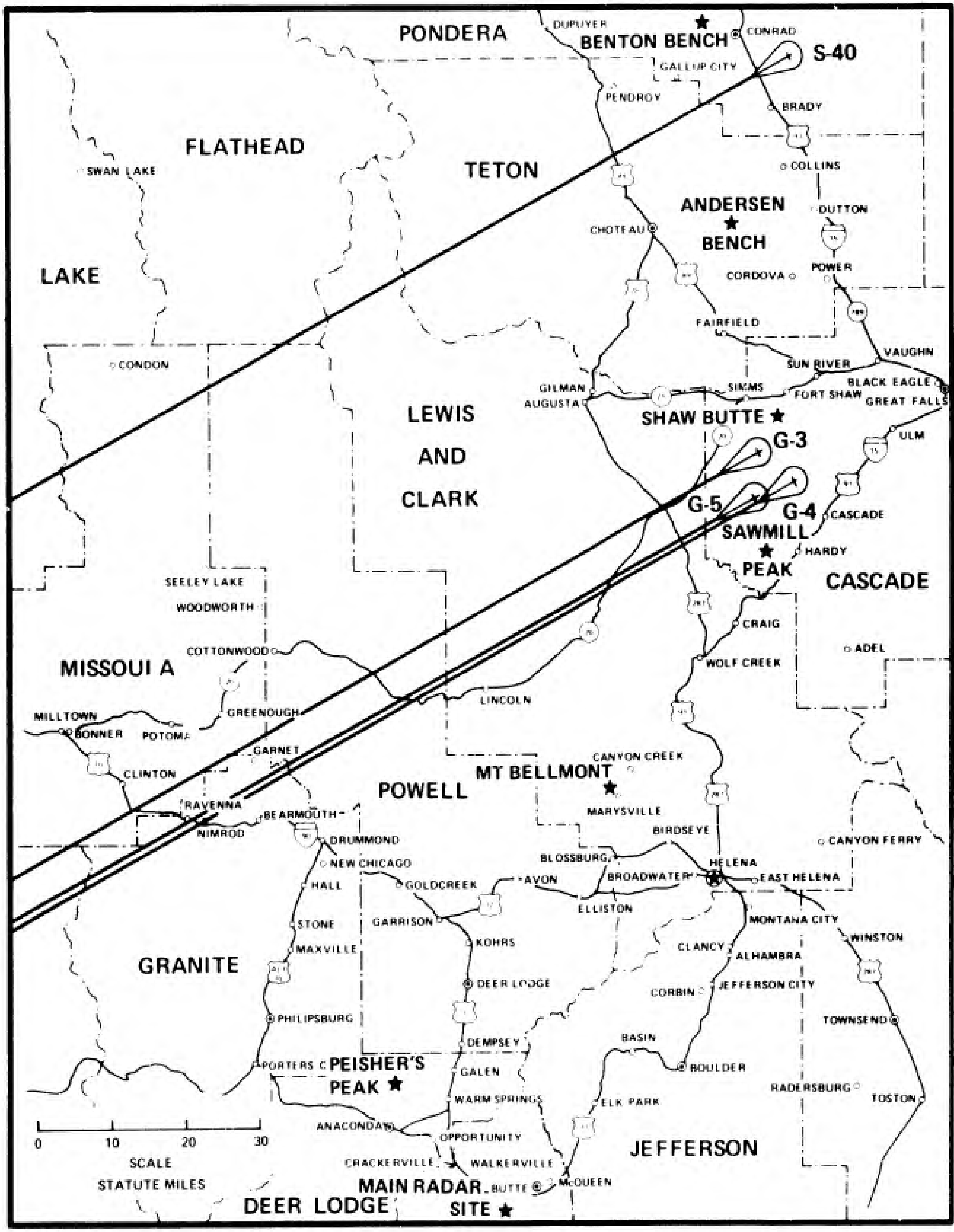


Figure 3-1. SUPPORT SITES FOR GIANT PATRIOT LAUNCHES

that some rerouting and fill-in construction is required here, but no major effort will be necessary. Road construction will consist of upgrading a gravel road approximately four miles in length. Two 12-inch thick concrete pads will be poured and two 20-foot-by-40-foot one story buildings constructed on the site. The total area required will be approximately 150 feet by 400 feet. An area for a helicopter landing pad will be marked out.

(3) For both Command Control sites, land use requirements will consist of a graveled 2,500-square-yard parking area, and lighting as required on a 10-acre easement. Roads must be capable of supporting a 16,000-pound axle load. Total easement required is 250,000 square feet.

b. Main Radar Site

(1) Butte, Montana has been selected as the main site for the MPS-36 radars. The area is approximately four miles from downtown Butte and is located in Township 3N R 8W in the southwest quarter of Section 33 in Silver Bow County, Montana. Some road construction will be required on the last 1.5 miles of access. The area has power and telephone lines nearby, although extension of power lines approximately one to 1.5 miles will be required.

(2) Construction will consist of a gravel access road capable of supporting a 16,000-pound axle load, a graveled parking area for 25 vehicles, 500-square yard trailer park for seven trailers, a 2500-square foot helicopter landing area, and construction of four buildings. The total easement required is 250,000 square feet.

(3) The Butte, Montana location was selected because it satisfied range safety requirements to allow acceptable aspect angles for tracking and command from launch through third stage termination. The Butte location was also selected on the basis of favorable conditions existing for microwave repeater installations.

c. Microwave Repeater Locations

(1) Four microwave repeater sites have been selected based upon range safety criteria and accessibility via public and private roads. The sites are as follows:

(a) Anderson Bench, located in Township 24N Range 3W of Section 25 in Teton County. A helicopter landing area will be produced by marking a 100-foot-by-100-foot area.

(b) Sawmill Peak located in Township 17N Range 2W on the line between Sections 8 and 17 in Cascade County. The area required will be 100-feet-by-300-feet.

(c) Mt. Bellmont, located in Township 12N Range 6W of the southeast one-quarter of Section 34 in Lewis & Clark county. The land area requirements are a 100-foot-by-300-foot area plus an additional 60-foot area for a helicopter pad.

(d) A peak recently named "Peisher s Peak", five miles north of Anaconda located in Township 5N Range 11W one quarter of Section 11 of Deer Lodge County. Land area requirements are 125 feet by 350 feet.

(2) Minimal construction will be necessary at these sites because equipment will rest on 8-foot-by-8-foot pallets. Construction of a fuel shelter is required on each microwave site. In addition, a life support system is required at each site (possibly a camper-type unit). Land area requirements are different for each microwave repeater site because of differences in the terrain at each site.

3. <u>Real Estate Requirements</u>

a. Real Estate interests will be required to support the roads, site preparation, and launch conduct. Launch operations will necessitate evacuation of people from a defined area and placement of certain instruments, such as cameras and electronics equipment at various locations around the sites. Although the actual use of land areas will be of short duration, the Air Force must have access for a longer period of time to permit placement of equipment, deployment of personnel and restoration of the premises if and as required.

b. In order to determine the specific missile sites for OBL, a right-of-entry was needed for an on-site survey. Various missile sites were selected as prime candidates for this test program. The right-of-entry onto lands adjacent to these sites has been negotiated with landowners of property surveyed.

c. The acquisition of leasehold estates have been identified.

(1) The launch site areas to be evacuated during launch are shown on Figures 1-24 and 1-25. The areas are approximately 1.8 by 6 miles surrounding each launch facility selected (G-3, G-4, G-5, S-40).

(2) In addition to the above, leaseholds estates will be established for the instrumentation sites identified in III.A.2.

d. The Seattle District Engineer will acquire a leasehold interest over the areas described above, including the area to be designated for an observation site. The lease should cover a period of five years from 1 May 1974 and provide for termination upon thirty-days written notice. If a portion of an ownership is contained within the area required, it is suggested that the Corps of Engineers take a lease over the entire ownership. Leases should be acquired subject to the restoration of the property or payment of damages in lieu of restoration. The leases to be acquired will authorize the Air Force to:

(1) Locate and operate vehicles, vans, cameras, auxiliary power units, electrical equipment, temporary communications and electrical power conduit on the land.

(2) Transverse the area for the purpose of notifying occupants to evacuate the area, assure areas have been evacuated, and for traveling to and from equipment locations. (See Section G)

(3) Require evacuations or prohibit entry upon the land for a one-time period not to exceed 12 hours after having given 24 hours notice to evacuate. During this period, the lessor will not be permitted upon the land unless he is accompanied by a Government representative.

(4) Enter upon the land to assist with evacuation and to recover any possible missile debris.

4. Communications Construction

a. Communication construction will require right of way clearing, cable laying, telephone poles, etc., which could have an impact on the area environment. However, removal and restoration of the communication facilities will be accomplished at the direction of individual landowners who will be given the option of retaining these equipments if so desired. Restoration of the visual environment can be accomplished with a minimum of effort. Previous Air Force projects have established a precedent whereby temporary communications construction by the Government has been directed to use by the local landowners following completion of the projects. This action has saved considerable construction costs to the landowners for private telephone service. In those instances where communications facilities were abandoned, there are usually no visible above-ground remnants to disturb the environment. All communications procured by the Strategic Air Command will be leased from the commercial telephone company that is currently franchised in that specific area selected for OBL.

b. The only impact that communications construction could have on the environment would be the outright abandonment of buried telephone cable and/or above ground telephone poles and open wire. The abandonment of buried cable would have no impact on the environment. The telephone companies will not be allowed to abandon above-ground telephone facilities.

5. Evaluation of GIANT PATRIOT Construction Requirements

a. Short term effects - Construction at GIANT PATRIOT support sites will have a minor impact on specific designated areas. Small construction crews will extend roads, erect a temporary building, and extend telephone and power lines. These facilities will be used only for the duration of the testing.

b. Long term effects - Because all constructed facilities will either be removed following testing or turned over to land owners, no adverse long term effects on the environment are projected. The Air Force will restore all areas to their original condition. The only possible long term effects would be some benefit to a few local landowners if facilities are to be retained after conclusion of the tests.

B. MISSILE EXHAUST

1. General

a. This section discusses the probable environmental impact due to exhaust from the MINUTEMAN II missile. The two cases treated are 1) normal launch and 2) worst case destruct situation. The normal launch evaluation assumes a successful launch and considers any environmental effects resulting from the complete ignition through exit from the atmosphere period. The worst case assumes an immediate destruct and complete burn at the launch facility. While the assumed worst case certainly presents the highest potential for problems from missile exhaust, it is improbable due to extremely high missile reliability in the early (i.e., 0-25 seconds) part of flight. In the SAC Operational Test Program from Vandenberg, there have been 63 MINUTEMAN II and 29 MINUTEMAN III launches to date with zero failures through the first 25 seconds of flight. (Missile reliability is high throughout the flight. The data is given through 25 seconds to show that the missile is well beyond launch area environmental problems.)

b. The normal case was treated as follows:

(1) Ignition of the first stage will create a ground cloud of exhaust gases during the time that the missile is building thrust and leaving the immediate launch facility area. Conservative assumptions were made regarding the amount of exhaust entered into the ground cloud and the height of rise of the cloud.

(2) Based on expected worst case meteorological data, the ground cloud pollutant concentrations and predicted ground level concentration resulting from dispersion of the ground cloud were computed and found to be less than applicable standards.

(3) After the missile leaves the ground cloud, the calculated pollutant emission weight per unit length of the trajectory is so small that no appreciable atmospheric concentrations can be produced.

(4) Potential for scavenging, fumigation, and effects on the upper atmosphere were considered and shown to result in the little or no possibility of impact on the environment.

c. Evaluations of the worst possible impact on the environment due to missile exhaust were performed as follows:

(1) The worst possible accident (from the standpoint of missile exhaust) was postulated to be a destruct almost immediately after launch so that all propellant would be consumed in the local area surrounding the launch facility.

(2) Computation of the weight of pollutants produced, modelling dispersion under worst expected meteorological conditions and conservative cloud rise assumptions, and prediction of pollutant concentrations as a function or distance from the launch site were performed.

(3) The predicted atmospheric levels were compared with standards for short term public exposure and the results showed that even under the worst case conditions public limits were not exceeded outside of the evacuation area. (If Air Force range safety personnel are required within the launch evacuation area, they will be issued appropriate equipment for protection.)

d. The remainder of this section presents the detailed evaluation of the probable effects of missile exhaust on the environment.

2. Source and Nature

a. The solid rocket motors used in the MINUTEMAN II emit three materials of concern into the lower atmosphere. These are hydrogen chloride (HCl), carbon monoxide (CO) and aluminum oxide (Al_2O_3). The two gaseous materials are potentially toxic while the Al_2O_3 is in particulate form and is a nuisance dust. Knowledge of the detailed combustion species of the rocket exhaust gases is largely based on thermochemical calculations which were validated by comparing the dynamics of the gas flow with the actually measured engine thrust.

In addition, lab tests have been conducted at the Air Force Rocket Propulsion Laboratory. Products of combustion exhausted at the rocket nozzle exit plane include compounds or molecular fragments which are not stable at ambient conditions and/or which react with the abundant oxygen in the ambient atmosphere in a post-burning process leaving only those products indicated in Table 3-1 in significant quantities.

b. Of the major detectable exhaust products, aluminum oxide (Al_2O_3), carbon monoxide (CO), and hydrogen chloride (HCl), are recognized as air pollutants presenting a potential hazard in the lower atmosphere depending on their concentrations. As the result of some observations and analyses, it is anticipated that CO generated by the MINUTEMAN II will oxidize to CO_2 due to the initial high temperature of the CO and the abundant presence of oxygen in the lower atmosphere (Ref. 3-1). However, for conservatism CO will be treated in the following discussions as if it did not oxidize in the post burning process.

c. Aluminum oxide (Al_2O_3), which is in the form of particulates having a mean size of 10 microns, is classified as a nuisance dust by the American Conference of Governmental Industrial Hygienists. Nuisance dusts are those which have a long history of little or no adverse effect on lungs and do not produce significant organic disease or toxic effect when exposure is kept under reasonable control; however, any dust may cause some cellular response in the lungs when inhaled in gross amounts. In the case of nuisance dusts, there is no impairment of lung passages, no significant scar tissues are formed, and any tissue reaction is reversible. Concentrations of Al_2O_3 high enough to cause cellular response are not expected to occur.

d. Guidelines developed for general public exposure to HCl by the National Academy of Sciences/National Research Council indicate it has been reported in the United States that the odor threshold for HCl is between 1 and 10 ppm, and that concentrations greater than 5 to 10 ppm are disagreeable or irritating. Concentration and exposure criteria have been established to preclude any irreversible physiological effects or injuries to man. It is recognized that formation of acid mist or rain resulting from natural clouds in the atmosphere containing HCl concentration may produce spotting on vegetation.

Table 3-1. COMBUSTION PRODUCTS FROM MINUTEMAN II

a. Total Weight of Combustion Products by Stage

Combustion Products	Stage I		Stage II		Stage III	
Total Weight	45,879 lbs.		13,745 lbs.		3,655 lb.	
Composition	weight %	weight (lbs.)	weight %	weight (lbs.)	weight %	weight (lbs.)
CO	24.16	11084	21.48	2952	35.76	1307
CO_2	3.60	1652	4.32	594	3.12	114
Cl	0.13	60	0.32	44	0.06	2
HCl	21.43	9832	22.28	3062	3.28	120
H	0.01	4	0.02	3	0.02	1
H_2	2.07	950	1.87	257	1.71	62
H_2O	9.52	4368	12.58	1729	4.90	179
N_2	8.76	4019	8.75	1203	13.71	501
Al_2O_3	30.32	13910	28.38	3901	37.42	1368
OH	---	---	---	---	0.02	1
Total	100.00	45879	100.00	13745	100.00	3655

b. Total Weight of Principal Emissions vs. Altitude

Altitude* Region (ft.)	Total Combustion Products (lbs.)	Principal Emissions (lbs.)		
		HCl	CO	Al_2O_3
Surface-2,000 ft.	7333	1571	1771	2223
2,000-10,000 ft.	8583	1839	2074	2602
10,000-50,000 ft.	19249	4125	4650	5836
50,000-761,760 ft.	28114	5479	6848	8518
Total	63279	13014	15343	19179

*Altitudes are given above surface at launch site

e. In the upper atmosphere, the effc water vapor, carbon dioxide, and hydrogen chloride from the er e exhaust may be of concern due to the low natural concentration of these materials. The possible influence on the earth's heat balance or ozone and electron concentrations is of interest and is considered.

f. In the event of a vehicle failure in flight, or a commanded vehicle destruct, the sudden reduction in chamber pressure caused by rupturing solid rocket motor cases will probably extinquish some of the propellant. It is felt that 90% of the propellant would burn.

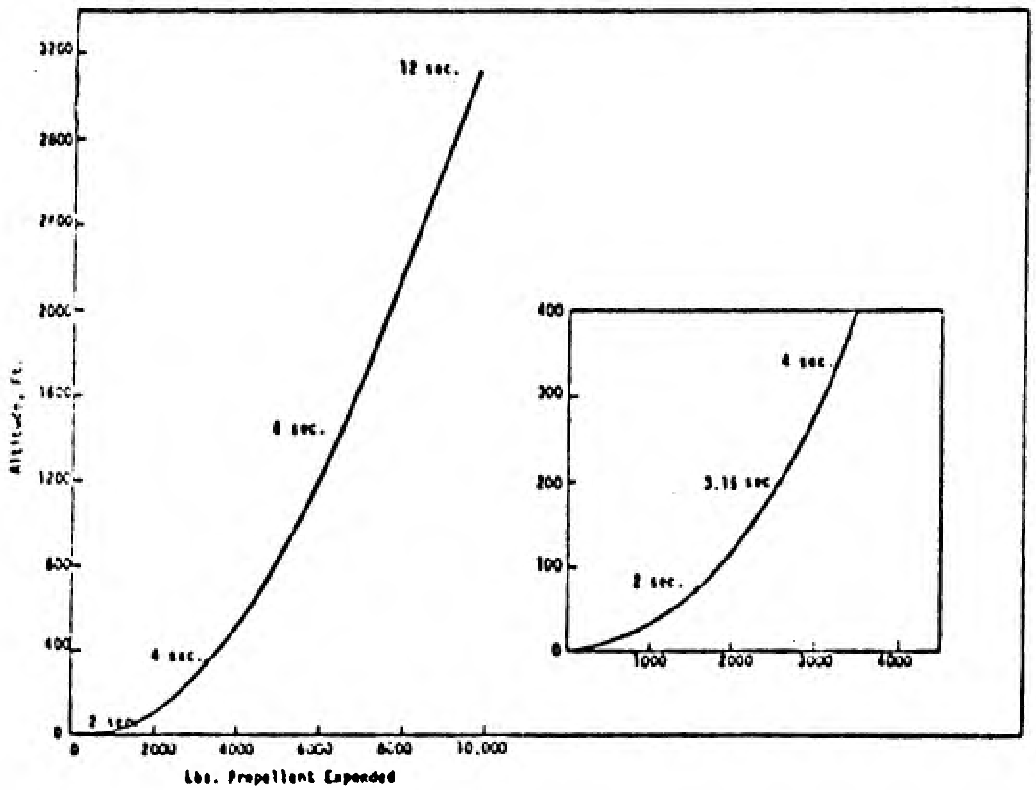


Figure 3-2. ALTITUDE VS FUEL EXPENDITURE FOR MINUTEMAN II

g. The amount of pollutant injected into a layer is estimated from the curve of altitude vs. fuel expenditure (Figure 3-2) and the assumed composition of exhaust gases given in Table 3-1.

h. The model used to analyze the data for this report was model 3 of the NASA/MSFC Multilayer Diffusion Models. Similar models were used to calculate the missile exhaust emissions in the USAF Space Launch Vehicles Environmental Statement. The results for TITAN III C and D and the SCOUT missile are presented along with the MINUTEMAN II data to expand the data base that can be used to determine the impact on the atmosphere. The MINUTEMAN II missile is twice as large as the SCOUT and approximately 1/14 as large as the solid portion of TITAN III C and D.

3. Short Term Exposures of the Public to Air Pollutants

a. Background

(1) The continuing introduction of chemicals into channels of distribution for industrial, military, space exploration, and various other applications creates the possibility of relatively brief exposures of both occupational and non-occupational groups cf people to air pollution from such chemicals.

(2) Such occupational exposures were the subject of a report issued in 1964 by the Committee on Toxicology of the National Academy of Sciences National Research Council titled "Basis for Establishing Emergency Inhalation Exposure Limits Applicable to Military and Space Chemicals." It was prepared at the request of the federal agencies sponsoring the Committee and its Advisory Center on Toxicology to meet a need of their civilian or military personnel who might briefly be exposed to atmospheric pollutants arising from the federal facilities. The report dealt only in general terms with possible similar exposures.

(3) The Clean Air Act as amended in 1970 places responsibility for public exposures to air pollutants with the Commissioner of the Air Pollution Control Office of the Environmental Protection Agency. Under Contract No. CPA 70-57 the Air Pollution Control Office of the Environmental Protection Agency requested the National Academy of Sciences, Advisory Center of Toxicology to provide guidance on establishing standards for various pollutants occasionally released for short periods of time into the atmosphere. Their recommendations served as the basis for a series of "Guides for Short-Term

Exposures of the Public to Air Pollutants." They also established the terminology Short Term Public Limits and Public Exposure Limits.

b. Short Term Public Limits (STPL)

(1) Short Term Public Limits (STPL) are used as criteria when assessing predictable excursions arising from single or occasionally repeated events. These would apply during normal launch events. See Table 3-2.

(2) The STPLs for HCl and CO are time-weighted averages not considered to present any health hazard. It should be recognized that excursions above these levels for HCl are likely to produce objectionable odors and/or irritations. The concept of time-weighted averages allows excursions above the level; however, the degree of permissible excursion is related to a number of factors, such as the nature of the contaminant, whether the effects are cumulative, whether acute poisoning will result, the frequency of excursion, and the duration of such excursions. These factors were evaluated by the Systems Command Surgeon for the Space Launch Vehicles environmental statement and an allowable excursion factor of 2 was established for HCl.

c. Public Emergency Limits (PEL)

(1) Public Emergency Limits (PEL) are emergency exposure limits for the public during situations in which pollutants escape in an uncontrolled manner at unpredicated times and places as a result of accidents, such as in transportation, fires, launch aborts, etc. Although under optimum conditions the STPLs require there be no adverse health effects, the PELs recognize the possibility of some temporary discomfort, provided, of course, that the effect is reversible and that no serious sequels result from it.

(2) The impact of the PELs for HCl is felt to be no more than strong odor, or at the most, slight irritation of the mucous membranes. Although the National Academy of Sciences "Guide for HCl" did not specifically establish the PELs for HCl as time-weighted averages, current sampling and analysis methods do not permit the determination of instantaneous peak concentrations. Sampling procedures after a 10-minute time period would, in essence, reflect the 10-

Table 3-2. CONCENTRATIONS AND EXPOSURE CRITERIA FOR POTENTIALLY HAZARDOUS COMBUSTION AND PROPELLANTS

	Criteria for Controlled Population	Criteria for Uncontrolled Population		
Material	Suggested Short Term Emergency Limit (a)	Short Term Public Limit (b)	Threshold Limit (f)	Public Emergency Limit(c)
HCl	30 ppm, 10 min.	4 ppm, 10 min	5 ppm	7 ppm, 10 min(d)
	20 ppm, 30 min.	2 ppm, 30 min		3 ppm, 30 min.
		2 ppm, 60 min		3 ppm, 60 min.
Al_2O_3		(g)	$10 mg/m^3$	(g)
CO	200 ppm, 1 hr	90 ppm, 10 min	50 ppm	275 ppm, 10 min (e)
		35 ppm, 30 min.		100 ppm, 30 min.
		25 ppm, 60 min.		60 ppm, 60 min.
		15 ppm, 4-5 hr/day 3-4 days/mo		

NOTES:

(a) Reference 3-2

(b) Short Term Public Limit (STPL), as explained in the text, applicable during launch operations.

(c) Public Emergency Limit (PEL), as explained in the text, applicable during unexpected releases (accidents).

(d) Reference 3-2.

(e) Reference 3-4

(f) Threshold Limit Values (TLV) are time-weighted concentrations for 7 or 8-hour work days and a 40-hour week. TLV's are thought to be conservative for short duration exposure of controlled populations for relatively infrequent normal operations. "Threshold Limit Values of Airborne Contaminants and Physical Agents With Intended Changes," American Conference of Governmental Industrial Hygenists, 1973.

(g) See National Air Quality Standard to CFR 50.8

minute time-weighted average. For conservatism, the permitted excursion of concentration is limited to a factor of 2.

(3) The PELs for CO are recommended as "Ceiling Limits" in order to prevent the carboxy hemoglobin (COHb) levels from exceeding 5% in persons engaged in "light work" and 6% in persons engaged in "heavy work." Persons at rest would be expected to never exceed 3% COHb during exposure to the PEL concentrations for the times given. A margin of safety may be assumed in the CO PELs only insofar as one would not expect a person having myocardial difficulties, such as recurring angina, to participate in "light work" for durations of time that could precipitate anginal pains even in the absence of CO.

4. Hydrogen Chloride Background

a. As developed in the foregoing section, hydrogen chloride (HCl) is one of the solid rocket motor constituents available in quantities great enough to be significant to the environment. Each MINUTEMAN II has approximately 63,280 pounds of solid propellant aboard. By comparison, each TITAN III C and D vehicle has approximately 850,000 pounds of solid propellant aboard. Approximately 21% of the solid propellant weight is emitted through the exhaust nozzle as HCl.

b. Prior to the first flight of the TITAN III C from Cape Kennedy in 1965, the potential hazard of HCl in the atmosphere was evaluated (Ref. 3-6). Because of the high sensible energy in the exhaust of rocket engines, the exhaust clouds have been observed to rise rapidly. The gases soon reach thermal equilibrium with the atmosphere and diffusion begins. Using weather parameters typical of Cape Kennedy, it was concluded there would be no ground level hazard from HCl off base. Based on this rationale, and conditional on the results of monitoring the first three launches, the initial vehicle was cleared for flight. Experience has demonstrated the validity of the HCl hazard assessment for the TITAN III C at Cape Kennedy. There have been 18 TITAN III C launches through 1972 from the Cape and in no case has there been an HCl toxic hazard observed at ground level. At least eleven of these launches have been monitored and in no case has HCl been detected at ground level except within the exhaust ground cloud in the immediate vicinity of the launch complex (Ref. 3-9).

c. When operations of the TITAN III D were planned for Vandenberg, a question arose as to the applicability of the rationale developed for Florida to the Vandenberg area. The major differences prompting this question were those of climatology and of separation distances from the launch pad to uncontrolled population. A joint Air Force/Aerospace Corporation HCl Working Group was established in October 1968, with a primary goal of determining the magnitude of the HCl toxic hazard. Two independent concurrent studies, References 3-8 and 3-9, were initiated by members of the HCl Working Group to assess the HCl hazard following launch activity at Vandenberg AFB. There was good agreement between both studies as to the anticipated downwind HCl concentrations following a TITAN III D launch or abort. In addition, the work conducted by the GCA Corporation provided mathematical modeling of atmospheric mixing processes which permits near real-time prediction of the rate of dissipation of HCl in the atmosphere.

d. Throughout this environmental statement emphasis is placed on the effect of HCl on man. It is recognized that vegetation and wildlife may react adversely to high concentrations of HCl. However, several studies, as summarized in Reference 3-3, indicate that HCl presents little hazard to plants when compared to other phytotoxic air pollutants and animals should not experience irritation in excess to that experienced by man at similar concentrations. On this basis, the criteria for man are used as a guide to safeguarding the total environment.

e. Since the inception of the MINUTEMAN program, hundreds of MINUTEMAN missiles have been launched from Vandenberg AFB. None of these launches have had any known effect on the animals or plants around the launch facilities. Small amounts of HCl have been detected in the silo area immediately after launch.

f. Present plans call for evacuation of all people within a 1.8 mile radius of the proposed launch facility for blast safety.

g. Air Sampling Programs

(1) Air samples have been taken during MINUTEMAN II, MINUTEMAN III, TITAN III C and D programs to

monitor the presence of HCl in the lower atmosphere. Both ground-based and airborne chemical air samplers have been employed. At present no really accurate HCl sampling method exists.

(2) To verify diffusion theories and assumptions, it has been of interest to know the concentration of HCl within the exhaust ground cloud. Several attempts have been made to obtain air samples by penetrating the exhaust cloud with aircraft equipped with air sampling equipment. Penetration into a TITAN III C exhaust ground cloud approximately 30 minutes after launch yielded a measurement of 0.5 ppm indicating that either effective diffusion or poor sampling had occurred from the assumed initial condition of approximately 100 ppm concentration of HCl at 2 minutes after launch. A TITAN IIID launch at Vandenberg was monitored and the exhaust ground cloud was penetrated at a time when a concentration of 20.5 ppm of HCl was expected; the measured value was 9.66 ppm. The third exhaust cloud penetrated was from a 7-segment solid rocket motor test fired at Coyote Pass. At the time of the aircraft penetration, United Technology Center (UTC) estimated that a mean concentration of 23 ppm was expected; the measured value was 10.6 ppm. In the case of the TITAN IIID launch and the test firing at Coyote Pass, additional penetrations were made into the exhaust cloud at intervals following ignition. In these two cases, the measured concentration of HCl has been approximately half that expected. A portion of this difference can be explained by a known error in sampling technique which accounts for about 15% of that difference. The remaining is suspected to be due to loss of HCl from the sample by absorption on the walls of the bubbler inlet probe.

(3) At Cape Kennedy, at least eleven of the TITAN IIIC launches have been monitored with ground based samplers (Ref. 3-7). In accordance with diffusion predictions, it appears possible that the samplers placed downwind of the launch pad were not in the proper location to have measured HCl returning to the ground. On the other hand, it has never been reported that anyone has seen the exhaust ground cloud return to ground level. Also, it is not known if HCl is only in the visual portion of the cloud. In any event, eighteen launches of TITAN IIIC and D from Cape Kennedy have been incident free with respect to HCl. Several hundred launches of MINUTEMAN II have been made from Vandenberg AFB with no incident.

(4) At Vandenberg, four TITAN IIID vehicles have been launched. For the first launch, approximately 85 chemical air samplers were deployed at ground level downwind of the launch pad at distances ranging up to 21 km (13.5 miles). Even though the exhaust cloud passed directly overhead of some of the sampling stations during the first launch, there was no HCl detected at ground level. This is consistent with meteorological data which indicated the exhaust ground cloud was within the inversion layer and with observations that the exhaust ground cloud did not return to the ground (Ref. 3-24 and 3-25).

(5) During the second, third and fourth TITAN IIID launches at VAFB, extensive exhaust cloud monitoring has been continued. Extensive photographic coverage of the exhaust ground cloud both from the ground and the air has also been accomplished. Data from the second launch were released during August 1972 (Ref. 3-26, 3-27, 3-28, and 3-29). These documents indicate that as in the case of the first launch, the volumetric prediction model, used to estimate ground level HCl concentrations, yielded conservative predictions. Again, the exhaust ground cloud was contained within the inversion layer and the cloud was not observed to touch down on any land areas. Data from the third and fourth TITAN IIID launches was not available.

(6) In the development of atmospheric diffusion theory and modeling, the temperature of the materials of interest has generally been relatively low and the effect of molecular diffusion and chemical reactions with the atmosphere has been neglected because of its insignificant contribution to the diffusion process. However, in the case of rocket engines where the exhaust temperature is high, it has been suggested (Ref. 3-26) that molecular diffusion and the chemical process may have an effect worthy of consideration. Research on HCl reactions in the atmosphere is currently being conducted by the Naval Weapons Laboratory at China Lake.

5. Launch Analysis (Volumetric Method)

a. In a normal launch, exhaust products are distributed along the trajectory path. Due to the rate of accelerations of the vehicle and the staging processes, the quantities of exhaust gas emitted per unit length of the trajectory are greatest at ground level and decrease continuously. In a practical sense, the relatively large quantity of exhaust gases in the first 2,000 feet of the atmosphere is most likely to be detectable. It has been observed from many launches that the portion of the exhaust plume that persists for more than a few minutes is that portion emitted during the first few seconds after ignition and which is concentrated in the pad area and referred to as the ground cloud. Because the ground cloud does persist over a period ranging from a few minutes to many minutes, the rate of dilution of that cloud is important to ground level concentrations.

b. The second stage of mixing of an exhaust ground cloud into the atmosphere takes place at the end of the ground cloud formation. At this time, approximately two minutes after launch, a cloud of finite size exists in the atmosphere and the predominant forces effecting further mixing are those imparted by natural atmospheric motions. The size of the initial exhaust ground cloud establishes the initial source strength (Ref. 3-12). Further diffusion of this exhaust ground cloud has been modeled as the result of many empirical analyses (Ref. 3-8, 3-9, and 3-13). Such models treat elevated finite sources as if they had emanated instantaneously from a virtual point source upwind of the actual launch. Mathematical models have been constructed which estimate the peak on-axis ground level concentration and exposure which may be expected as the ground cloud diffuses. The rate of diffusion of the exhaust ground cloud is obviously dependent on the rate of diffusion of the exhaust ground cloud and is obviously dependent on the rate of its growth in volume. Relating normally measured weather parameters to the rate of growth of the cloud dimensions is the key to predicting diffusion. Prediction techniques for use in the field were provided by the GCA Corporation, Ref. 3-9, and amended by the Aerospace Corporation, and have been demonstrated to be a conservative technique for estimating the growth behavior of the exhaust ground cloud. These processes are applicable to all of the materials in the exhaust cloud.

c. The diffusion model that is being used to calculate peak ground level concentrations assumes an instantaneous elevated volume source. The vertical distribution of the exhaust products was initially assumed to be Gaussian about the actual stabilized height of the exhaust ground cloud to permit calculations of the weight of HCl contained in the portion of the exhaust ground cloud within the surface mixing layer. The model required then an effective source height for the HCl be determined. A spherical cloud with a trivariate Gaussian distribution of the material within the mixing layer was assumed to be centered at the effective height.

d. Using conservative weather parameters and the expected performance and trajectory of the TITAN IIIC and D and the SCOUT vehicles, analytical predictions of the peak ground level concentration of HCl were calculated. These predictions are presented in Figure 3-3 and were prepared using techniques described in Ref. 3-8, 3-9, and 3-13. Data for MINUTEMAN II was run using the multilayer model, but is presented for comparison, even though the volumetric model was used for the TITAN IIIC and D, and SCOUT vehicle. The MINUTEMAN II missile is twice as large as the SCOUT and about 1/14 the size of the TITAN solid portion. The values presented in Figure 3-3 are absolute peak concentrations for HCl. The values presented in Figure 3-4 are absolute peak concentrations for CO, while the values presented in Figure 3-5 are the absolute peak concentrations for Al_2O_3.

6. Launch Analysis (Multilayer Method)

a. The volumetric diffusion model, which is being used routinely by USAF to evaluate HCl ground-level peak concentrations, is a simple model easily applied in the field which yields conservative predictions. Newer diffusion modeling techniques are considerably more sophisticated and permit what may be a more realistic treatment of the initial exhaust ground cloud geometry. The vertical distribution of HCl is again assumed to be Gaussian about the actual exhaust ground cloud stabilization height. The portion of the stabilized exhaust ground cloud within the surface mixing layer is partitioned into a number of sublayers which are then permitted to mix vertically. In the newer multilayer approach, it is not necessary to reconfigure the source. Also, because partitioning of the HCl along the vertical more closely approximates the actual distribution of material in the exhaust ground cloud, the calculated ground-level concentrations within 5 to 10 kilometers (3.1 to 6.2 miles) of launch site should be more realistic than those calculated by means of the simple volume used in the 1970 GCA report (Ref. 3-9).

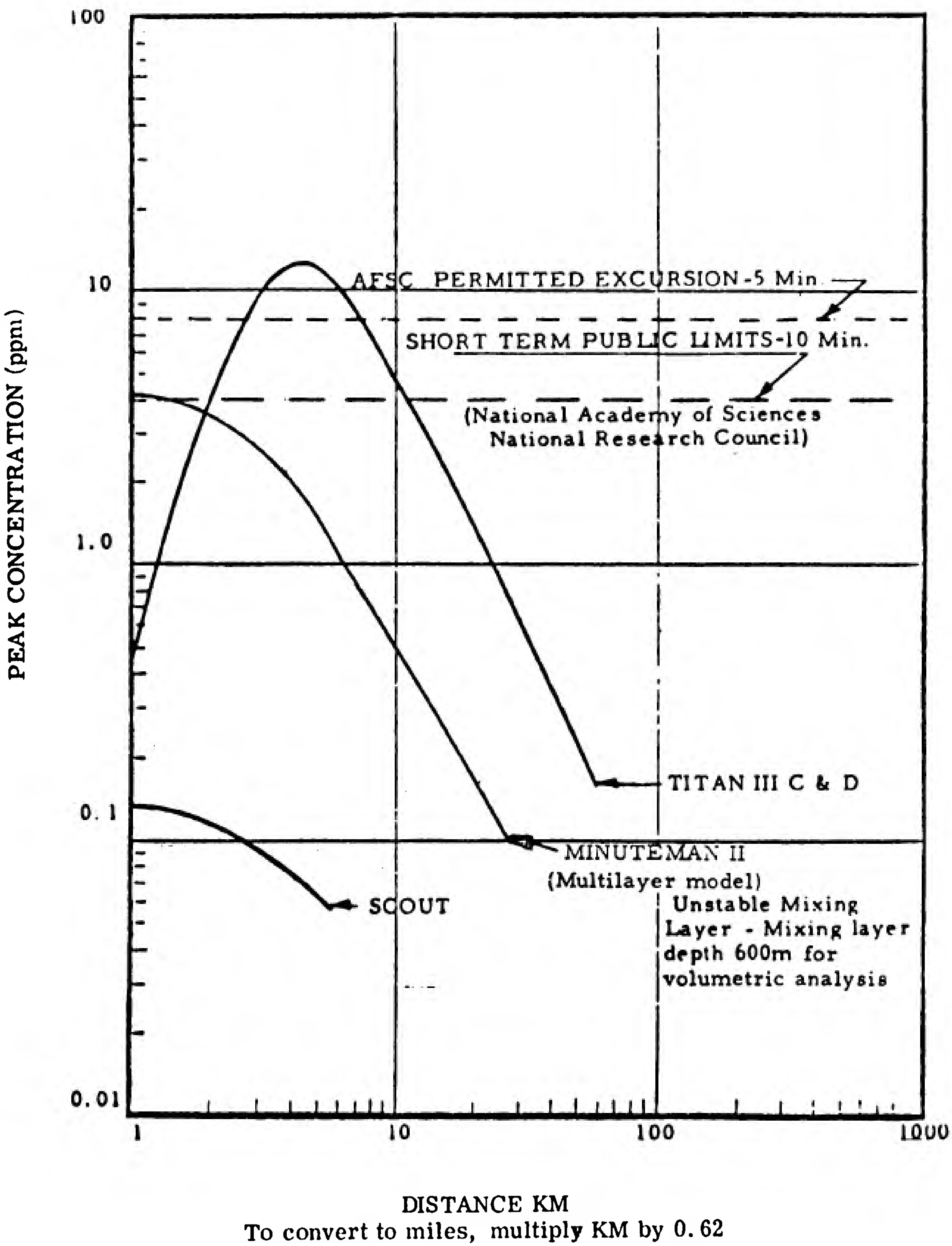


Figure 3-3. ESTIMATED MAXIMUM HCl CONCENTRATIONS FROM NORMAL LAUNCH. (VOLUMETRIC PREDICTION TECHNIQUES)

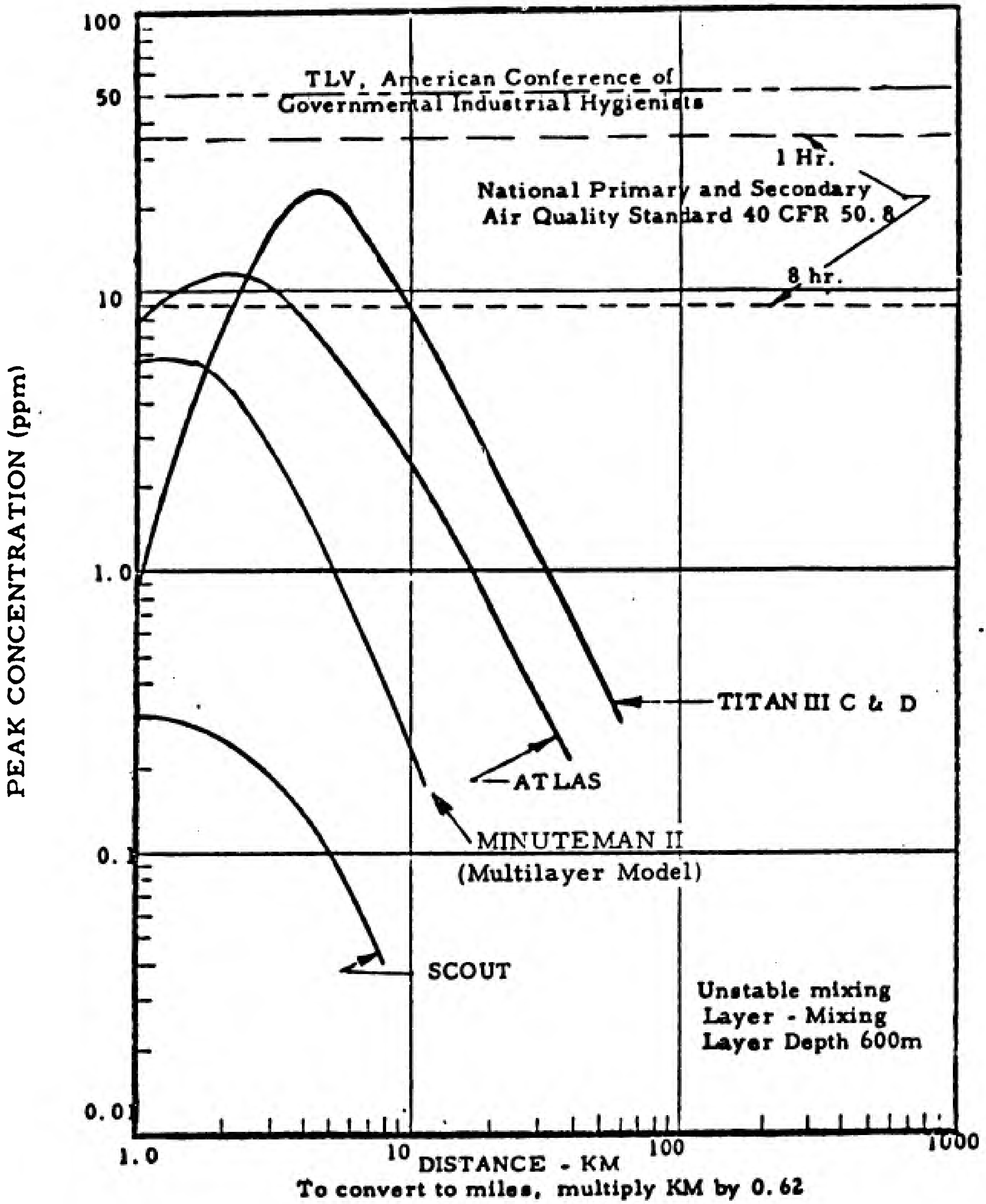


Figure 3-4. ESTIMATED MAXIMUM CO CONCENTRATION FROM NORMAL LAUNCH

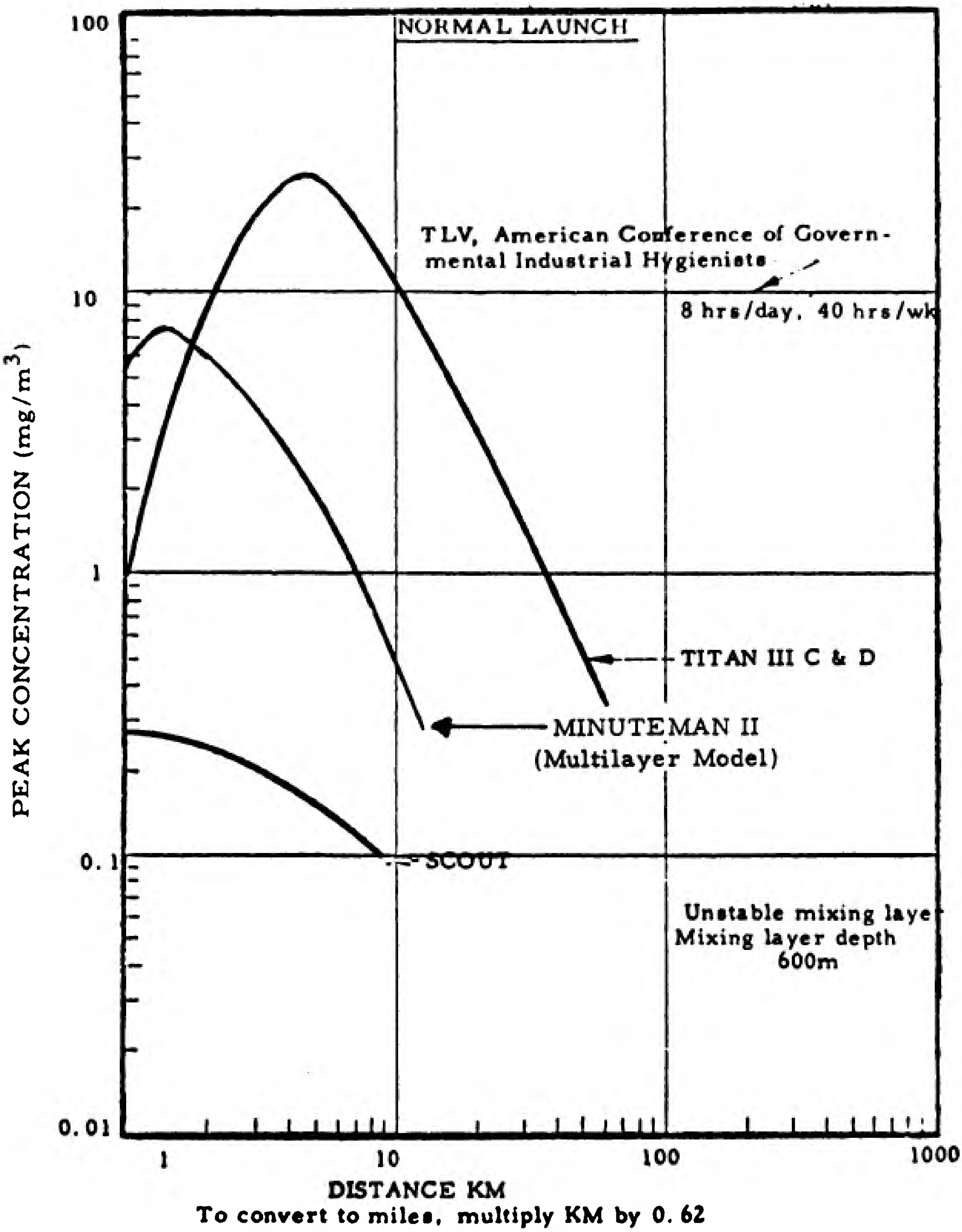


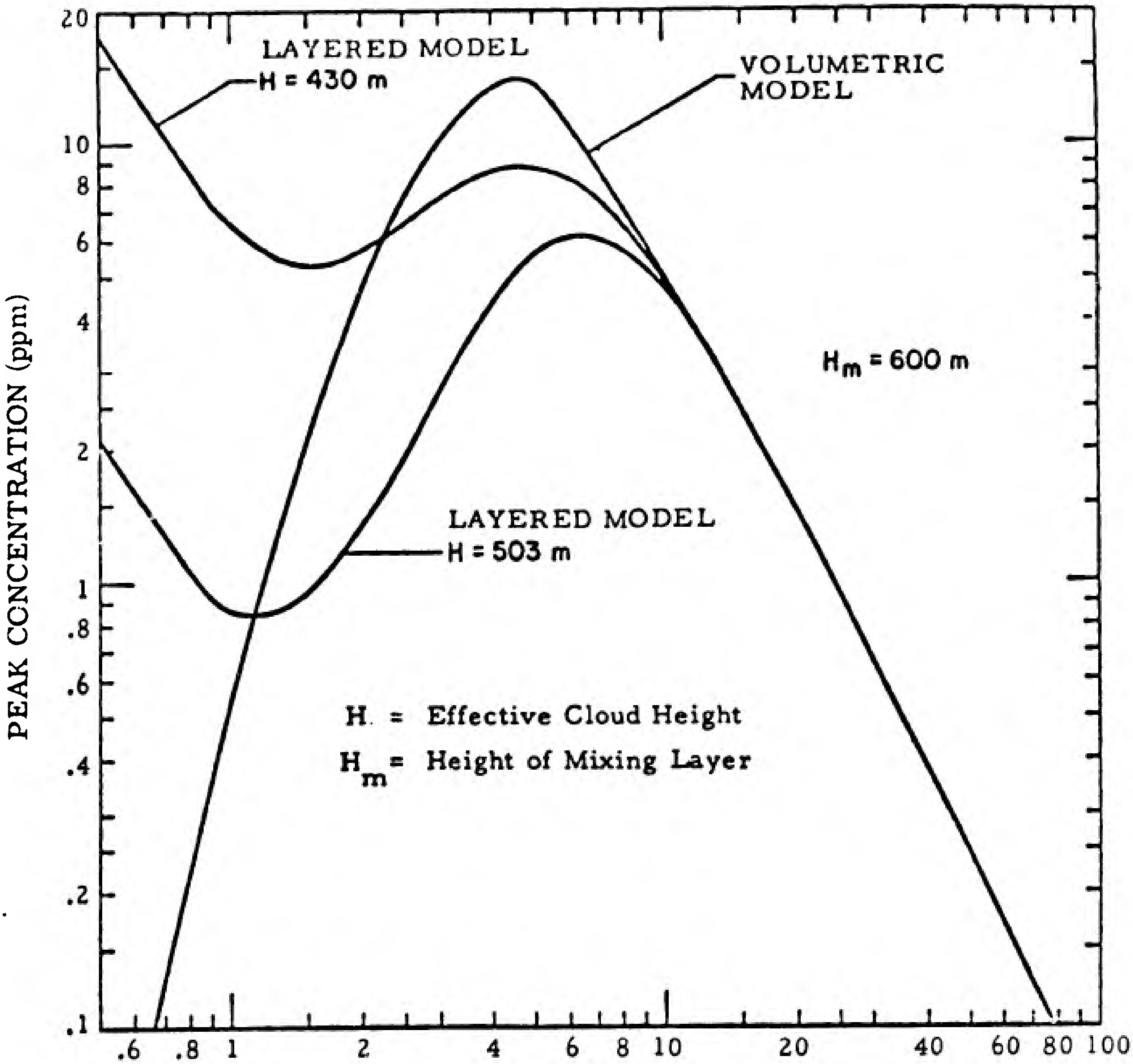
Figure 3-5. ESTIMATED MAXIMUM Al_2O_3 CONCENTRATIONS FROM NORMAL LAUNCH

b. These newer diffusion models are being explored and developed by NASA/MSFC with additional expertise being provided by contractors and other investigators (Ref. 3-15, 3-16, 3-17, 3-18 and 3-19). Because these newer techniques permit real-time estimation of exhaust ground cloud formation (stabilized height and dimensions) and because the multilayered approach coupled with the assumption of Gaussian distribution in the exhaust ground cloud, NASA has predicted peak ground level concentrations of HCl resulting from TITAN IIIC launches (Ref. 3-20) which appears to be different from those reported here by USAF. In order to demonstrate that the prediction techniques are in fact compatible, the layered model is compared to the volumetric model in Figure 3-6.

c. Two sets of calculations using the newer multilayer model are shown in Figure 3-6. One uses and exhaust ground cloud stabilized height of 503 m (1, 650 feet), while the other uses an effective stabilized height of 430 m (1, 410 feet). In both sets of calculations, the mixing layer depth was divided into six sublayers. It is evident from Figure 3-6 that all three concentration curves converge to form a single curve at downwind distances greater than 10 kilometers (6.2 miles); the calculations are no longer sensitive to the details of the initial vertical distribution of the HCl. From this, it may be concluded that at distances beyond 10 kilometers (6.2 miles), both the modeling techniques give identical results for identical inputs.

d. At distances between 4 km (2.48 miles) and 10 km (6.2 miles) downwind from the launch site, the prediction of peak ground level HCl concentrations currently afforded by the volumetric model is higher and hence in this region represents a more conservative approach. At downwind distances less than 4 km (2.48 miles) substantial variation between the prediction techniques is evident. This is due to assumptions made concerning the vertical distribution of material in the initial exhaust ground cloud. It is important to recognize that detailed knowledge of the actual vertical distribution of HCl in the stabilized exhaust ground cloud is not available from actual measurements. Therefore, predictions of ground level peak concentrations close to the launch pad (in controlled areas) are subject to considerable uncertainty.

e. Another feature of the newer prediction technique which is not illustrated by Figure 3-6 is the ability to estimate exhaust ground cloud rise and size based on real-time meteorological



To convert to miles, multiply KM by 0.62

Figure 3-6. CONCENTRATION PREDICTION COMPARISONS OF MODELS data. Should these data result in a prediction of an initially higher and larger volume exhaust ground cloud, the effect would be to displace the concentration curves downwind to predict lower HCl concentrations at given downwind distances from the launch pad.

f. Use of Model 3 of NASA/MSFC Multilayered Diffusion Model.

(1) The burning of rocket engines during normal launches and launch aborts results in the formation of clouds of hot exhaust products which subsequently rise and entrain ambient air until an equilibrium with ambient conditions is reached. In a normal launch, the cloud is formed principally by the forced ascent of hot, turbulent exhaust products that have been deflected laterally and vertically by the ground surface. In the case of normal launches of MINUTEMAN II vehicles, hold-down time is minimal and vehicle residence time in the lowest kilometer of the atmosphere is relatively short (see Figure 3-7). The exhaust products contained in the stabilized cloud are therefore emitted over a time period on the order of 10 seconds. Experience to date shows that the buoyant rise of exhaust clouds from normal lauches of MINUTEMAN II vehicles is best predicted by using a cloud-rise model for instantaneous sources. While no cloud-rise data are available for launch aborts of MINUTEMAN II vehicles, cloud-rise data from static tests of large rocket motors indicate that the use of a cloud-rise model for continuous sources is appropriate in this case. Estimates of maximum cloud rise for the normal launch of a MINUTEMAN II vehicle are based on an expression for instantaneous sources derived by using procedures similar to those contained in a paper presented by G. A. Briggs (1970) at the Second International Clean Air Congress (Reference 3-14 and 3-15).

(2) In model 3 of the NASA/MSFC Multilayer Diffusion Model the vertical extent of the source is less than or equal to the depth of the surface layer, and the initial alongwind, crosswind and vertical distributions of material contained in the stabilized ground cloud are assumed to be Gaussian. Model 3 contains a vertical expansion term which accounts for reflection of material at the surface and at height z and distance x downwind from the launch area is given by the expression

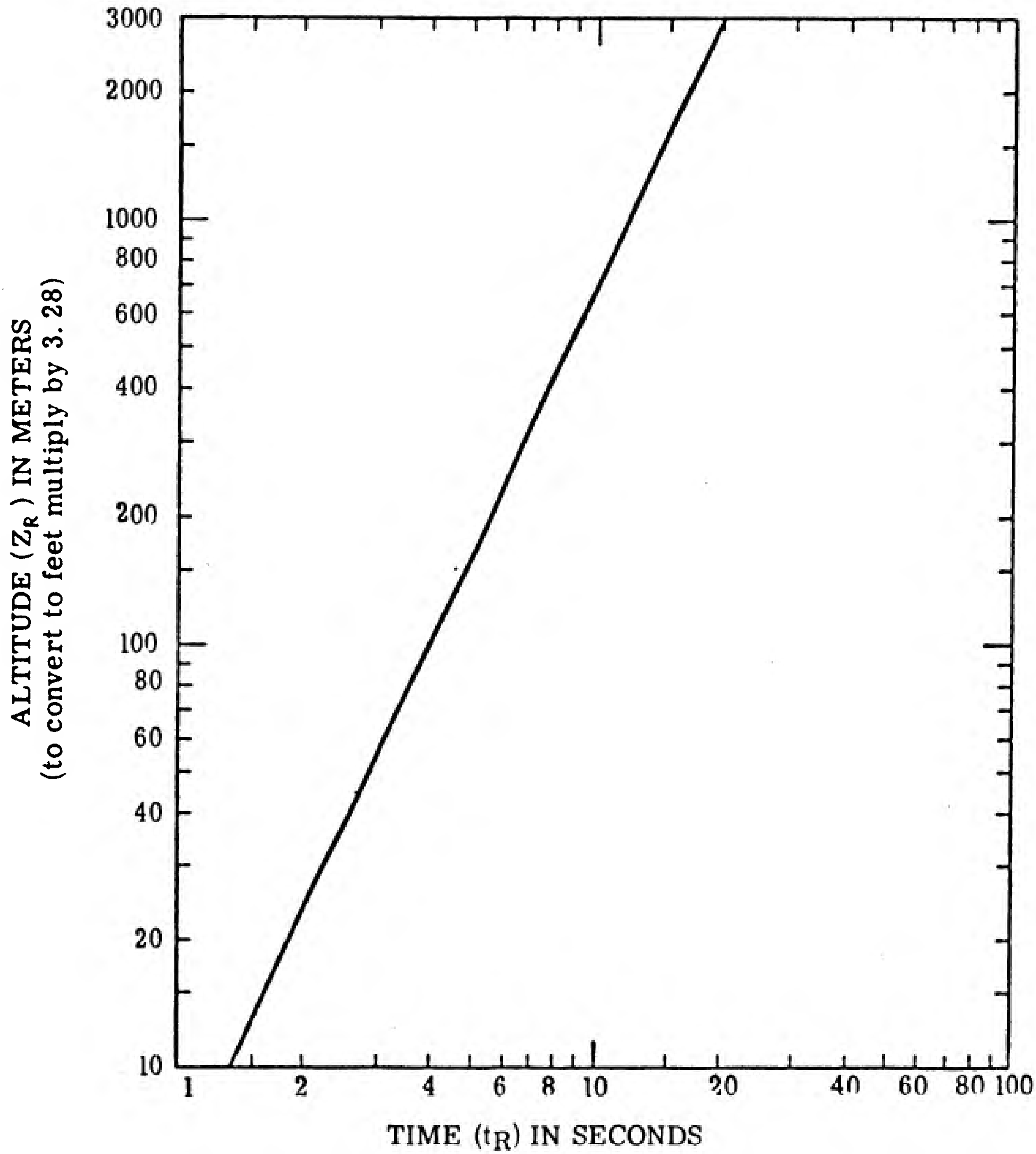


Figure 3-7. HEIGHT OF THE MINUTEMAN II VEHICLE AS A FUNCTION OF TIME AFTER IGNITION (t_R)

$$
\begin{aligned}
\chi_c\{x,0,z\} = \frac{Q}{(2\pi)^{3/2}\,\sigma_x\,\sigma_y\,\sigma_z}\Bigg\{ & \exp\left[\frac{-(H-z)^2}{2\sigma_z^2}\right] \\
& + \exp\left[\frac{-(H-2z_B+z)^2}{2\sigma_z^2}\right] + \sum_{i=1}^{\infty}\Bigg\{\exp\left[-\frac{\left(2i\left(z_T-z_B\right)-\left(H-2z_B+z\right)\right)^2}{2\sigma_z^2}\right] \\
& + \exp\left[\frac{-\left(2i\left(z_T-z_B\right)+\left(H-z\right)\right)^2}{2\sigma_z^2}\right] \\
& + \exp\left[\frac{-\left(2i\left(z_T-z_B\right)-\left(H-z\right)\right)^2}{2\sigma_z^2}\right] \\
& + \exp\left[\frac{-\left(2i\left(z_T-z_B\right)+\left(H-2z_B+z\right)\right)^2}{2\sigma_z^2}\right]\Bigg\}\Bigg\}
\end{aligned}
$$

where

Q = source strength or total mass of material in the surface layer

σx = standard deviation of the alongwind concentration distribution in the surface layer at distance x.

σy = standard deviation of the crosswind concentration distribution in the surface layer at distance x.

σz = standard deviation of the vertical concentration distribution in the surface layer at distance x

H = effective source height or height of the centroid of the stabilized ground cloud

z = height at which concentration is measured

z_B = height of the base of the surface layer

z_T = height of the top of the surface layer

The subset of equations defining σ_x, σ_y, and σ_z are simple power-law expressions relating turbulence parameters to cloud growth with distance and are given on pages 22, 25, and 28 of Reference 3-15. Further information on the models and detailed information on how they were employed are contained in "Downwind Hazard Calcuations for MINUTEMAN II Launches at Malmstrom Air Force Base, Montana," Reference 21.

g. As noted, winter launches of MINUTEMAN II vehicles during the early morning hours are planned. Accordingly, the Third Weather Wing Climatology Branch supplied the weather data for 12 noon Greenwich (1200Z) taken at Malmstrom for the 14th, 15th, and 16th of January for the years 1961 through 1966 for use in obtaining profiles of model inputs of wind speed, wind direction, temperature and pressure. Weather data for 1200Z on the 14th of January 1963 shown in Figure 3-8 are representative of most of the eighteen profiles used in the concentration calculations. Figure 3-8 shows a surface based inversion extending to a height of about 580 meters (1902 ft.) above the surface, relatively high wind speeds with a speed of 5.1 meters per second at the surface increasing to 11.0 meters per second at the top of the inversion layer, and a wind-direction shear of 148 degrees through the layer. Meterological data for all eighteen soundings are given in Reference 21. The 18 days of data provide an excellent random sample of information obtained close to launch time. The temperature, pressure, and wind-speed profile information obtained from the weather data was used directly in calculating the rise of the buoyant ground cloud. The nocturnal inversion is normally the strongest around 1200Z, the data used therefore provide the worst case as far as inversion height and strength. We also obtain a very realistic example of worst case data by using the sounding that gives the poorest diffusion distances

h. The MINUTEMAN II vehicle is a reliable system. The probability of launch accident which would result in burning of all or part of the solid propellants is remote. However, the occurrence of an unanticipated event can be postulated and these sorts of accidents for TITAN III C and D and MINUTEMAN II have been examined in References 3-9, 3-23, and 3-37. It is judged that the accident modes and subsequent combustion cloud behavior as presented in References 3-23 and 3-37 are credible and realisitically represent remotely possible events.

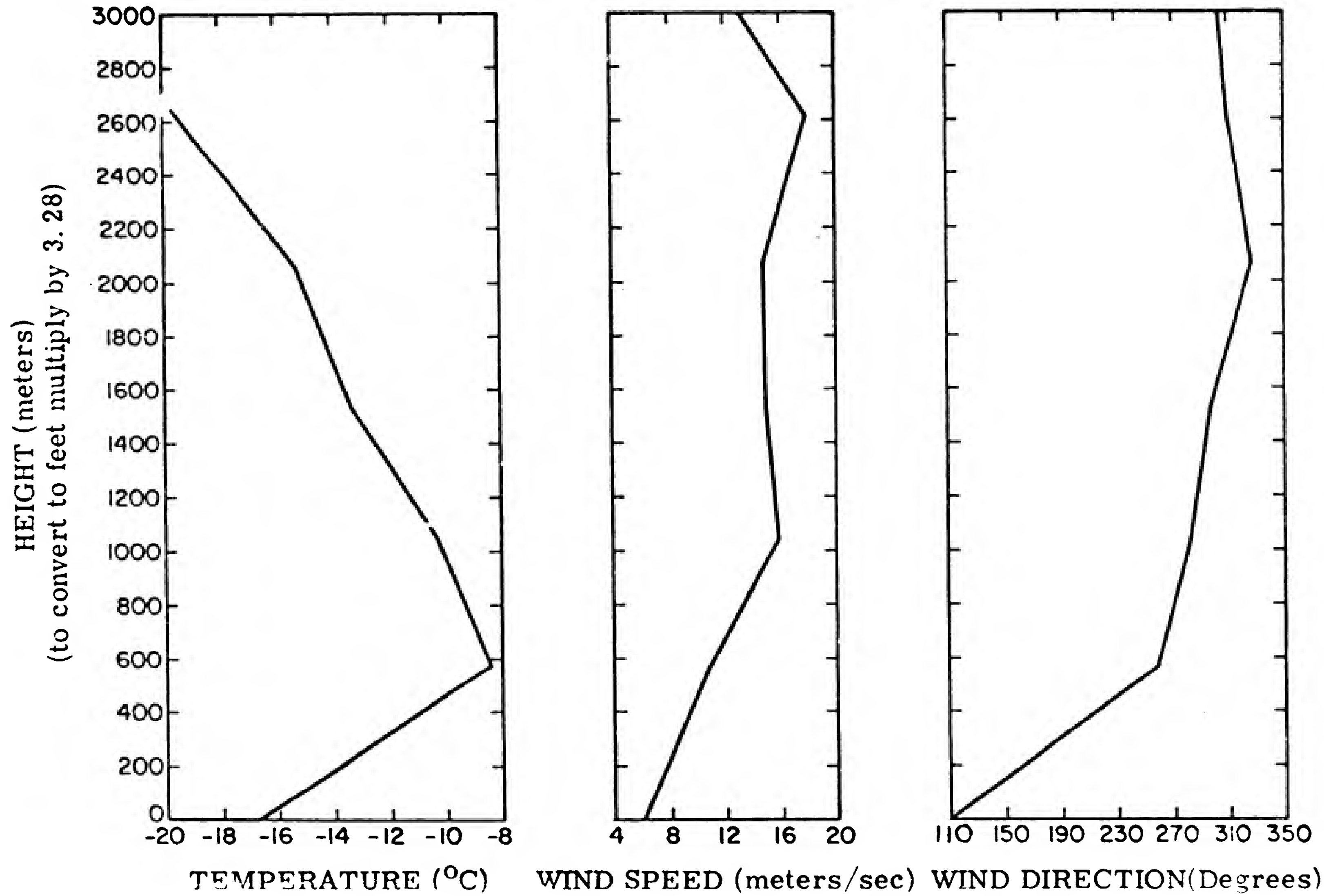


Figure 3-8. VERTICAL PROFILES OF TEMPERATURE, WIND SPEED, AND WIND DIRECTION MEASURED AT 1200 Z, 14 JANUARY 1963, MALMSTROM AFB, MONTANA

i. As pointed out by Dumbauld (Ref. 3-15, p. 69), the model ground-level concentrations near the launch area are very sensitive to the assumptions made concerning the vertical distribution of exhaust products in the stabilized ground cloud. Until the details of this vertical distribution are established through actual measurements, model calculations of the ground-level concentrations at distances within a few kilometers of the launch area are subject to uncertainty. A study of the ground level pollutant concentrations from a GIANT PATRIOT launch was conducted assuming a variety of cloud sizes and stabilized cloud heights (Ref. 3-38). The results of this study showed that while the exact size and stabilized cloud height for a MINUTEMAN missile are not currently known, the envelope of possible conditions (i.e., worst case) can be used to predict the expected ground concentrations. The levels predicted based on the range of possible uncertainties were in good agreement with the results from the multi-layer model data presented below. The maximum centerline concentration results from the downward turbulent mixing of exhaust products contained in the stabilized ground cloud. For the launch abort cases, more heat is available for cloud rise than for the normal launch case. However, because the heat is released over a much longer time period, the buoyant cloud rise is only slightly higher in most cases than the rise calculated for normal launches. Concentrations are higher for the launch-abort cases because of the larger amount of exhaust products contributed to the ground cloud by the complete burning of fuel from all three stages of the MINUTEMAN II.

7. Data Analysis.

a. Hydrogen Chloride. Approximately 1,500 pounds of HCl will be generated in the lower two thousand feet of the atmosphere. Figures 3-9 and 3-10 present the envelopes of ten-minute average concentration profiles for normal launch and launch abort, respectively. The normal launch ten-minute average does not exceed the STPL as given in Table 3-2. The value of 0.5 ppm at 2 miles is realistic for the maximum that would be encountered in a normal launch. This is well below the safe level of 4 ppm, that has been recommended for a STPL. The total destruct yields a worst case value of only 2 ppm at two miles which is well below the recommended PEL of 7 ppm. There will be no health hazards from the HCl generated by the proposed launches.

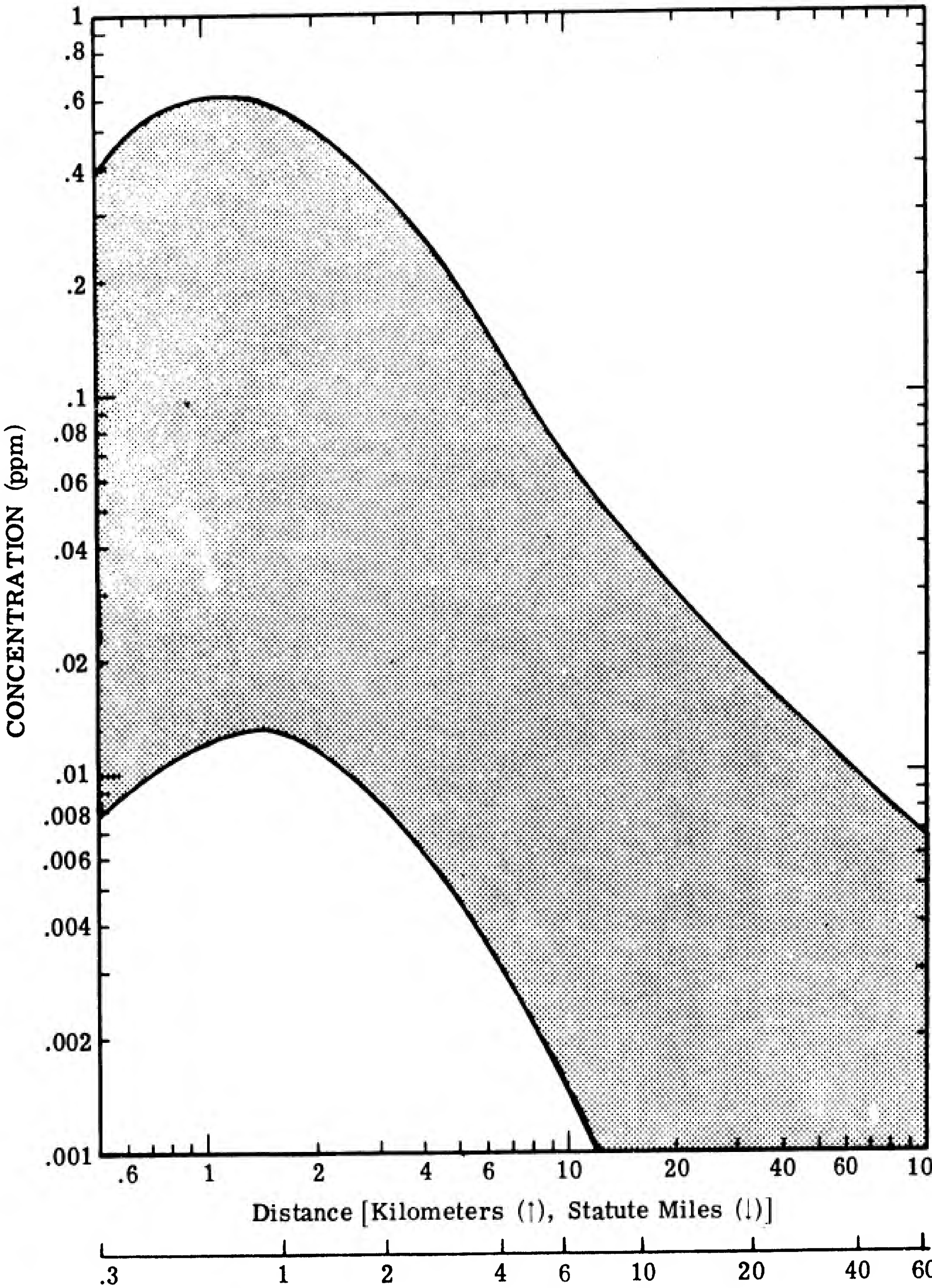


Figure 3-9 ENVELOPE OF TEN-MINUTE AVERAGE CONCENTRATION PROFILES OF HCl-NORMAL LAUNCH

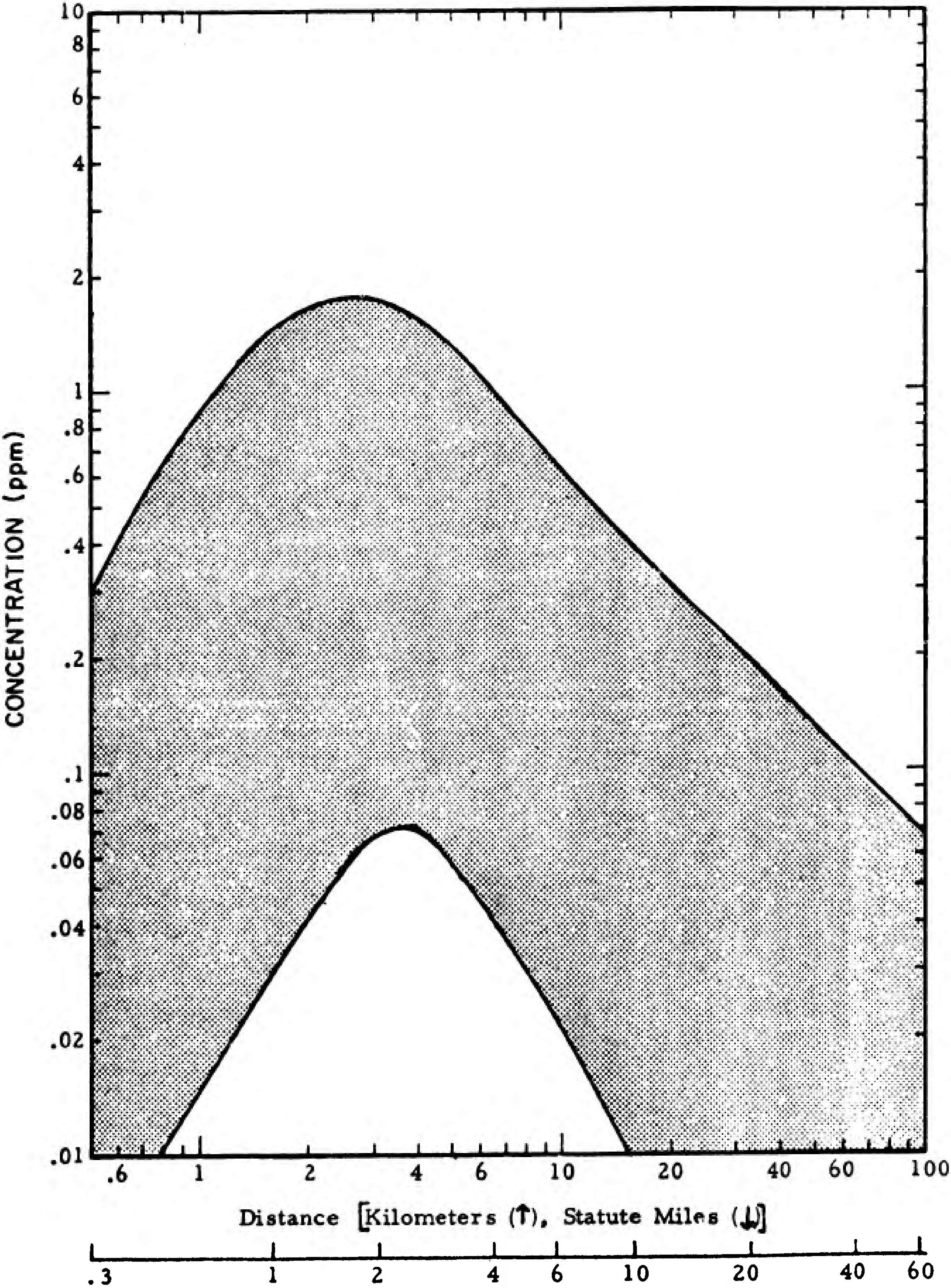


Figure 3-10. ENVELOPE OF TEN-MINUTE AVERAGE CONCENTRATION PROFILES OF HCl-LAUNCH ABORT

b. Carbon Monoxide. As noted earlier, CO is not expected to be found in detectable quantities near ground level because it is expected to have been oxidized to CO_2. This is a result of the high gas temperature at the exit plane of the rocket engine and the abundant availability of atmospheric oxygen to complete the reaction. The data presented in Figures 3-11 and 3-12 use a six-minute average as defined in Reference 3-29. Even if we use these values or call them ten-minute averages, we find that we do not even come close to exceeding the limits for CO in either the normal launch or launch abort mode.

c. Aluminum Oxide. No standards for short term public exposure have been recommended. The National Air Quality Standard 40CFR 50.6 (Ref. 3-21) for particulates in the nuisance dust category specifies as a primary standard an annual geometric mean concentration of 75 $\mu g/M^3$ (micrograms per cubic meter) and a maximum mean concentration of 260 $\mu g/M^3$ for 24 hours once a year. For both normal and worst case launch abort under worst meteorological conditions (Figures 3-13 and 3-14), the 24-hour average of Al_2O_3 concentrations is less than the secondary standard. In addition the TLV of 10 mg/M^3 shown in Table 3-2 is not exceeded even in the worst case concentrations shown in Figure 3-14. Thus the Al_2O_3 levels for both the normal and worst case abort mode are below the established criteria.

d. Fumigation of HCl From Inversion Layers. Material entering an inversion layer will tend to remain there and such material may be transported downwind with diffusion limited to only the lateral and alongwind directions. The process by which such material in an inversion layer is diffused to the ground is called fumigation. Fumigation is initiated by the solar heating of ground surfaces so that layers of air close to the ground surface become heated by radiation. When the temperature of these lower layers increases to temperatures greater than those existing in the inversion layer, the stable inversion layer then becomes part of an unstable or mixing layer.

e. Precipitation Scavenging. A matter of concern with respect to HCl is the precipitation scavenging. This factor has been treated in a limited way in Reference 3-9, but the process remains the least understood at this time. Launching a MINUTEMAN II into a clear atmosphere of saturated air will not result in the formation of droplets

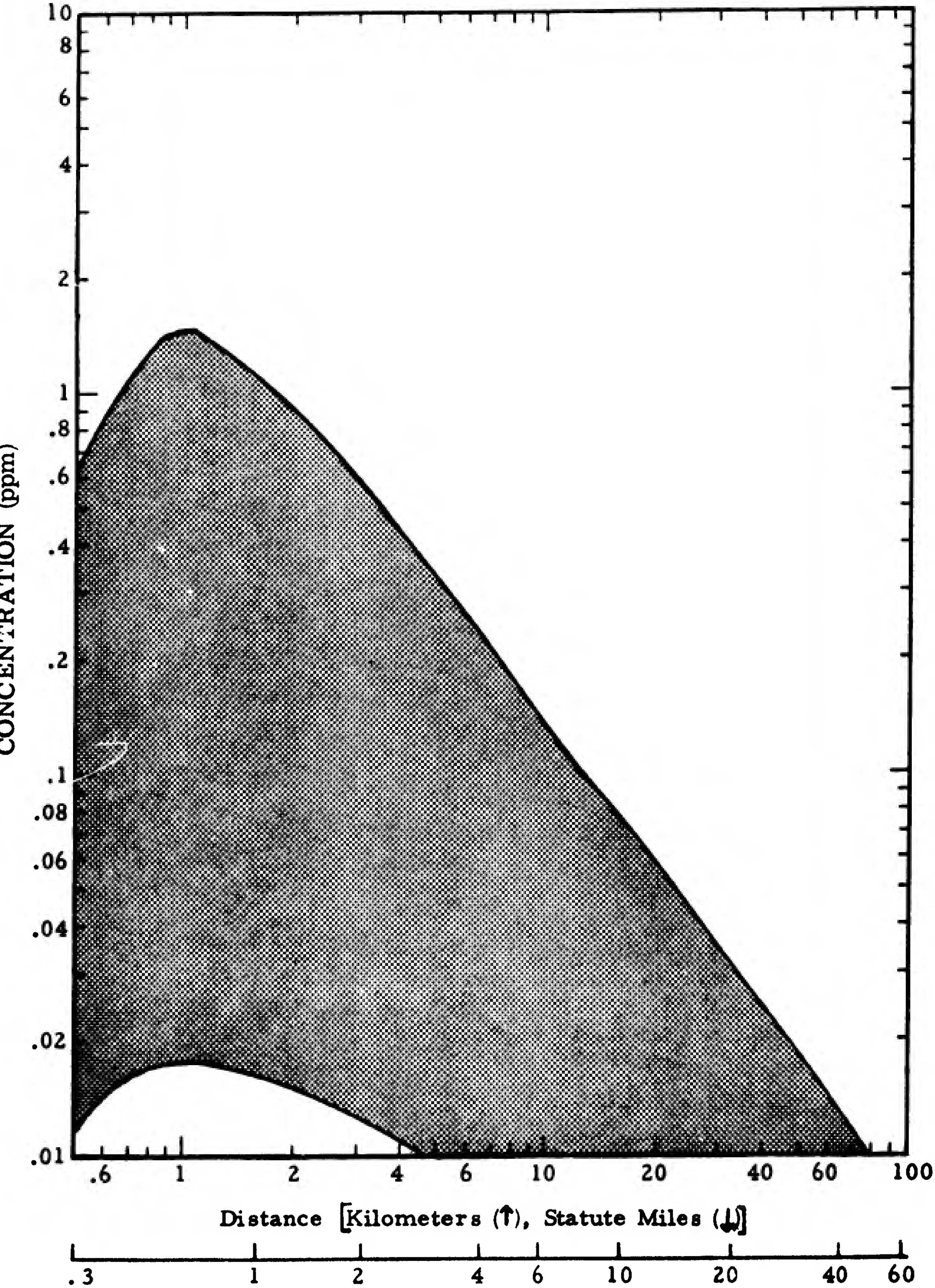


Figure 3-11. ENVELOPE OF 6-MINUTE AVERAGE CONCENTRATION PROFILES OF CO FOR NORMAL LAUNCH

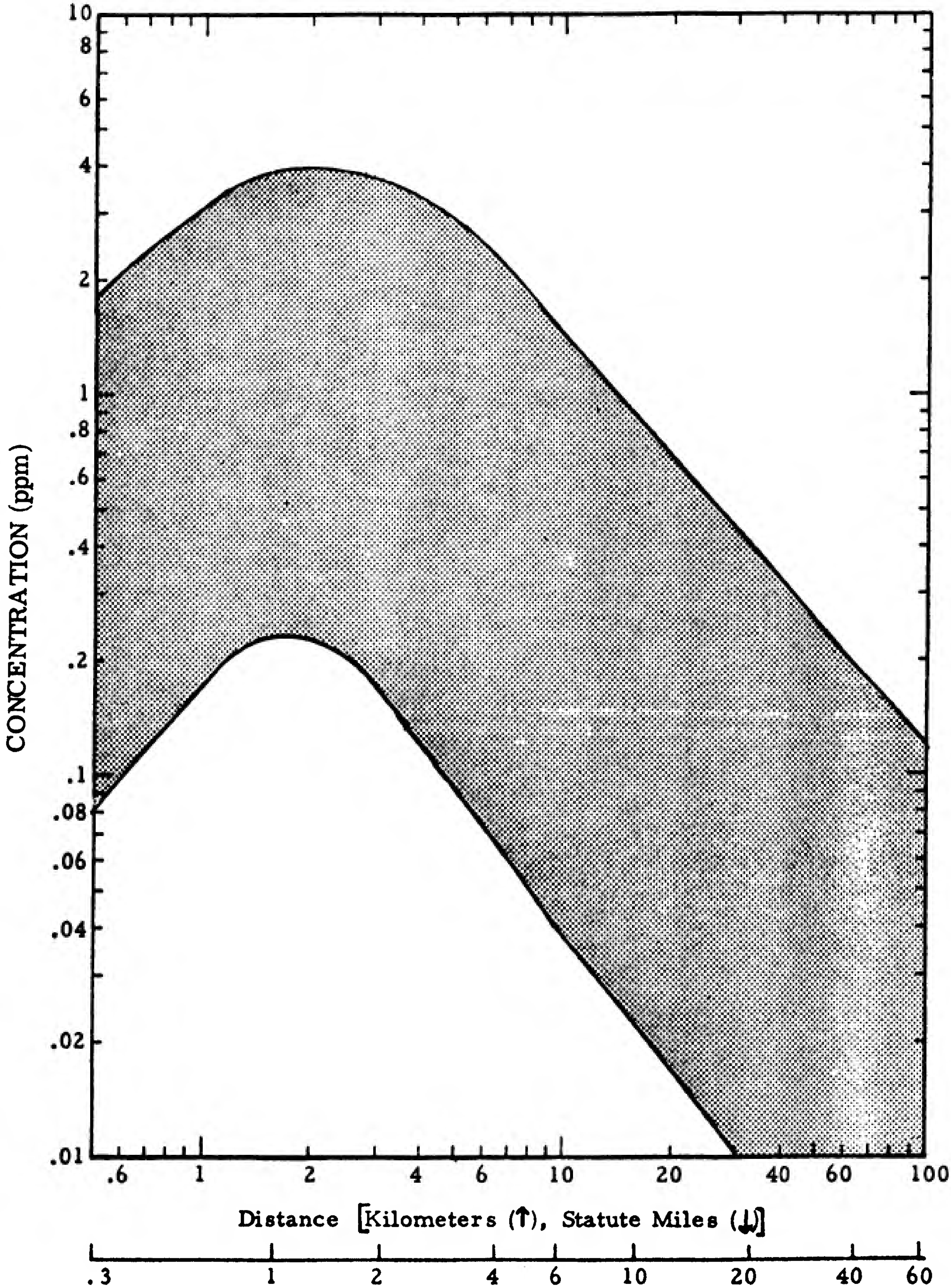


Figure 3-12. ENVELOPE OF 6-MINUTE AVERAGE CONCENTRATION PROFILES OF CO FOR LAUNCH ABORT

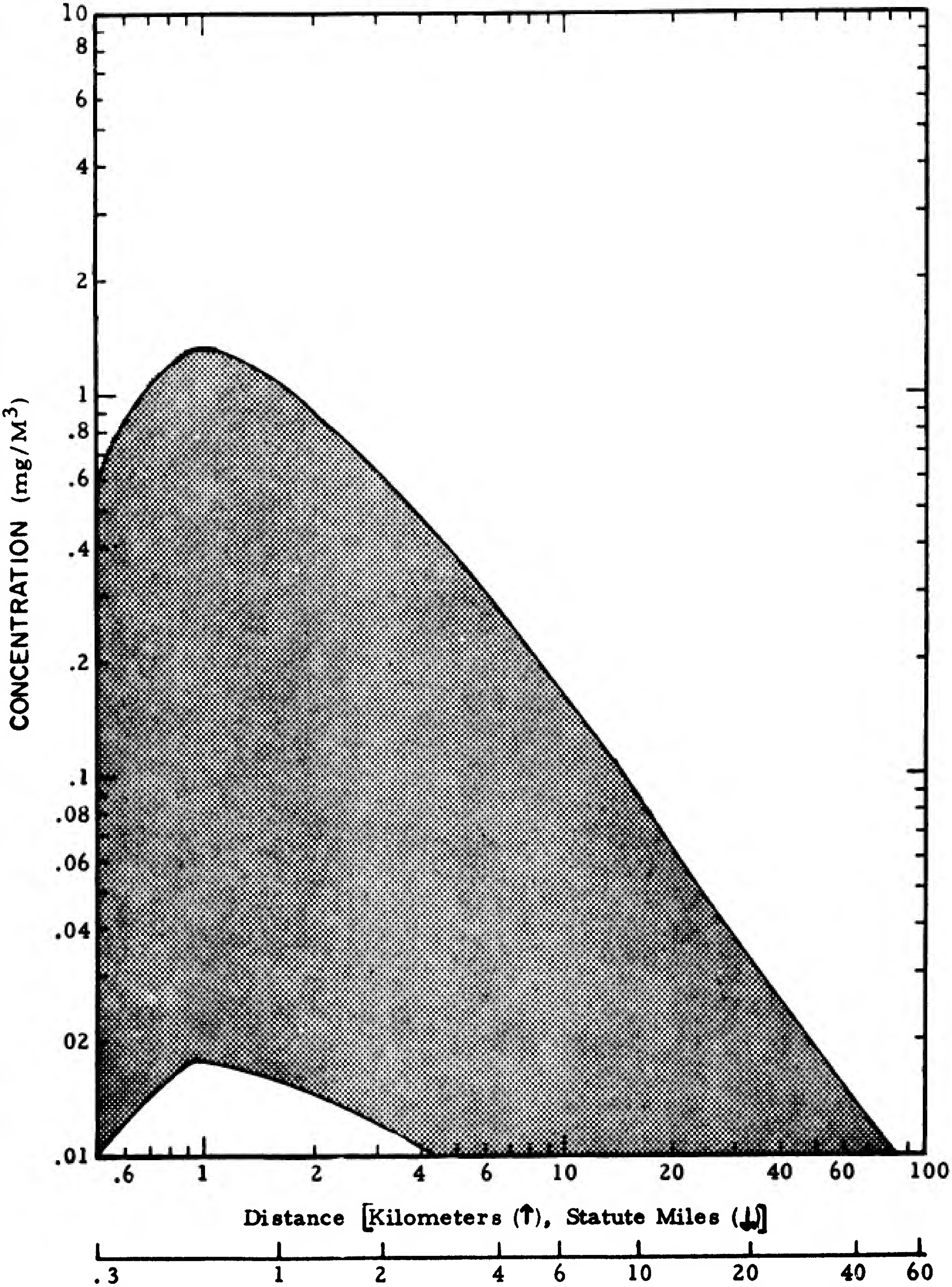


Figure 3-13. ENVELOPE OF TEN-MINUTE AVERAGE CONCENTRATION PROFILES OF Al_2O_3 FOR NORMAL LAUNCH

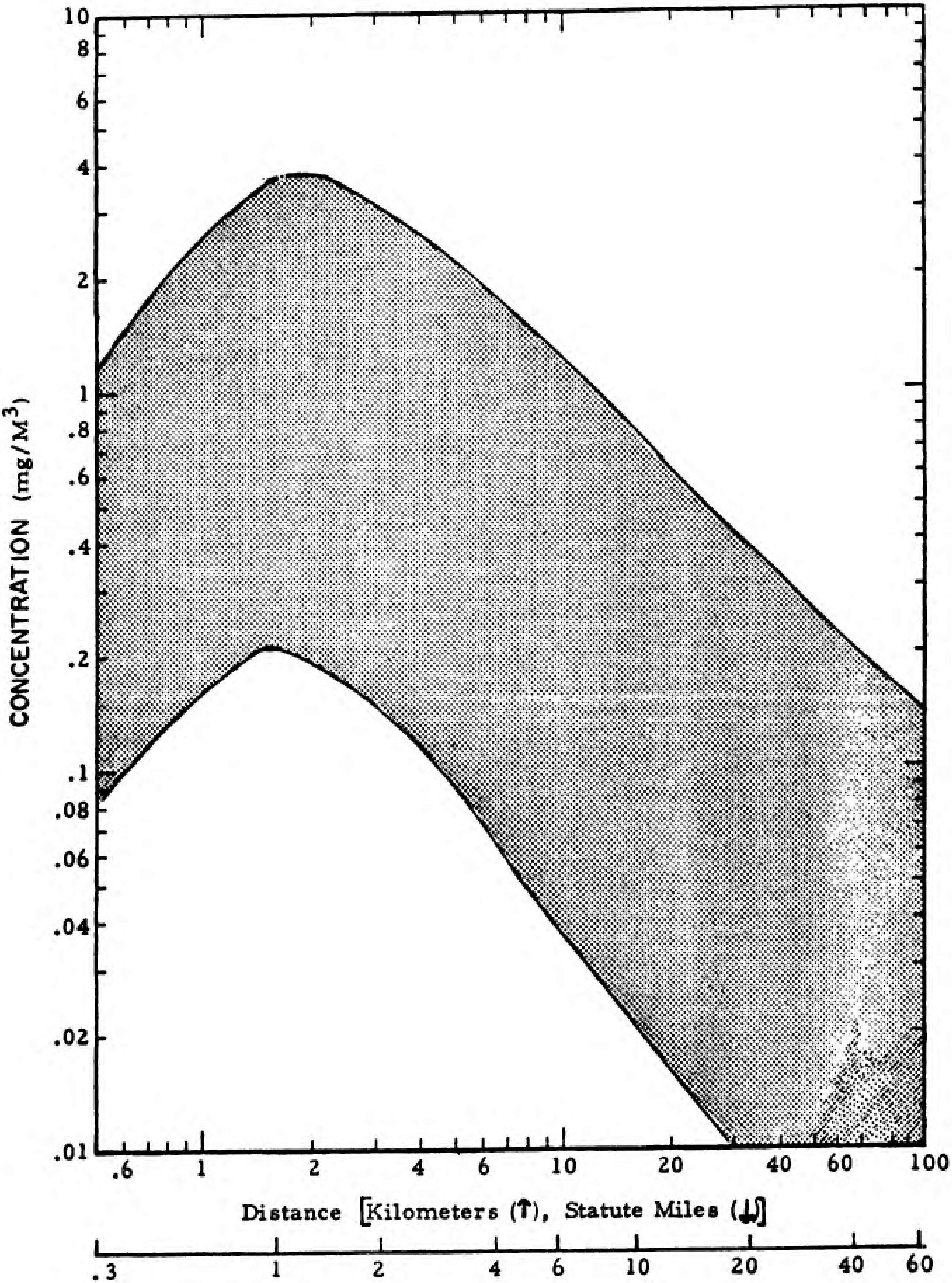


Figure 3-14. ENVELOPE OF 10-MINUTE AVERAGE CONCENTRATION PROFILES OF Al_2O_3 LAUNCH ABORT

which might fall out. Droplets do occur in fog or in natural clouds and due to the great affinity of HCl and water, an acid mist or rain may be expected. It has been estimated that the HCl concentration of such droplets would be less than 1%. The bounding parameters, such as the effects, the possibly affected areas, the rate of dilution of the droplets, the rate of burn-off of clouds or fog, etc., are not well known. Due to safety criteria visual tracking of the missile is required from launch until radar acquisition. This means that there will have to be a cloud free line-of-sight from the visual tracking location to the missile from the surface to approximately 50,000 feet.

8. Upper Atmosphere Effects.

a. The effect of rocket engine emissions into the atmosphere above the near ground mixing layer will be discussed in this section. Emissions into the troposphere between 2,500 and 36,000 feet altitude are diluted by turbulent mixing and wind shears in the layer. It is not expected that ground level concentrations of HCl would be detected as a result of vehicle climb-out. Similarly, even if the quantity of CO indicated at the exit plane of the MINUTEMAN II motor exhaust did not oxidize to CO_2 in the atmosphere, the same dilution noted would preclude measurable concentration from reaching ground level. It is expected, therefore, that CO will not be a concern in the troposphere either.

b. In the stratospheric layer of the atmosphere, MINUTEMAN II vehicles exhaust a small quantity of H_2O vapor, CO_2, H_2, N_2 and HCl. The principal concern regarding increase of H_2O and CO_2 in the upper atmosphere is the effect these constituents might have on global radiation balance through obsorption and scattering of incoming and outgoing radiation. Complete agreement does not exist in the scientific community as to the magnitude of the effects of the foregoing materials. More than 50 governmental laboratories from many agencies are actively engaged in the investigation of the complexities of the upper atmosphere. The Climatic Impact Assessment Program of the Department of Transportation (Reference 3-32) is designed to provide an objective assessment of the impact on the upper atmosphere caused by emissions from propulsion systems operating there. While disagreement exists with respect to causes and effects, chemistry and dynamics of the upper atmosphere, it is agreed that the major problem is lack of definitive measurements which properly and adequately define the upper atmosphere. It can also be agreed that the impact of four MINUTEMAN vehicles is of minimal effect.

c. Even though the stratosphere layer has great stability against vertical mixing because of its inversion, lateral diffusion will occur. NASA-OSSA has estimated that at an altitude of 25 kilometers, a cross section through the exhaust plume of a TITAN III C would have to expand laterally to an area of only one square kilometer for the water vapor concentration to reach the ambient value given in the standard atmospheric tables. At a 60 kilometer altitude, the cross section of the plume would have to expand laterally to 800 square kilometers to reach an equilibrium with ambient water concentrations. In the case of CO_2 at an altitude of 25 kilometers, the section through the exhaust plume would have to expand laterally to less than 1/10 square kilometers before the CO_2 would reach ambient levels. At 60 kilometers altitude, the plume would reach ambient levels of CO_2 concentrations after it expanded laterally to a cross sectional area of 4 square kilometers.

d. There is some concern that HCl emitted into the stratosphere will be ionized by solar radiation and result in radio interferences upsetting communications and telemetry. In the case of the MINUTEMAN, the small quantity of HCl per unit length of the vehicle trajectory is expected to be of no significance. As mentioned before, hundreds of MINUTEMAN missiles have been launched with no noticeable effect. It is felt that the MINUTEMAN missiles launched for Operational Base Launch will have no noticeable effect on the stratosphere.

C. MISSILE NOISE

There are three principal sources of noise from MINUTEMAN missiles. These are discussed as follows:

1. Missile Propulsion Noise
2. Sonic Boom
3. Noise from Destruct

1. Missile Propulsion Noise

a. Source and Nature

(1) A rocket engine produces noise as a result of combustion processes and as a result of the turbulence within the rocket exhaust as well as that created by the mixing of the rocket exhaust with the ambient atmosphere. Jet exhaust is generally the predominant noise source, which results in a wide spectrum of random noise.

(2) Figure 3-15 shows noise levels and spectrum shapes in octave band form for a variety of distances from the launch site. The spectrum for 2.6 miles is measured MINUTEMAN data taken at the Kennedy Space Center (Ref. 3-39). The spectra for nearer and farther distances were extrapolated from the measured MINUTEMAN data. This extrapolation was accomplished with the use of extensive measured SATURN V noise data (Ref. 3-40). This reference contains measured octave band data for four launches over a range of locations up to about 20 miles from the liftoff site. These data are for the maximum noise levels observed at each measuring site during missile ascent. Therefore, the data contains these effects: normal energy spreading due to distance, absorption of sound by air molecules and dispersion of sound by turbulence, and maximum noise levels at particular sites occurring during different points in time as the missile ascends. The average of the four sets of SATURN data provides an excellent measure of the noise level variation at various ground distances for missile ascents. When these average variations in noise level in each octave band for each distance are applied to the MINUTEMAN data at 2.6 miles, the other curves in Figure 3-15 are the result.

(3) It should be pointed out that the curves in Figure 3-15 are predicted ~~nominal~~ data for a MINUTEMAN

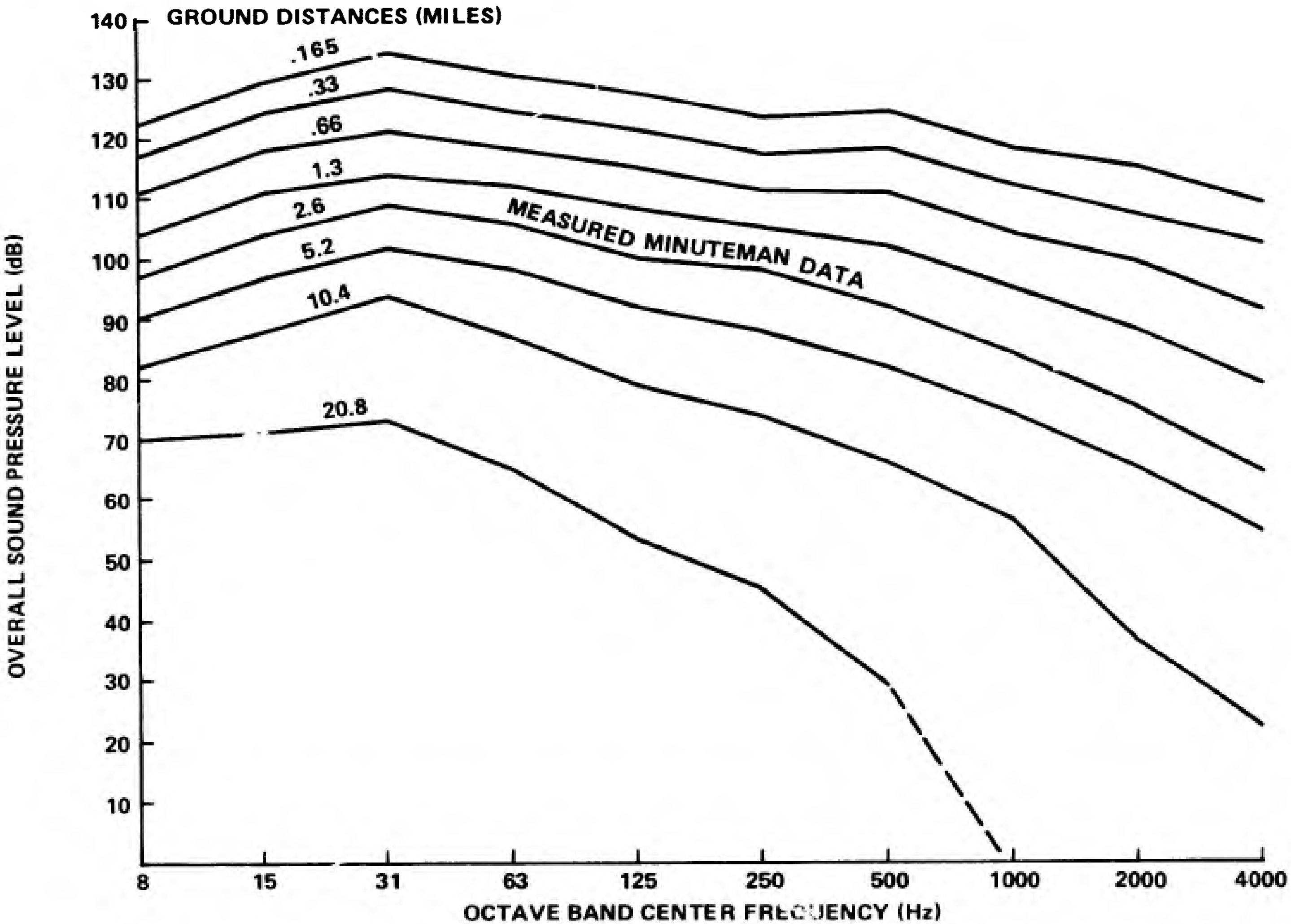


Figure 3-15. PREDICTED FREQUENCY SPECTRA AS A FUNCTION OF DISTANCE

launch in the OBL program. Over 10 to 15 miles, these noise levels may be exceeded by 10 to 20 dB in small areas. This is due to sound channeling by atmospheric conditions generally at downwind locations with a temperature inversion. Temperature inversions can channel sound even with no wind. On the other hand, these same conditions can sometimes completely refract the sound away from some locations. Such increases and decreases in rocket engine noise levels in the community 10 to 15 miles away were common experiences in the static firing program at the Marshal Space Flight Center (Ref. 3-41).

(4) Referring to Figure 3-15, note the increasing reduction of high frequency noise with increasing distance. This gives the sound at each outward distance a lower frequency characteristic and a more rumbling sound.

(5) The predicted overall noise variation with distance is shown in Figure 3-16. This curve corresponds to the summation of the octave band data at each distance.

(6) Since the missile is essentially going straight up during the maximum noise part of ascent, noise level contours of equal intensity would be circular, centered on the launch site. Thus, the curve from Figure 3-16 typically would apply to any direction from the launch site.

(7) The curve in Figure 3-16 represents the maximum levels expected on the ground. These levels will occur only for a short period of time due to the missile's rapid ascent. It is probable that rocket engine noise will be almost inaudible after the first minute at any location.

b. Effects of Missile Propulsion Noise

(1) Launch noise does affect the environment, with its most important effects on man and on structures. Such acoustic energy hazards may range from bodily injuries through performance impairment down to simple perception of the presence of or annoyance by the sound intrusion into the environment. The effects of sound waves on man and man's expected response to them have bee studies extensively, and the effects and responses can be

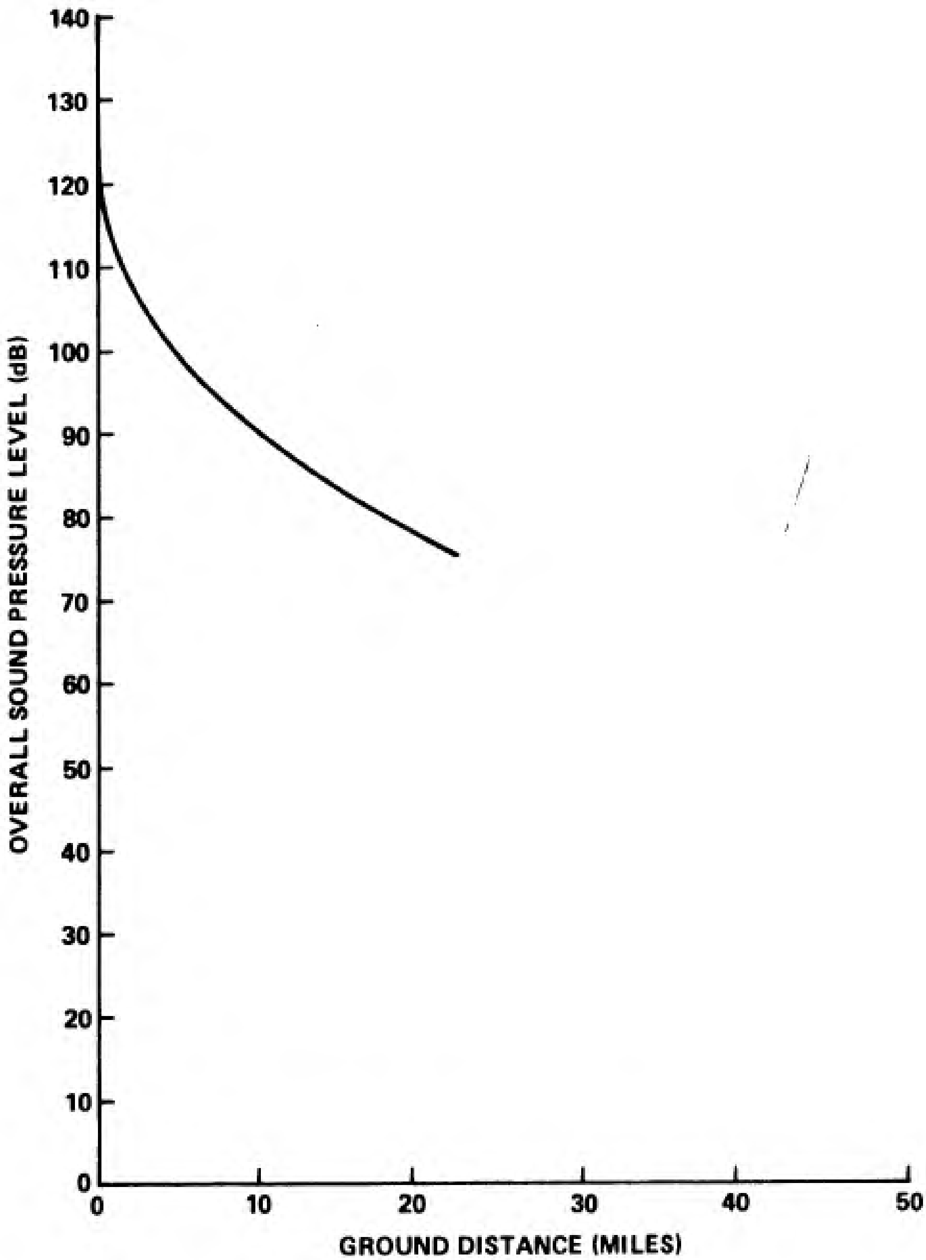


Figure 3-16. PREDICTED MINUTEMAN SOUND LEVEL AS A FUNCTION OF GROUND DISTANCE

predicted with a limited degree of assurance. There is a range of tolerance in sound energy levels which cause given effects on different people. The degree of annoyance, pain, or injury also involves a tolerance range. Because of both the psychological and physiological effects of sound, the net reaction of man to acoustic hazards is somewhat subjective. Nevertheless, criteria have been proposed and/or accepted which provide useful guidelines for evaluating the probable effects of acoustic hazards on people.

(2) MINUTEMAN propulsion systems generate acoustic energy fields that encompass a wide frequency spectrum. Frequency components that contribute significant portions of the total acoustic energy range from below 1 Hz to well above 100, 000 Hz and this full spectrum has been considered in evaluating the impact of rocket operations on the environment. In considering acoustic criteria as they apply to rocket engine noises, it is necessary to consider not only the overall sound pressure level, but also the frequency spectrum and the duration of exposure. Sound durations are short for launches and will be infrequent. It is with these considerations in mind that the criteria which are presented in Table 3-3 should be examined. Observance of these criteria will be met by excluding personnel from areas of exposure in excess of criteria levels and providing any essential personnel (i. e., Air Force range safety personnel) with adequate ear protection.

(3) In the following discussion of acoustic energy, subdivisions of frequency range will be considered because of the differing degrees of human responses which occur; the effects on man appear to be a function of this sort of subdivision. Sound fields generated by chemical rocket engines contain energy in the infrasonic (inaudible frequency region below 20 Hz), in the audible (audio frequency range between 20 and 20, 000 Hz), and in the ultrasonic region (frequencies above the 20, 000 Hz high frequency detection capability of the human ear). Figure 3-15 gives the predicted noise levels from a MINUTEMAN launch site at several distances. These data are based on actual measurement of a MINUTEMAN launch and indicate noise intensity at individual frequency ranges.

(4) Since the safety requirements of the launch require that all non-essential personnel be evacuated within at least a 1. 8-mile radius, noise effects on people are considered only

Table 3-3. PERMISSIBLE NOISE EXPOSURE FOR CONTROLLED POPULATION (OCCUPATIONAL PERSONNEL)

Duration Per Day (Hours)	Sound Pressure Level (dBA; re. $2 \times 10^{-5} N/M^2$) (REF: *)	Sound Pressure Level (dBA; re. $2 \times 10^{-5} N/M^2$) (REF: **)
8	90	84
6	92	86
4	95	88
3	97	
2	100	92
1 1/2	102	
1	105	96
1/2	110	100
1/4 or less	115****	104
0.125		108
0.0625		112
0.037		115***

NOTE: Appropriate standards for the uncontrolled (general) population have not been published.

* "Occupational Safety and Health Standards," Code of Federal Regulations, Title 29, Chapter XVII, Part 1910, 37FR 22102, Subpart G, Occupational Health and Environmental Control, 1910.95 Occupational Noise Exposure.

** REF: AFR 161-35 Hazardous Noise Exposure

*** Do not expose above 115 dBA without adequate ear protection. The limiting duration of daily exposure at any noise level can be determined by the equation $T=16-2^{(L-80)/4}$

**** Use Equation $T=16-2^{(L-80)/5}$ (T = time; L = SPL dBA) beyond that distance. Any Air Force personnel within the 1.8-mile area will be protected in accordance with the standards presented in Table 3-3 and will be issued adequate ear protection in accordance with AF standards.

(a) Infrasonic Range (0-20 Hz)

Several human body resonances occur in the infrasonic range and intense sound can cause body vibration. However, significant effects occur for discrete frequencies at levels of greater than 130 dB (Ref. 3-42). Since infrasonic noise levels beyond the ground safety zone (1.8 miles) are 110 dB or less (Fig. 3-15) in any given octave band, no body vibration effects should occur. Regarding hearing damage, Reference 3-43 quotes infrasonic levels in the 140 dB to 150 dB range for more than a few minutes as being harmful to hearing. Since maximum OBL launch levels at 1.8 miles are about 110 dB or less, people exposed should incur no hearing damage at all. A study of recommended levels for community acceptance of rocket launches gives 98 dB at 1.0 Hz up to 108 dB at 10-20 Hz as limits (Ref. 3-42). An OBL launch will marginally meet these criteria at 1.8 miles or greater.

(b) Audible Range (20-20,000 Hz)

From the low frequency to 1000 Hz, an octave band level of 135 dB for 1.5 minutes is the limit for hearing loss protection (Ref. 3-42). At 3000 Hz, the limit has dropped to 120 dB for 1.5 minutes of exposure, with somewhat higher levels permitted above 3000 Hz. It is evident from Figure 3-15 that noise throughout the audible frequency spectrum (at 1.8 miles) is so much lower than the hearing loss criteria, that no hearing loss will occur. In addition, the Air Force standards for occupational personnel given in Table 3-3 (which are more conservative than the Occupational Safety and Health Act (OSHA) standards) permit a 115 dB exposure for 2 minutes. The calculated dB_A level (sound pressure level adjusted for human ear response) from OBL at 1.8 miles from the launch site is 100 dB_A.

(c) Ultrasonic Range (above 20,000 Hz)

Sound energy in the ultrasonic range (above 20,000 Hz) has affected some people. Tests have shown that some subjects are annoyed, have headaches, feel fatigued or nauseated, etc., from prolonged exposure to ultrasound (Ref. 3-42). The threshold for such effects is approximately 70 dB in the low ultrasonic frequency range. Figure 3-15 shows a trend of continual reduction in noise with increasing frequency at any given distance. This trend would continue into the ultrasonic range. Consequently, no ultrasonic effects should occur outside the launch safety zone.

(5) Effects on Structures

(a) Intense broadband noise can cause structural damage if levels are sufficiently high. However, the octave band levels to be encountered (Max. 110 dB) at the edge of the evacuation zone are typical of jet aircraft flyovers near airports, which may cause some vibration but usually do not cause direct structural damage. A test program to determine typical house vibration responses due to aircraft flyovers was performed by NASA (Ref. 3-45). It was shown that typical vibration levels for jet aircraft flyovers at 700 feet were on the order of 0.01 g (1 g equals the acceleration due to gravity), which is the same order as that caused by truck traffic at 100 ft. and freight trains at 200 ft. It was also shown that other household activities such as walking, playing, and running various appliances, caused similar vibration levels, and that loud hi-fi music could increase the vibration level almost by a factor of 10. The aircraft vibration level of 0.01 g was determined to be the threshold of rattling of loose windows, mirrors, plaques on walls, and loose dishes. Low frequency noise levels on the order of 110 dB were found to be the threshold for vibration complaints from SATURN I static firings (Ref. 3-49).

(b) The overall effects of OBL launch noise outside the evacuation zone is expected to be no worse than that described in the preceding discussion of aircraft flyover noise.

(c) A rocket noise criterion in Reference 3-42 states that overall levels of 140 dB are damaging to structures. Although buildings within the controlled area as near as 1000 ft. to the launch sites may not be exposed to levels this high, some damage may occur. Damage can be expected, however, to buildings closer than 1000 ft. to the launch site.

(6) Other Effects

The noise levels to be encountered outside the Safety Zone (up to a few miles) are no worse than those normally experienced near the runways at airports or airbases. Such noise should have no effect on geologic formations and might have a slight startle effect on domestic animals or wildlife. Within the evacuation zone, stray wildlife and domestic animals may be startled and show some panic reactions. In hundreds of launches at Vandenberg, there seems to have been no significant impact from noise; deer and rabbits have been observed to continue feeding during the test operations, close to the operational sites at Vandenberg. Geological effects should be negligible as no delicately balanced rock formations have been identified within the zone.

2. Sonic Boom

a. Background

(1) A body moving through the air forces the air to part to make way for that body, the air closing once the body has passed. In subsonic flight, pressure signals (precursor waves which travel at the speed of sound) move ahead of the body, forewarning of its approach, with the parting of the air and the passage of the body being a relatively smooth process. In supersonic flight, precursor waves cannot precede the body; the parting process is abrupt. A bow shock wave parts the air, which expands as it passes around the body, and then a trailing shock wave recompresses the air as it closes behind the body. These waves travel through the atmosphere as pressure waves and, because of the abrupt noise they generate when passing an observer, are called sonic booms. This general pattern of bow shock, expansion region, and recompression shock is idealized as the N-wave characteristic signature as shown in Figure 3-17. The bow shock passes suddenly but requires a finite rise time (t). From the peak positive overpressure (ΔP, pressure above atmospheric), the overpressure then drops through 0 (atmospheric pressure) continuing to the peak negative pressure as the trailing shock (recompression) passes. The time duration (ΔT) of the entire process can be a fraction of a second up to several seconds depending on the distance of the observer from the missile, exhaust plume length, flight path, and dimensions and speed of the missile. Other characteristics of the N-wave, including ΔP as a function of time,

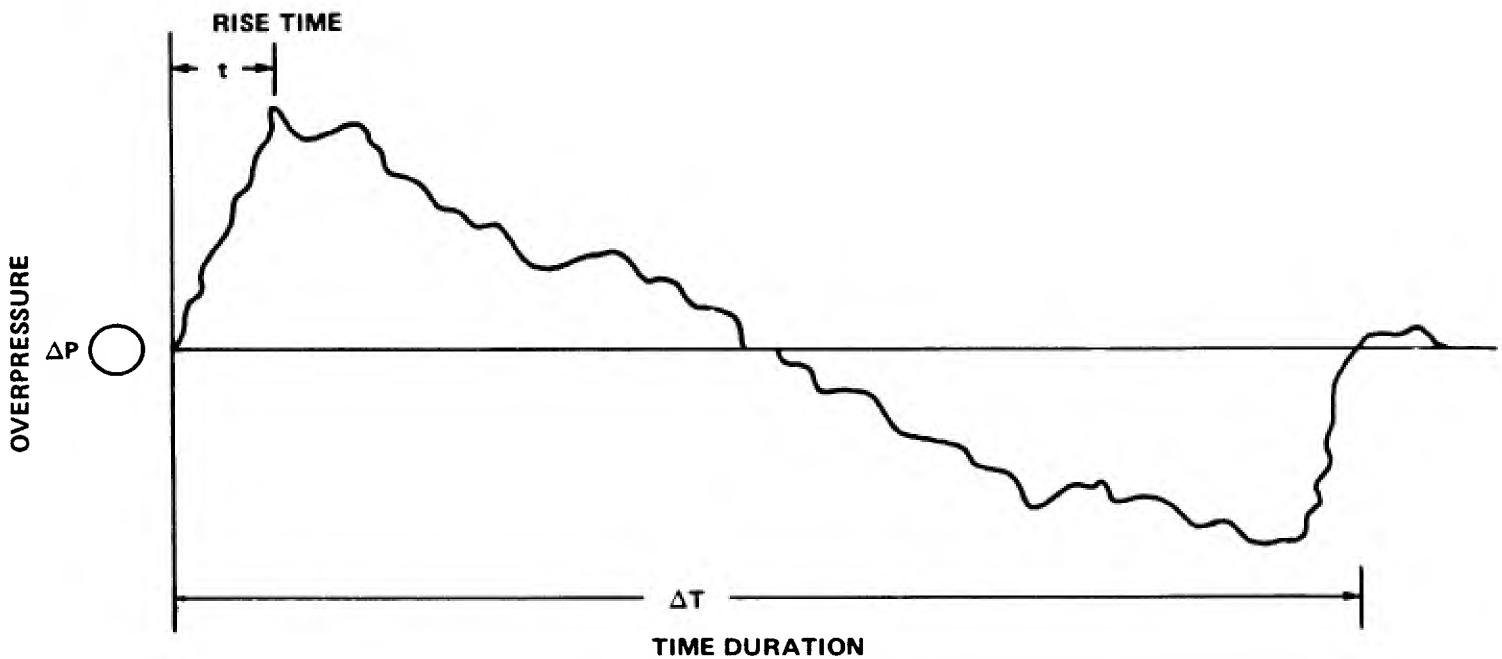


Figure 3-17. TYPICAL MISSILE N-WAVE CHARACTERISTICS

are also affected by these variables and in addition are affected by air turbulence, wind, and density and temperature variations. This results in the ragged appearance of most N-waves.

(2) Since the N-wave is a pulse of finite length, the noise spectrum it represents is a continuum with a peak at the fundamental frequency (e.g., at 1 Hz for $\Delta T = 1$ second), with lower peaks at harmonics of the fundamental and at the frequencies of minor pressure waves caused by missile geometry, atmospheric effects, etc. The noise energy generally decreases with increasing frequency.

(3) The preceding characteristics are generally true of all sonic booms. The exact details are very complex, due partly to some of the reasons already mentioned. Some unique characteristics are associated with a missile ascent which are not found in missile horizontal flight. These, and the normal characteristics, are the subject of the next section, as applied to OBL ascents.

b. Ascending Missile Sonic Boom

(1) It is not generally known, but all orbital space missions and most large operational missile launches have created sonic booms (3-47). These booms have occured mostly over water in cleared areas, and, consequently, have not been heard. Furthermore, these booms almost always have a focusing effect that magnifies ΔP. The ascent focusing effect can be described as follows: with the aid of Figure 3-18.

(2) As the missile first attains sonic velocity (i.e., missile velocity = speed of sound), depicted as point "a" on the flight path of Figure 3-18, the precursor waves no longer precede the missile but the shock system previously described forms an angle from the flight path at the bow that is a function of the mach number ($\sin \theta = 1/M$). * The shock wave propagates perpendicular to the wave front; the propagation path (which will be referred to as a ray) is represented by a dashed line, emanating from the points "a" through "g" along the flight path in Figure 3-18. Since the shock front at low mach number

*Mach number (M) is defined as the ratio of the missile speed to the local speed of sound in the atmosphere.

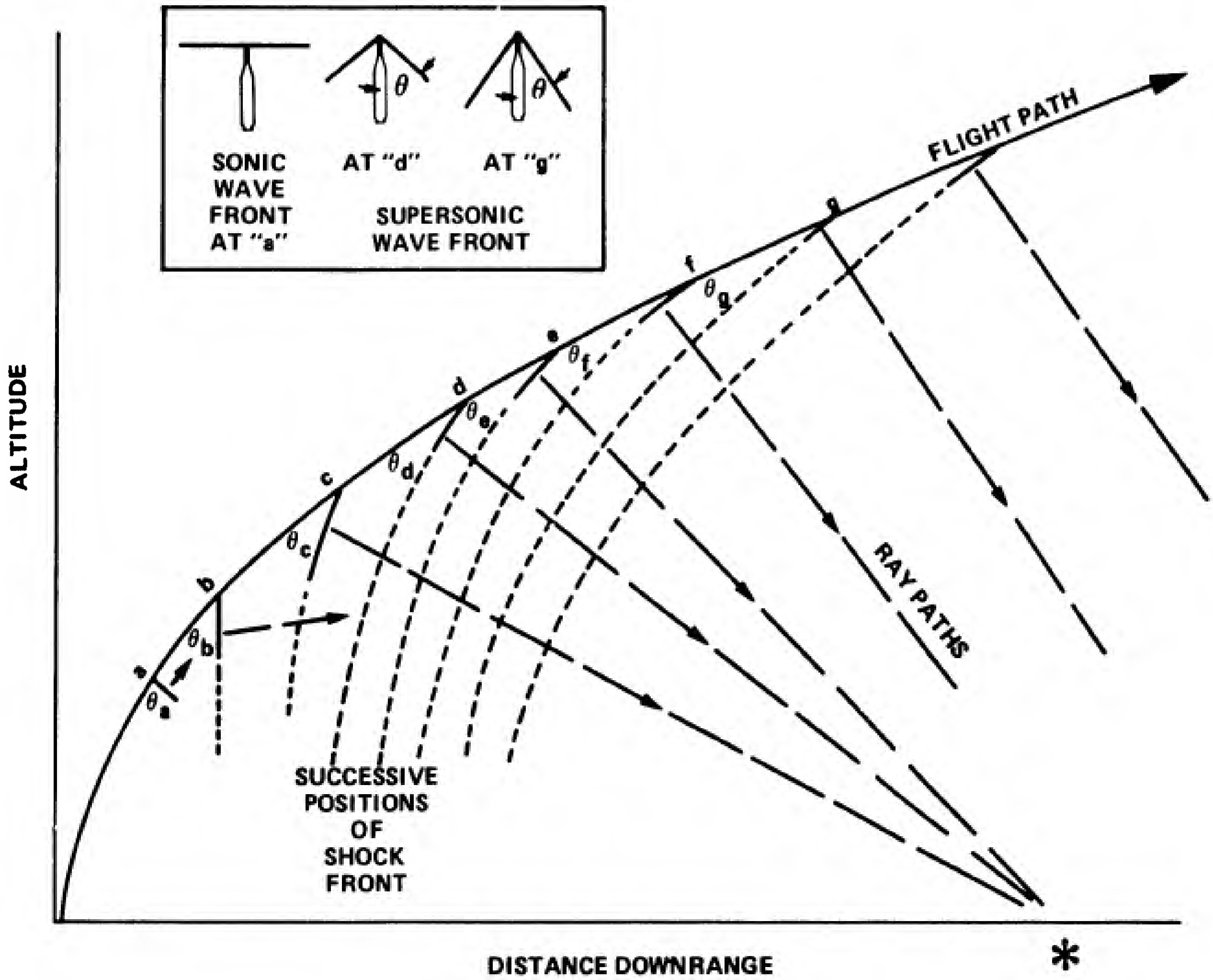


Figure 3-18. ASCENT FOCUSING EFFECT

is traveling nearly parallel to the ground, no sound energy reaches the ground. A shock wave propagating laterally is refracted upward slightly due to temperative and density gradients. As a missile accelerates and pitches over moving on to point "c", the wave front path begins to intersect the earth due to missile flight path and due to decreasing wave front angle with increasing mach number as seen in the inset diagram in Figure 3-18. At each succeeding point as the missile accelerates and pitches over, the waves propagate more nearly perpendicular to the earth. Areas where the rays come closer together are areas of increased shock wave energy, or areas of "focus". Maximum energy focus will occur where rays intersect. Rays drawn from points "c", "d", and "e" thus indicate a focus at point "*" on the earth's surface. Rays drawn from points above "e" also intersect the earth's surface, but downrange of the focus point. These ray patterns result in an initial downrange area of no sonic boom (unless a focus occurs uprange in the air), followed by an area of sharply focused sonic boom which then rapidly falls off in intensity downrange. The intensity of ΔP falls off due to decreasing atmospheric density at the ray's points of origin, increasing distance of propagation, and the fact that the wave is no longer focused.

(3) The time duration, ΔT, and the level of ΔP are increased by the rocket engine exhaust plume. The plume in effect lengthens the missile, which causes the trailing shock wave to be further behind the bow shock, thus increasing ΔT (up to a factor of 10) for a given missile velocity, (Ref. 3-48). The plume also increases the effective missile frontal area. The result is that the overpressure, ΔP, can be magnified by a factor of 4 to 10 over that of a missile with no plume (Ref 3-47).

(4) It is recognized that the current state of art in sonic boom prediction for an ascending missile has not resulted in a standard or generally accepted procedure for their calculation (Ref. 3-47). Such procedures are currently under review by a committee of NASA specialists. There are well established prediction methods for aircraft in level flight at constant velocity. The suitability of these for boom prediction of an accelerating, vertically ascending missile is questionable. It was felt that sonic boom predictions could be most accurately made by empirically extrapolating the

measured APOLLO data, which includes both plume and focus effects, discussed in References 3-47 and 3-48, and in conjunction with the prediction methods for aircraft in level unaccelerated flight. These results were verified using the computer program for predicting overpressures for APOLLO 16 and 17 missions (Ref. 3-47).

(5) It is known that the sonic boom ΔP of a non-lifting projectile for given flight conditions is basically a function of its length, fineness ratio, and altitude (References 3-49, 3-50). Since the fineness ratios are similar for both the MINUTEMAN and APOLLO, the sonic boom ΔP should be in proportion to their lengths (including plume lengths which are assumed to be proportional to missile lengths), with the difference in altitude where focusing occurs accounted for also. The MINUTEMAN is shorter than an APOLLO launch vehicle (SATURN V) by a factor of 6.1. This would tend to decrease ΔP, but this is offset by the MINUTEMAN'S increased pressure factor of approximately 4 and distance-to-travel factor of approximately 3, both augumenting ΔP. The maximum ΔP for APOLLO in the focus area was 8.9 PSF* (Ref. 3-47). When all factors are considered, the plume-focus effect increases the overpressure by a factor of about 18. It is, therefore, expected that the maximum MINUTEMAN ΔP will be 15 PSF for nominal weather conditions. MINUTEMAN trajectory showed that because of atmospheric effects and other unknowns, the maximum overpressure could be in the Computer-based results on the MINUTEMAN trajectory showed that because of atmospheric effects and other unknowns, the maximum overpressure could be in the range of 10 PSF to 18 PSF for worst case weather conditions. It is not expected that the overpressure will vary outside this specified range. Results of the computer program indicate a possibility of two focuses occurring approximately two(2) miles apart, instead of just one. The estimated boom time duration, T, is 0.76 seconds.

(6) The shock wavefronts, in three dimensions, trail behind the missile in a distorted cone shape. When rays, perpendicular to the wave front (or a conjunction of rays in the case of a focus), intersect the earth, a hyperbolic pattern of intersection results where the hyperbola extends downrange as shown in Figure 3-19. For practical purposes the "footprint" area of significant sonic boom focus looks like the crescent areas shown in Figure 3-19. The crescent shaped area extends only laterally so far (Lateral cutoff) because at a critical angle off to the side of the ground track, the wave

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*PSF - pounds per square foot, a measure of pressure equal to 1/144 of a pound per square inch (PSI).

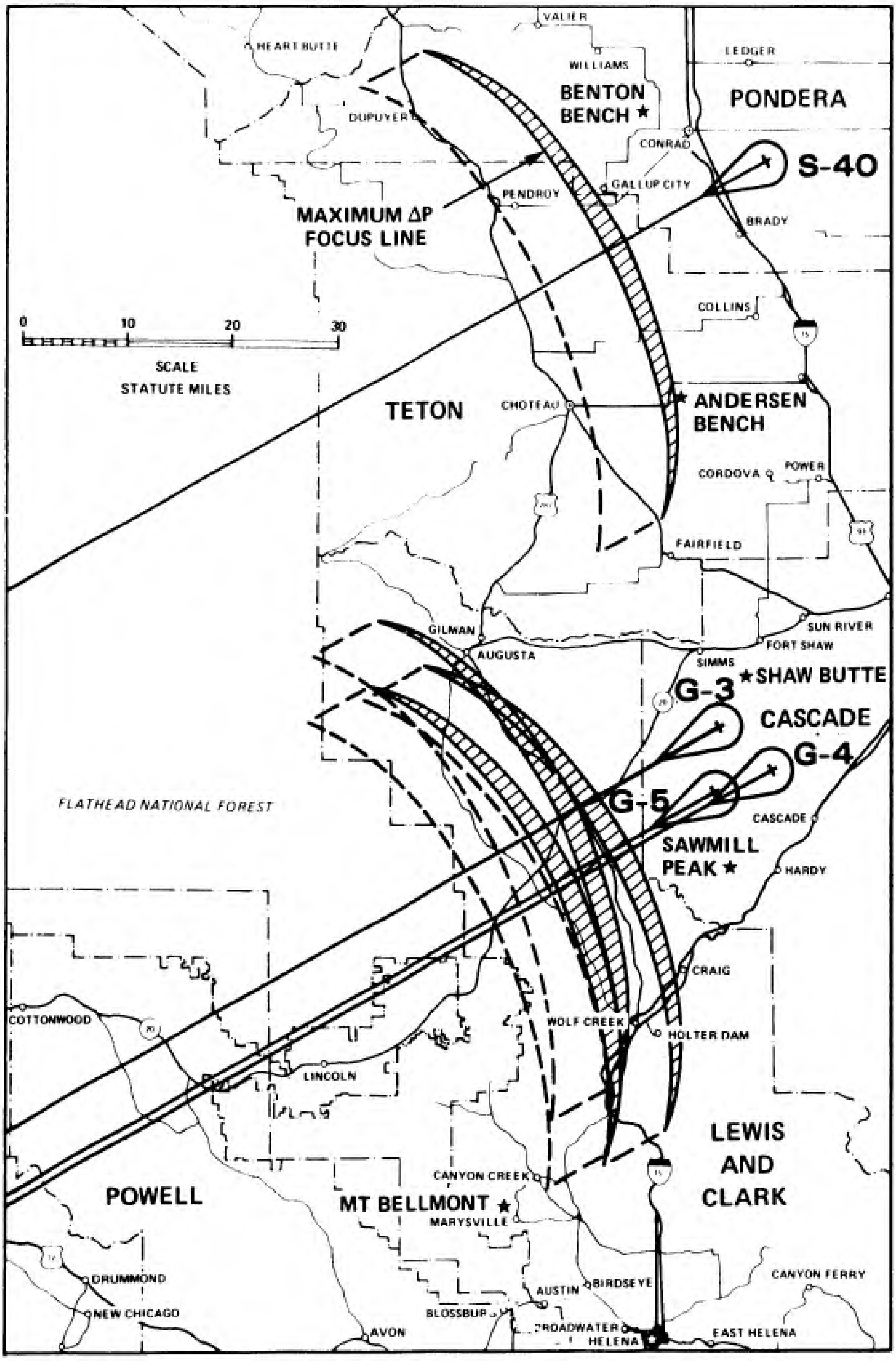

Figure 3-19. MAXIMUM FOCUS AREAS FOR PREDICTED SONIC BOOMS - GIANT PATRIOT LAUNCHES

fronts are again refracted to such an extent that they do not reach the ground. The area in which this occurs is defined as the cutoff region. The hyperbolic region of maximum ΔP is somewhat thicker at the center than at the ends and is followed by a broader crescent shaped area of greatly reduced ΔP, which then gradually fades out. Figure 3-1 indicates (by dotted lines) the overall region in which the focus from a specified launch could fall. A typical area affected by the maximum sonic boom from a single launch would be similar in shape to the shaded footprints shown and could occur at any one location within the region of possible sonic booms shown in Figure 3-19. The uncertainty of the location of the focus region is mainly due to meteorlogical conditions, which will depend on the day and time of launch.

(7) A ray propagation analysis and computer program results indicate that for MINUTEMAN II the focus boom will first intersect the ground at about 15 to 24 statute miles from the launch site, depending on the atmospheric conditions. Since the MINUTEMAN reaches sonic velocities at a lower altitude than an APOLLO, the pressure disturbance field will be much smaller when it intersects the earth surface. It is estimated (based on Ref. 3-47), that the lateral extent of the boom crescent area (Figure 3-19) will be approximately 48 statute miles; maximum thickness of the total crescent will be 10 statute miles at the ground track and on until the missile exits the atmosphere. The boom focus line is predicted to be in the order of 1 to 2 statute miles thick and will have a ΔP of 8-15 PSF. The remaining area of the crescent will have a ΔP of 2 PSF or greater near the focus line.

(8) In the history of the USAF missile operations there have been no problems reported as a result of sonic booms. This is due undoubtedly to the fact that the ascent track of all of the vehicles has been over open ocean and the planned reentry of spent stages is also over open seas, thus placing sonic booms away from land areas where they can be experienced. However, the fact that missile paths have been over open ocean has also resulted in few data. By necessity, the single measured data point on sonic booms from a missile (i.e., the APOLLO launch) was used to arrive at a predicted numerical level so that environmental impact could be assessed. The peak pressure levels predicted in the maximum focus region represent the worst case values. While many methods exist for predicting the sonic boom overpressure due to vehicles in level flight, prediction of

focusing effects for different sizes of accelerating missiles are based on extrapolation factors which have not been verified by empirical measurements. For MINUTEMAN II it is the focus and plume extrapolation factors which mainly contribute to the predicted overpressure levels since the without plume and focus factors levels are less than 1 PSF. The extrapolation which yielded these values predicted for MINUTEMAN II could actually be far too conservative because of the unknowns in the technology and the extreme differences in the size of a MINUTEMAN compared to the SATURN V.

(9) There is some qualitative empirical data relative to overland flight of MINUTEMAN II missiles. Four launches of the MINUTEMAN II on a southerly azimuth have occurred. These flights originated from North Vandenberg. Figure 3-20 shows the Malmstrom sonic boom footprints superimposed on a map of the Vandenberg area. As can be seen by Figure 3-20, the launch azimuth is over water and it was close enough to the Vandenberg coastline theoretically to focus a boom in the South Vandenberg area. No direct measurements of overpressure were attempted. There were no reports of a sonic boom being audible; no claims for damage were received, and there was no reported damage (broken windows, for instance) to any of the Vandenberg test facilities that dot that area. Differences in weather conditions between Malmstrom and Vandenberg could possibly move the focus region uprange or downrange.

(10) The Air Force does, however, plan to conduct a series of MINUTEMAN sonic boom tests. These recordings of overpressure will be done at sea off the coast of Vandenberg in association with upcoming scheduled MINUTEMAN operational tests. One test has been conducted and a sonic boom was measured on the surface. The measured levels were approximately 2 to 3 PSF, however, this may not be representive of the focus level. There was a weather change prior to launch that could have caused the focus point to move.

c. Descending Missile Sonic Boom

As the first stage returns to earth after burnout, it will be traveling at supersonic speeds. Inherent in this fact are the resultant sonic booms which will be detectable in an area along and surrounding the reentry ground track. Except for plume effect, which does not occur in descent, the same rules apply to descent as to ascent in the propagation of pressure disturbances. The wave front forms an angle with the flight path whose sine is inversely proportional to mach number with rays traveling perpendicular to the wave front. The exact ray paths are again dependent upon atmospheric conditions, which tend to refract the rays. The curvature of the reentry profile in conjuntion with the deceleration of the first stage creates the very high probability of a focus

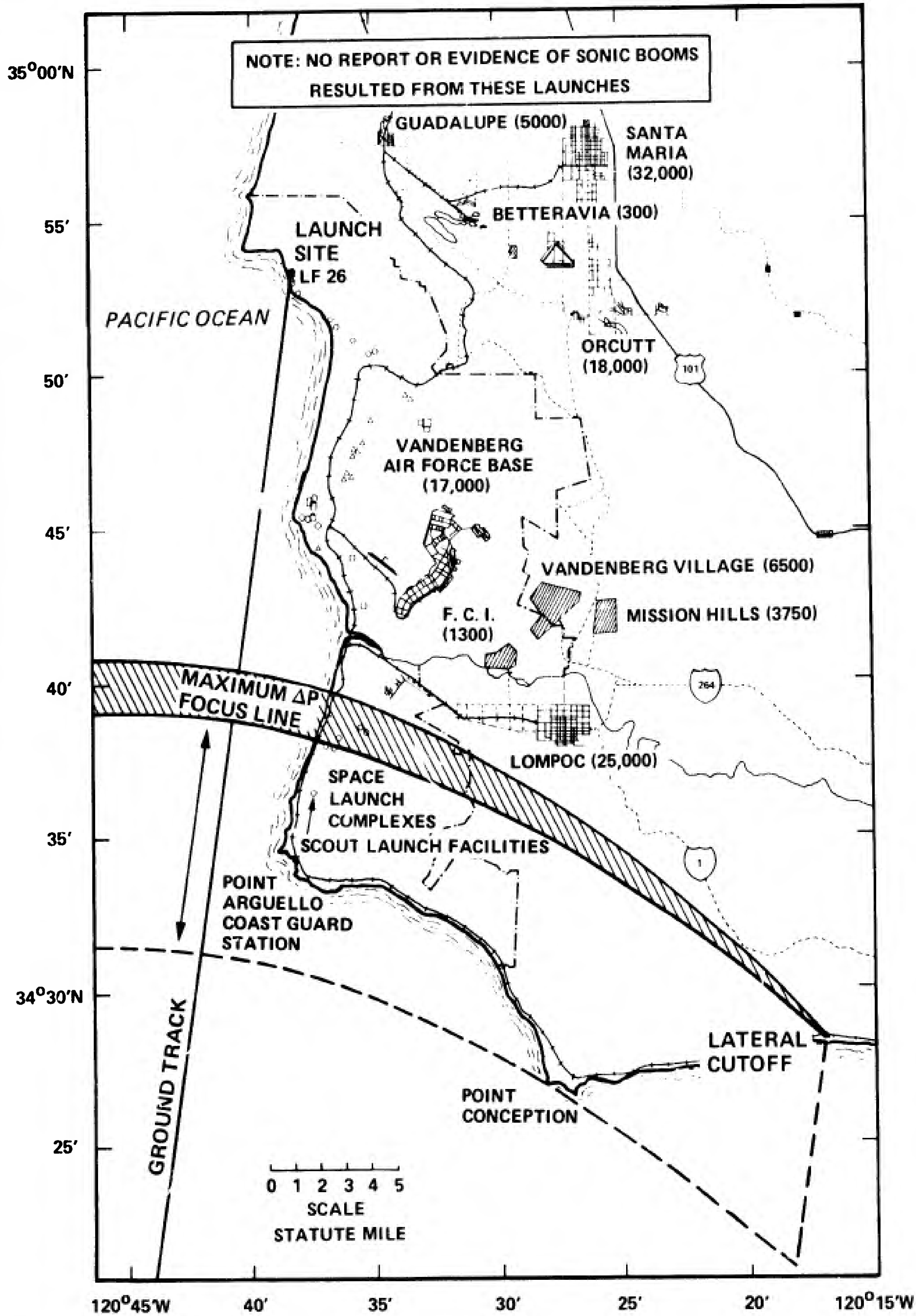

Figure 3-20. THEORETICAL SONIC BOOM FOCUS AREAS FOR LAUNCHES FROM VANDENBERG AFB

occurring at mach numbers between approximately 4 and 5. A descent focus "footprint" will look very much like the ascent footprint except that it will be an inverted image, the crescent extending uprange. Maximum overpressures in the focus crescent will range from 0.9 to 1.6 PSF, assuming a focus factor of 4 (References 3-58 and 3-59). The sonic boom overpressure will first be detectable at a distance of approximately 30 statute miles before the impact point and up to the impact area. The focusing crescent of maximum ΔP will occur approximately 15 miles uprange of the ground impact area.

d. Environmental Impact Due to Sonic Boom

(1) Effects on People

(a) The use of peak positive overpressure, ΔP, is not universally accepted as the physical parameters, such as total time duration, rise time, energy spectrum, are all known to have some influence, but insufficient research has been conducted to determine these effects accurately. Therefore ΔP is currently characteristically used to give first order effects of sonic booms.

(b) The standard level of acceptability of sonic boom exposures among people has not yet been established. There is such a wide tolerance in individual sensitivity to all types of noise, that absolute acceptability criteria in terms of a single number may never be determined. However, several authorities have estimated that the range of ΔP which is thought to produce essentially no adverse reaction (even though detectable) is from 0.1 to 0.75 PSF (Ref. 3-51), at least for daytime booms.

(c) The primary human impact that must be evaluated is any effect on health. For low-level sonic booms, on the order of 1.2 PSF, the startle effect does cause mild physiological reactions. The startle effects for this level of sonic boom may cause transient muscle tension and transient changes in respiration and heart beat rate, but no permanently harmful effects (Ref. 3-51).

(d) In the higher pressure range, a recent experimental study exposed 91 subjects to impulsive acoustic signals at peak pressures of 100 to 115 PSF (Ref. 3-51). No physical damage to the hearing mechanisms or changes in audibility levels were detected. In another program, an explosive charge simulation of sonic booms at peak pressures of 17 PSF were found to create no human hazard (Ref. 3-5). Experiments with real sonic booms at 120 PSF to 144 PSF revealed only transient "ringing" of the ears as a hearing effect. No eardrum pain or hearing threshold effects were found (Ref. 3-1). Finally, an investigation of the effects of an average of 30 sonic booms a day, for several days, at overpressures of 2-24 PSF revealed no adverse effects (Ref. 3-51). Another recent investigation involved the effects of simulated 1.0 PSF sonic booms on the sleep patterns and moods of subject personnel (Ref. 3-52). The actual ear level of the booms was 0.1 PSF, the estimated indoor level for an outdoor 1 PSF boom. No mood changes of any type were attributed to sonic booms in 21 nights of testing after sleep with a boom every hour. Also, no changes in sleep state were attributed to booms, although slight responses were noted on some subjects' electroencephalograms. In summary, the authors found no adverse effects from the equivalent of a 1 PSF outdoor sonic boom. Another investigation concluded that an outdoor 1 PSF boom is the threshold for sleep interference (Ref. 3-51). Studies conducted by Kryter (Ref. 3-54), though limited in quantity of individuals studied, tend to show that for overpressures up to about 2.5 PSF outside, older people are aroused more often from sleep than younger people. For Kryter's specific tests his overpressures woke up older people 70% of the time, middle aged people 2% of the time and the young people 1% of the time.

(e) In a study of the startle effect on awake subjects, the FAA sponsored another program where physical movements of the arm and hand were measured (Ref. 3-53). In this study, actual aircraft booms were utilized. For indoor boom intensities of 0.5 to 0.6 PSF, only 10% of the subjects showed any measurable startle response. This did not change significantly until a boom level of 1.0 PSF was reached, which the authors suggest may be the real threshold for physical startle effects. The study also showed that young people were slightly more startled than older people. This was attributed to the differing hearing thresholds of the two groups.

(f) In terms of human annoyance, the result of a series of aircraft flyover sonic boom tests are reported in Reference 3-54. These results, from the booms of three different aircraft, showed that a level of 2 PSF was generally just acceptable on the average. Levels of 1 PSF were rated very acceptable. In another aircraft study, reported in Reference 3-54, boom levels above 1.8 - 2.0 PSF resulted in many complaints, whereas boom levels less than this resulted in few complaints.

(g) A discussion of the International Civil Aviation Organization (ICAO) exhaustive sonic boom study was reported in Reference 3-47, where it was concluded that booms of 0.5 PSF or less were not annoying, whereas all booms above 3.0 PSF were rated as annoying.

(h) To summarize the effects that can be expected from an OBL night launch, it can be stated that: (1) the expected 8 - 15 PSF booms occurring in ascent should not cause any direct physical damage or injury to people, nor should the 1.6 PSF boom created in descent of Stage I; (2) Since the predicted boom levels during ascent are well above the annoyance threshold and above the levels required to arouse sleeping people, widespread annoyance may occur within the narrow focus region and complaints may be received from any persons within this region. The reentering Stage I overpressure is much lower than ascent overpressure but because the overpressure is still above the sleep interference threshold, some individuals will be annoyed, and this could result in complaints. However, the area surrounding the reentry is remote and it is most likely that there will be no people within the area affected.

(2) Effect on Man-Made Structures

(a) Sonic booms, thunder, passing trucks, and trains, etc., can all cause vibration responses in buildings. Such effects as window and dish rattling are fairly common experiences. The exact threshold of such responses is not known because responses are dependent on looseness and balance of the rattling structure, among other things.

(b) The authors of a recent summary of sonic boom structural effects have concluded that the threshold of structural damage for buildings in good repair is about 11 PSF (Ref. 3-55). They do quote a small probability of some damage in older buildings at boom levels of 1.0-2.0 PSF.

(c) In a space shuttle sonic boom investigation, findings from the ICAO quoted 20 PSF as the damage threshold to primary structures and 1.0 to 3.0 PSF as the damage threshold for secondary structures such as old plaster and windows (Ref. 3-47).

(d) Since the st ıctural damage threshold for primary structures appears to be in the range of !1 to 20 PSF, some damage to primary structures damage may occur from an OBL launch. Damage to plaster, tile, and windows could also occur. All of these structural effects may be worse on older buildings. Rattling of windows and dishes, etc., may be present within the regions of maximum focus if the focus occurs in a populated area. Based on the predicted levels, the overall result of an OBL launch could be complaints, and possible damages caused by ascent sonic boom if the focus should occur in an area with population. (Figure 3-19 shows that the region of possible sonic boom contains some small population areas as well as open country.) However, the predicted sonic boom levels are not expected to result in more than localized damage and complaints.

(3) Other Effects

(a) Wildlife and Domestic Animals

A summary of sonic boom effects on animals was recently presented to Reference 3-56. Some of the findings are discussed as follows:

●Chicken Eggs - Repeated sonic booms of 5 to 19 PSF at a rate of 30 to 52 booms per day for 12 days, resulting in no difference in successful hatching rate compared to a control group of eggs. No development deviations were found in any of the eggs examined. No effects were found in any of the young chicks at age 12 weeks.

●General Farm Animals - Ten farms were visually monitored for animal reaction to sonic booms of up to 3.0 PSF in magnitude over a 3-week period. Except for some avian species, behavioral reaction was minimal—occasional jumping, galloping, bellowing, or random movements were noted. Cows reacted to only 19 out of 104 booms, and then only mildly, such as by raising the head. Poultry showed more response than the larger domestic animals. These reactions included running, crowing, sometimes flying. However, no injuries or deaths were recorded. The reactions of the larger animals and poultry were typical of responses to noises such as trucks passing by or low aircraft flights.

•High level ΔP on Cows and Horses - In another test, horses and cows were subjected to low altitude flyovers of supersonic aircraft resulting in overpressures as high as 144 PSF. The reactions were relatively mild. Typical were alerting of the body, looking around, and some movement or running for short distances of 10 to 30 yards. In all cases the animals immediately returned to grazing or whatever they were doing.

•Mink - Mink are noted as very sensitive animals, and some mink ranchers were quite concerned about sonic booms. Tests at a mink ranch, with typical ΔPs of 1.0 PSF resulted in alerting, but no real disturbance to mating pairs of mink. After young were born, females alerted and looked around, but did not panic, run, or kill the young as had been previously suggested. In another mink study, with simulated booms of 2.0 PSF, no effect on birth rate was shown. A further study with real booms on the order of 5.0 PSF, showed only minimal startling effects.

•Deer and Reindeer - On Eglin Air Force Base, where frequent high-intensity booms occur, deer showed almost no response to booms. Swedish reindeer in a large corral showed reactions similar to mammalian farm animals for booms up to 14.6 PSF.

•Zoo Animals - Some animals in the San Diego Zoo show alertness and momentary concern to booms. At the London Zoo most animals were oblivious to booms. Only young chimpanzees showed momentary fright.

•Ravens - English soaring ravens were noted to flap and call for a few minutes, then resume their quiet soaring.

•Terns - A mass hatching failure (99%) in 1969 in a tern colony off Florida Coast was circumstantially accounted to sonic booms of fighter aircraft "on the deck" activity, flying within 60 feet of the nest. This produced overpressures in excess of 100 PSF. In other years, normal high-altitude aircraft sonic booms had no effect on hatching.

•Fish - Reference 3-57 relates that underwater explosions resulting in impulses of 2100 PSF did not stun sensitive fish.

(b) The overall conclusions from all these studies are that an OBL ascent sonic boom should cause no permanent damage to domestic animals or wildlife, but could cause some alerting, jumping, and running in some species.

(c) Natural Geological Structures

Sonic boom energy is mostly reflected from the ground, typically by as much as 99.8% (Ref. 3-57). The impulse energy that does go into the ground is attenuated rapidly in the first few meters, depending on the exact composition of the earth. Measured data is limited to realtively low-intensity booms of 2.5 PSF. The ground reaction was stated as similar to ground vibrations 30 feet from the path of a car going 30 miles per hour (Ref. 3-57). Effects of higher overpressures are not known, but some of the low altitude boom tests ($\Delta P \sim 100$ PSF) apparently caused no problems in the flat countryside where the tests were run. In addition, tests run in an attempt to trigger an avalanche by means of low flying aircraft produced no effects at levels up to 10 PSF. The area affected by the ascent sonic boom footprint is shown on Figure 3-19. This region is at the 4000 to 5000-foot level and consists mostly of open plains and moderately sloping hills. No unusual geologic structures in this area have been identified.

3. Noise From Destruct

a. In the event of an abnormal launch, a commanded destruct of the missile will result in the detonation of the 3300 pounds of propellant in Stage III. The shock wave resulting from a destruct action during the early stage of flight would be felt on the ground in the vicinity of the launch facility. Figure 3-21 illustrates the evacuation area about the launch facility and the regions within which shocks exceeding a specified level may be detected. The outer

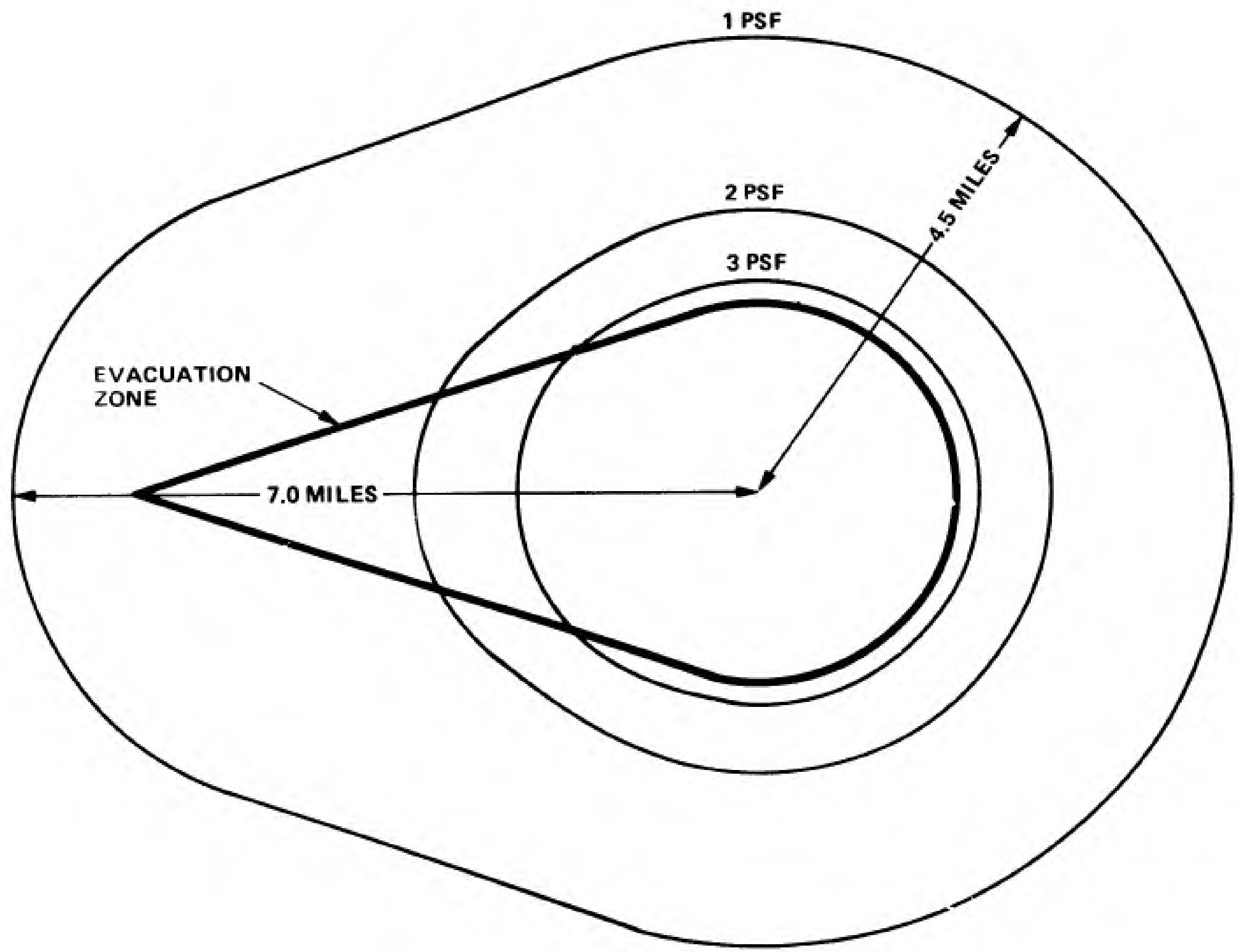

Figure 3-21. MAXIMUM SHOCK PRESSURE CONTOURS FOR MISSILE DESTRUCT NOISE

border, corresponding to an unreflected shock strength of 1.0 PSF implies that no shocks exceeding this intensity will be observed outside this border for any missile destruct action. The maximum time for destruct to produce a shock of this intensity anywhere within the 1.0 PSF border is 31 seconds. For the 2.0 PSF region, the maximum destruct time is 25 seconds, while for 3.0 PSF, the maximum time is 21 seconds.

b. Significant noise from a commanded destruct will be contained within the evacuation area. If an abort launch condition occurs within 21 seconds of launch, the noise levels will not exceed 3 PSF. The peak shock strength resulting from a missile destruct is equivalent in its effects to the peak overpressure of a sonic boom. More detailed discussion of possible effects and various pressure levels was presented in the previous section. No significant environmental impact in or outside of the evacuation area is anticipated from noise from missile destruct.

D. MISSILE DEBRIS

Debris from a MINUTEMAN II missile result from two different conditions: 1) Debris from a normal launch, and 2) Debris from destruct. There are no solid wastes or other products associated with the launch or launch facility since the missile uses a solid propellant. The launch facility is designed so that no solid wastes are left in the vicinity of the missile silo following launch.

1. Debris From a Normal Launch

For a normal flight of the MINUTEMAN missile, no debris are dropped until the end of stage I operation. At 61 seconds after launch the Stage I propellant is exhausted and the empty rocket booster is dropped. At this point the second stage is ignited. The interstage panel which comprises the outer structure between Stages I and II will be retained with the Stage II and impact in the Pacific Ocean. In previous operational tests of the missile the Stage I casing has always impacted in an open ocean area. For the GIANT PATRIOT launches, this debris will impact in a specific preplanned area which is described below.

a. The empty first stage weighs approximately 4, 800 pounds. Its dimensions are approximately 5. 5 feet in diameter by 24 feet in length. Since the casing will be empty there is no danger of an explosive impact, and therefore, it is unlikely that the Stage I impact will cause a fire. The Stage I empty casing has a casualty area of 2, 800 square feet. This means that an injury could result if a living being were within 30 feet of the impacting Stage I. Inhabitants within this small area could sustain significant injury, however, the high risk portion of the stage I impact area will be evacuated.

b. The expected point of impact of the first stage has been determined from radar tracking of the stages on launches at Vandenberg Air Force Base. These measurements of the impact point resulted in the definition of an ellipse within which the stages from a series of flights will impact 99. 7% of the time. Further refinement of this impact ellipse to include recent measurements from Vandenberg launches has resulted in a final impact ellipse size measuring 26. 5 miles in length by 5. 75 miles in width as shown in Figures 2-11 and 2-12. The reference center for this ellipse represents the region of highest probability impact. This reference center also applies to the mandatory evacuation ellipse which is 14 miles in length and 4 miles in width. Evacuation of the area between the evacuation ellipse and the impact ellipse is recommended but not mandatory since the risk to that area is very low.

c. The casings from the spent Stages II and III will fall in open ocean areas as for all of the Vandenberg launches.

d. The reentry vehicle in a normal flight will impact in the Canton Island lagoon in the Phoenix Islands. The reentry vehicle will be recovered by the Air Force following the impact.

2. Debris from Destruct

a. The second situation which creates missile debris is a destruct due to missile failure. Because of the high reliability of the MINUTEMAN II missile, the probability of the need for destruct while the missile overflys the United States is low. If destruct is required, the GIANT PATRIOT destruct system will produce fragments which will move outward from the point of destruct at velocities up to 900 feet per second. If destruct takes place within the atmosphere, the higher velocity fragments will rapidly lose their initial velocity and fall back to earth with least lateral travel. Other slightly more dense fragments will tend to travel the greatest distance laterally from the point of destruct because of the lessened significance of air resistance balanced against the absorption of explosive energy by the piece. Finally, the most dense pieces travel a moderate lateral distance since both explosive energy absorption and air resistance effects are minimized.

b. The fragment distribution is typically many small fragments with a few larger ones. For destruct during the first stage flight there may be one rocket motor casing fragment of 2000 pounds and the reentry vehicle. The remainder of the significant fragments which reach the ground would range from 100 pounds down to one pound or less. The fragments consist of both hardware debris and propellant. Depending on the time at which destruct is initiated, approximately 276 inert fragments would be expected to reach the ground with a major portion of these less than 10 pounds in weight. During the early times, there would also be some propellant fragments but most of these would be less than 2 pounds and would fall in the same area as indicated for inert fragments.

c. The fragment pattern for the winds at Great Falls is presented for several selected flight times in Figure 3-22. The expected number of inert fragments in each region of the pattern is shown within the debris contours for five different cases of missile destruct to illustrate how missile debris would be distributed in the case of a missile malfunction and destruct. In the case of a launch abort prior to 60 seconds, the unburned first stage rocket motor casing

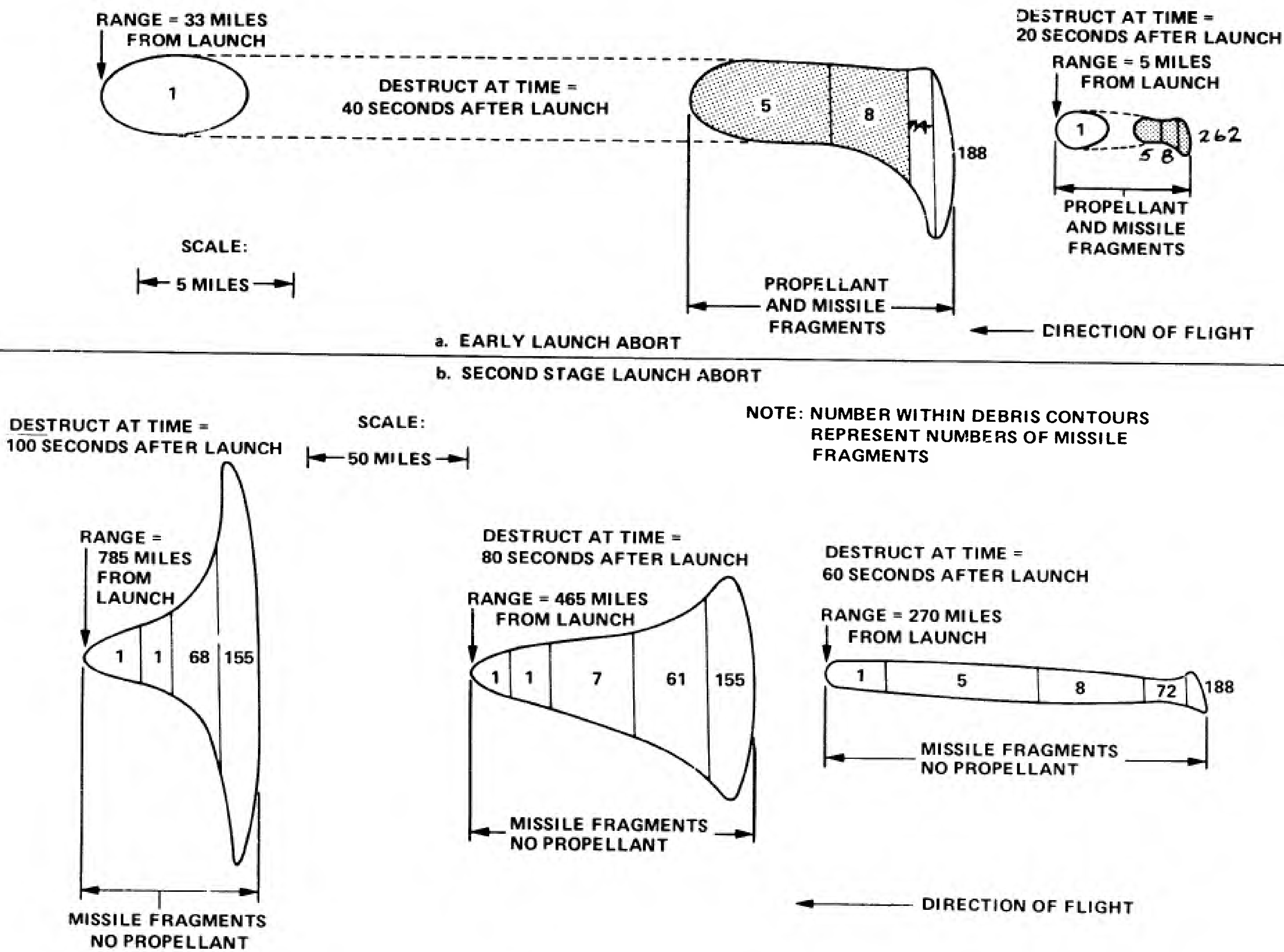

Figure 3-22. DEBRIS DISTRIBUTIONS REPRESENTATIVE OF MISSILE DESTRUCT

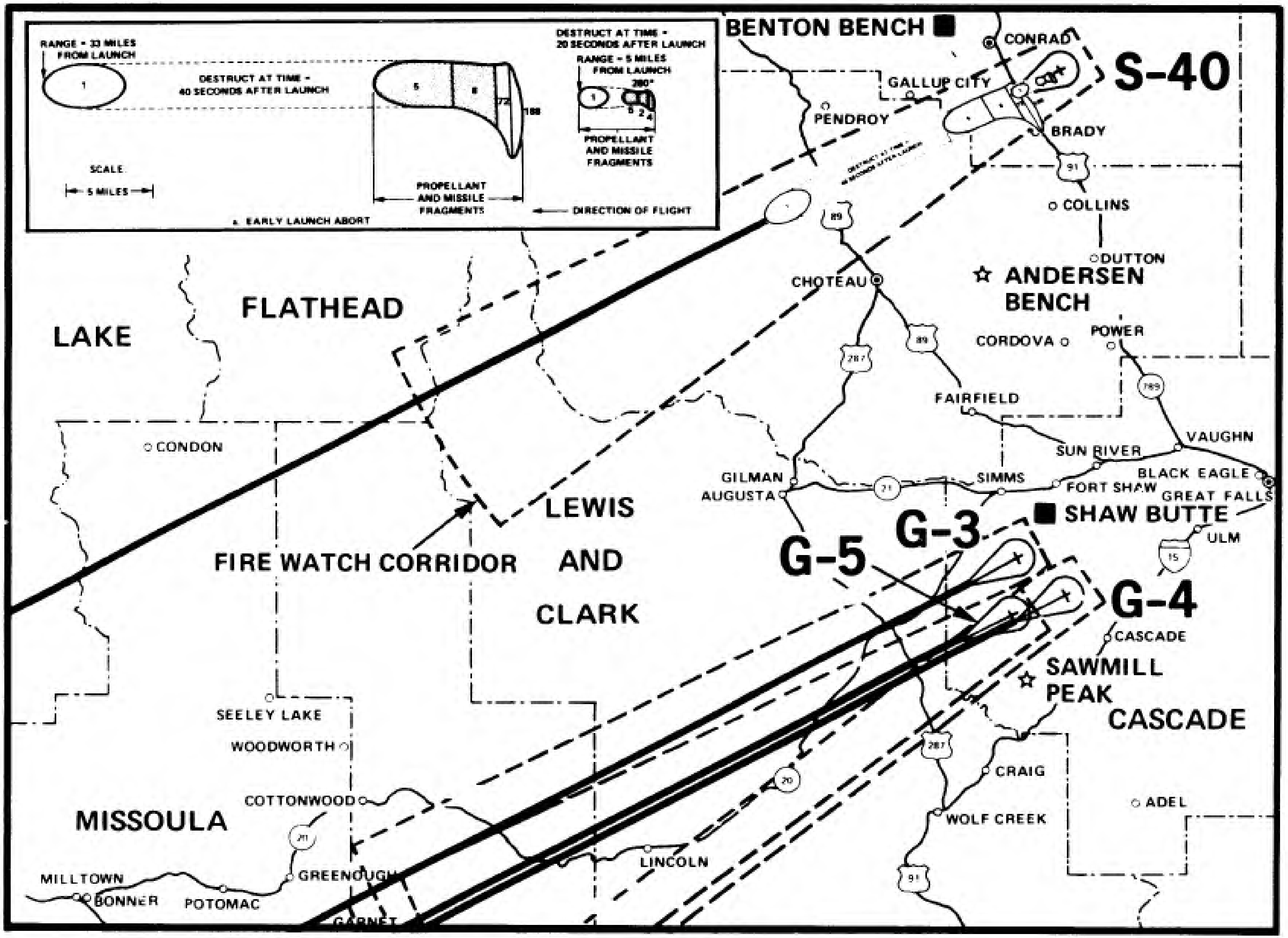

Figure 3-23. DEBRIS PATTERNS ALONG FLIGHT PATH DURING EARLY FLIGHT

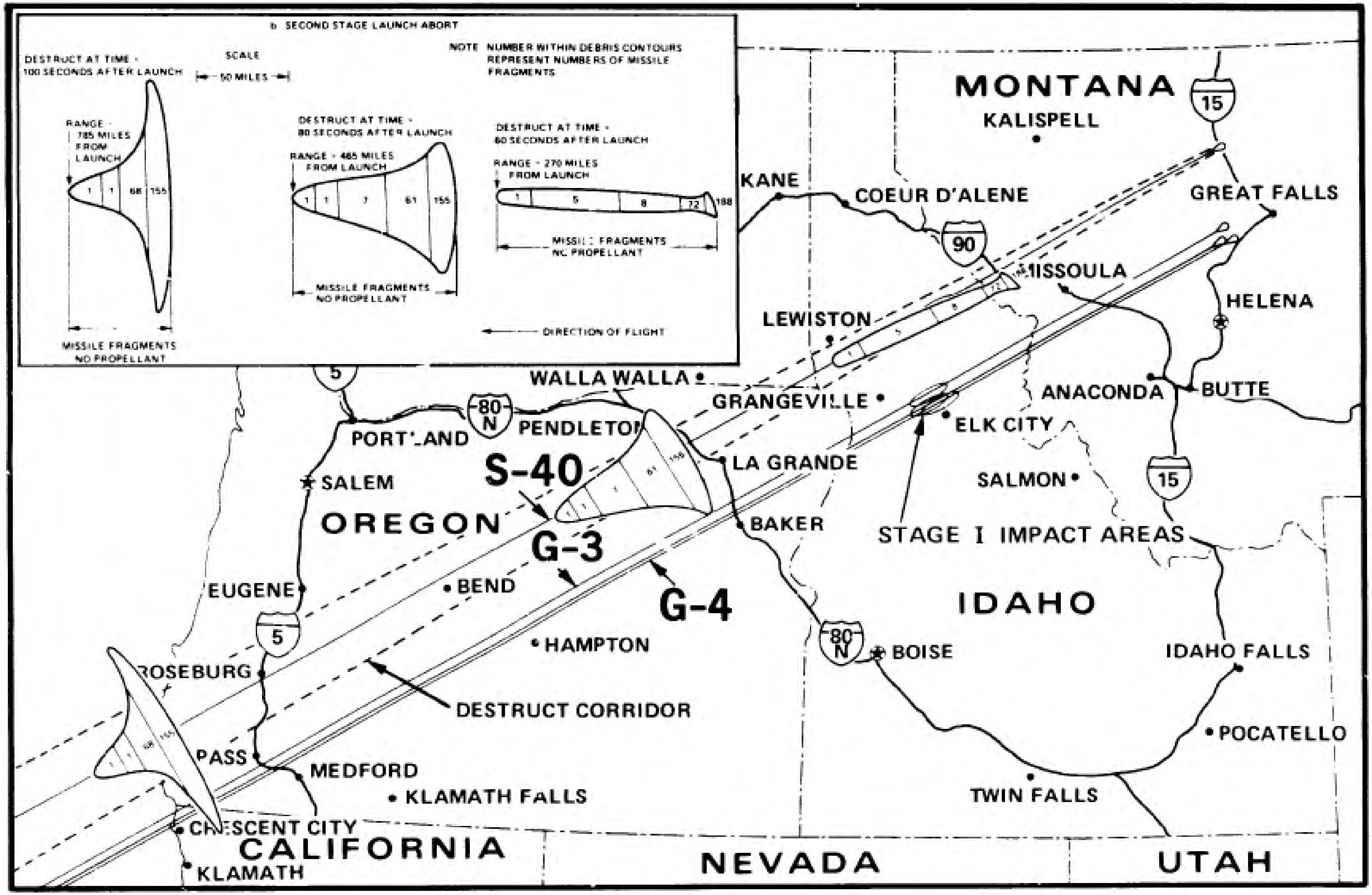

Figure 3-24. DEBRIS PATTERNS ALONG FLIGHT PATH LATER IN FLIGHT

would be the largest fragment to impact the earth at the furthest point in the debris pattern. Figure 3-22 shows for example, that if a missile destruct occurs at T = 20 seconds after launch, from an initial position along the nominal flight path, all fragments including propellant would impact within the six mile evacuation area. For the case of a missile destruct after 40 seconds, all missile fragments would impact within 33 miles of the launch site. Similar examples are also shown for T = 60, 80, and 100 seconds after launch.

d. For a missile which fails along its normal flight path, the locations of the debris patterns for destruct at 20 and 40 seconds are pictured in Figure 3-23; the corresponding patterns at 60, 80 and 100 seconds are shown in Figure 3-24. This normal flight path failure represents the most probable failure case. However, if for example the missile should fail in a left failure mode and be destructed when it crosses the destruct line, then the patterns would be skewed and shifted to the left of the normal flight path. The single heavy fragment would undergo the greatest crossrange shift, ranging from 5 miles for a 40 second destruct to 47 miles for a 100 second destruct. Compututation of risk levels from debris was performed based on nominal and destruct line cases. The risks are described in Section I. D.

e. The shaded areas on Figure 3-22 represent locations which could possibly contain propellant fragments; however, for destruct after 10 seconds of flight, 90% of the burning propellant would be consumed before reaching the ground. If missile destruct occurs 52 seconds after launch or later, no burning fragments would reach the ground. During first stage up to 60 seconds of flight the winds are seen to have a substantial effect upon the shape of the pattern, but beyond 60 seconds the explosion velocities control pattern shape. As the lighter fragments at the right end of the pattern are given the highest velocity impulses at destruct, their spread is greater in the tenuous atmosphere of second stage flight, while in the lower atmosphere the initial fragments, which are the reentry vehicle, rapidly separate from the remainder of the debris cloud in the lower atmosphere because it is not greatly affected by atmospheric drag. If destruct should be required after the first stage has been dropped (after 60 seconds), the largest fragment would be approximately 100 pounds with the vast majority of the pieces one pound or less. The distribution of most of the debris then would be confined to the areas shown.

f. The fragment density indicated in Figure 3-22 applies to the inert debris composed of plastics, metals, and insulations. In addition, there are a number of solid propellant chunks. These typically range from one to eighty pounds with a few pieces of several hundred pounds resulting from early destruct of the first stage. Ninety percent of the propellant fragments are assumed to be burning or to ignite at the time of destruct. Most of the postulated 3500 propellant fragments produced for first stage destruct would be completely consumed before reaching the ground for a destruct at a time greater than ten seconds.

g. Because propellant fragments continue to burn at a reduced rate as they fall to earth, there is a maximum time of destruct beyond which the largest pieces of burning propellant are completely consumed before impact. The OBL flights this time corresponds to 52 seconds; the five minutes required for the largest chunk of second stage propellant to reach the ground is adequate for its complete consumption. This impact point occurs 73 miles downrange and defines the downrange limit of the fire corridor.

h. The computer program used for hazard analysis (as discussed in Section I. D) simulates the debris footprints (similar to those illustrated in Figure 3-22) at each second of launch and calculates where each fragment would fall. The result of this calculation is a probability of impact for each local area and the hazards to population within that area. Appendix C presents the results for all locations affected by the launches.

3. Environmental Impact From Debris

a. For a normal OBL flight the first stage will impact in a preplanned, evacuated area. As it returns to earth in one piece, its effect on the environment will be restricted to a small area corresponding to a circle of 30-foot radius. The first stage will not be burning at the time of impact. A conventional roof will not provide protection from aStage I impact, however the high risk areas of potential impact will be evacuated. The effect on the environment resulting from missile debris during a normal launch is low and extremely short-term. The impact of the first stage will be confined to damage done to wildlife or vegetation confined within the impact ellipse in the State of Idaho. The Air Force will attempt to recover Stage I if possible.

b. For missile destruct, over 90 percent of the fragments will impact at a speed of less than 85 miles per hour. All the fragments considered have the potential for injury to people or livestock in the open, but a conventional roof would provide protection against over 90 percent of the fragments. The safety hazard associated with the OBL launch are presented in the range safety hazard analysis section. The hazards to people are based upon the expectation that any individual in a specific community might experience a minor injury as a result of the launch. The OBLSS destruct system is designed to reduce the size of the pieces to help minimize the risks and fire hazards. In addition, the relatively small pieces would be spread over a larger area to reduce the effects on the natural environment. Following the launch, the Air Force will attempt to recover all missile debris from destruct.

E. FIRE PROBABILITY

1. General

a. There exists the possibility of a fire, principally due to the impact of burning propellant pieces. Because the MINUTEMAN missile is basically a solid-propellant type booster, the destruction of the missile early in flight produces a number of propellant fragments which may or may not be burning. The destruct system used on MINUTEMAN for Vandenberg launches merely rips the casing down the sides creating large pieces of propellants. This type of destruct system was considered unacceptable for OBL because of the fire hazard situation. Large pieces of propellant would survive to impact even if a destruct was initiated at high altitudes and would create a greater fire hazard.

b. To minimize the potential of a fire, the OBLSS destruct system was designed to detonate the missile into small fragments that would spread over a large area and therefore reduce the hazards. In addition, the burning propellant fragments would be smaller and therefore burn out prior to impact from a destruct at higher altitudes. This situation in turn reduces the fire danger area.

c. Studies for the specific GIANT PATRIOT trajectories planned have indicated that burning propellant chunks are not likely to survive to impact from a destruct which occurs after the first 52 seconds of flight. The calculation for these studies used data from the static destruct test and the flight destruct test. The largest burning fragment observed during both the White Sands Missile Range static test and the GIANT PATRIOT No. 2 destruct test was identified as the bottom section of the first stage.

The information from both the White Sands test report (Ref. 3-60) and the GIANT PATRIOT No. 2 TRAP aircraft report (Ref. 3-61) was used to establish the flight time at which burning fragments would no longer survive to impact.

d. An analysis was conducted by the SAMTEC Range Safety Office to establish debris patterns for small and large burning fragments. This study involved computing impact points for the fragments up to 52 seconds of flight. The results were used to establish a firewatch corridor which anticipates fire probabilities if a missile destruct occurs. The SAMTEC Range Safety Office has reviewed the debris impact pattern and developed a tentative firewatch corridor nearly 73 miles long downrange and 21 miles wide. This firewatch corridor is defined for the purpose of stationing firewatch ground stations along the corridor and is augmented by surveillance aircraft covering the entire area of the corridor. The surveillance aircraft will be supported with the Air Force's Modular Airborne Fire Fighting System (MAFFS). The MAFFS consists of an Air Force C-130 cargo aircraft converted into an air tanker capable of dispensing a swath of fire retardant 80 feet wide and a quarter of a mile long. The fire retardants are known by the trade name Phof Chek, Firetrol 100, and Firetrol 93 1LC. It contains five pressurized 500-gallon tanks coupled to twin 18-inch diameter exhaust manifolds which are capable of holding an additional 500 gallons of retardant. The total system capability provides a capacity of 3,000 gallons. A report published by the United States Air Force further describes the concept and operational capabilities of the MAFFS (Ref. 3-62). The Air Force plans to have four of the systems available to support an OBL launch operation.

2. Geography and Climate in Potential Fire Areas

a. The area in Montana of concern is around Great Falls and the Lewis and Clark National Forest. The principal area of Idaho affected is the Nez Perce National Forest. The general area of Great Falls is surrounded by mountain ranges on all but the north and northeast sides with the Continental Divide to the west and the Big and Little Belt ranges to the south. These ranges are prime factors in producing the frequent wintertime Chinook winds which bring warm air into the area, giving relief to the otherwise cold climate that this area would experience. Cold spells seldom last more than a few days and temperature rises of 40°F or more in 24 hours are not uncommon. As a result of the recurring Chinooks, snow seldom stays more than a few days. This leaves the area mostly bare, or nearly bare of snow, most of the winter, except in the surrounding mountains and high foothills. Snowfall amounts to about 56 inches per year. In the months of January-April, the mean snowfall is 8.6 inches per month, with January being the month with the most snowfall for the entire year.

b. Topographical mass of this area show high rolling plains (elevation approximately 3500 feet) leading into foothills on the west and south. From the foothills, there is a fast rise (in about 15 miles) up to the Continental Divide whose elevation averages from 5 to 6 thousand feet.

c. The Nez Perce National Forest is located in Idaho, and is where the first stage is predicted to impact. This area is mostly mountain ranges covered with forests. These forests consist mainly of white and Ponderosa pine and Douglas fir. The general elevation is above 3,000 feet and is covered with snow most of the winter season. This area is about 100 miles west of the Continental Divide and is bordered by the Clearwater, Bitterroot, and Payette National Forests. The Nez Perce National Forest includes both federal land and an Indian reservation. The climate of Idaho in these mountain regions is the continental type with characteristics as follows:

- Winters are long and severe.
- Summers are relatively short with cool temperatures.
- January temperatures average about 10° F to 20°F.
- Average temperatures for July, the warmest month, are about 60° F to 65°F.
- Precipitation is meager throughout most of the state of Idaho.
- Only in the high mountains, like the Nez Perce, is the annual average precipitation more than 40 inches per year.
- The annual average snow fall varies from 20 inches at Boise to over 200 inches per year in the Bitterroot Range.

3. Fire Hazard Probability Associated with Normal Launch

a. For a normal launch, the first stage will burn for about a minute reaching an altitude of approximately 22 miles. At this point the first stage will separate, fall back to the earth, and impact approximately 198 miles downrange from the launch site. The first stage is approximately 6 feet in diameter and

24 feet long and weighs approximately 4800 lbs when empty. A potential fire hazard exists from the first stage, which after launch and separation becomes spent (all fuel exhausted), but remains hot. The nozzle of this stage will be quite hot (nearly incandescent) and the insulation material between the fuel chamber and rocket structure will be fairly hot. The hot nozzle would cool considerably during its 6-minute fall from burnout to the ground, whereas the insulation would not cool appreciably because of its lack of exposure to the outside air. It is possible for the first stage to land in an area (i.e., sharp rocks) that could rupture the case, thus releasing the hot insulation and thereby creating the possibility of a fire. However, such an area would generally be devoid of combustible materials such as trees and shrubs. The hot nozzle is also a possible fire hazard, but it is not expected to splinter on impact and would have to contact highly combustible material to create a fire hazard. This is not likely with the very cold temperatures and deep snow present during the winter months. As an aid to assessing the fire potential of the area, a forest ranger in the Nez Perce National Forest was contacted (20 April 1974) and the following information on fire hazards in the area was obtained:

- In general, snow cover exists most of the winter in the national forest.
- Specifically, one of their ski areas in the forest had 112 inches of snow on its slopes in late April (these ski slopes are located at an elevation of about 3500-4000 feet).
- The area can be divided into two sections; one is the terrain below 3000 feet elevation consisting mainly of grassy plains and river canyons. The other is the section above 3000 feet elevation, which covers most of the area and is mainly timbered forest area with snowcover throughout the winter and early spring.
- On the average about 250 fires per year are started, mostly in the fire season, with 98% of these started by lightening.
- The main fire season is from 1 July to about 15 September. The time of concern in any forest is during the fire season. This occurs when the temperature is warm and the air, ground, and vegetation has a low moisture content so that if a fire is started, the probability of it spreading

is great. On the other hand, when a forest area is wet or snow-covered the probability of a fire starting and spreading is low. The latter is the condition at the first stage impact site when snowcover will probably persist from late fall to late spring, so that during the period from January to April the first stage impact area will be snow-covered.

Based on this information and the above reasoning, it was concluded that the probability of fire in the first stage impact area is so extremely low as to say that it is essentially zero.

4. Fire Hazard Probability Associated With an Abort

a. Even though the probability of failure associated with the launch of the MINUTEMAN II missile is small, the fire hazard probability associated with an abort must be considered. Malmstrom Air Force Base was selected as the OBL launch location because of the low population density of the area. In the launch area, a hazard corridor has been established and all personnel living or working in this area (except for GIANT PATRIOT personnel) would be evacuated prior to launch. This hazard corridor extends 6 miles downrange from the launch facility and includes the area within a 1.8-mile radius around the facility.

b. If the launch becomes abnormal during the initial moments (1 to 7 seconds), the range safety officer will destroy the missile by initiating the destruct system which reduces the missile to many pieces of various sizes. The majority of these missile pieces would be in the 1 to 14-pound size range and consist mainly of fuel fragments. At longer times from launch (greater than 10 seconds), two factors enter, both of which reduce the fire hazard probability as follows:

(1) The more time before a destruct of the missile is initiated, the more fuel that is burned, thereby reducing the total fuel load, which in turn reduces the amount of fuel fragments that could fall and cause a fire.

(2) The more time before a destruct of the missile is initiated, the higher in altitude the missile will be and the longer it will take for the fuel fragments to fall back to earth,

thereby reducing the number and size of the fragments from burnup and burning, respectively, during free-fall.

c. Thus, the main fire hazard area is around the launch area and a short distance downrange. The area around the GOLF sites usually has very little snow cover in the winter months, but has high moisture content during the winter due to precipitation. The only real combustible materials in the area are isolated structures (i.e., houses, barns, etc.), and the probability of a fuel fragment landing on one of these structures is less than 7×10^{-6}, or approximately one chance in 140,000, so the fire hazard probability is extremely small.

d. During launches, a firewatch corridor will be established by the Air Force to make sure that if a fire is started, there will be personnel and equipment standing by to put it out. This firewatch corridor would be located along the flight path from the launch site far enough downrange to cover the fire hazard potential area. The firewatch corridor would cover particularly the area where it is possible for burning fuel fragments to reach the earth from an abort. Section I.C. indicated the abort fire hazard area extends about 73 miles downrange and is about 21 miles wide.

5. Evaluation of Fire Probability

The OBLSS missile will be launched during the winter through early spring period when cold temperatures and frequent snowstorms are common. During this period, most of the fire hazard potential areas will be devoid of combustible materials except for isolated structures (i.e., houses, barns, etc.). Thus a "fire out" condition will exist in most areas. The probability of a burning fuel fragment from a destruct landing on these structures is extremely small. In addition, the use of a firewatch patrol for the fire hazard corridor will be used as an added precaution to insure that, even if a fire is started, it would be quickly detected, prevented from spreading, and extinguished. The low probability of fire, probable snowcover and "fire out" conditions, local fire fighting equipment, and augmentation by MAFFS will insure little or no impact to the environment within the designated firewatch corridor should destruct be necessary.

F. WATER POLLUTION

1. General

Potential ways in which a MINUTEMAN launch may contribute pollution to bodies of water are:

a. Normal flight which results in the impact of spent stages into the ocean and the remote possibility of impact in a la. e or stream of the first stage.

b. In-flight failure which may result in vehicle hardware and/or burning propellant being dumped into water.

c. On-site failure which may result in dispersal of propellant and hardware and release of liquid coolant containing sodium dichromate.

d. Indirect contamination of water from fire retardants which would be used in the unlikely event of fire caused by missile destruct.

These potential effects will vary depending on whether the missile launch and flight are normal or whether there are abnormalities which require missile destruct either near or at the launch site or at distances further along the trajectory and higher in altitude. This section summarizes the missile components which could potentially cause water pollution, discusses possible effects from normal and failed launches, and summarizes the probable impact to the water environments. The GIANT PATRIOT project does not require use of any water resources (other than ocean drop areas) and does not have planned discharge of chemicals as other pollutants to any water environment. Thus, the potential water pollution effects being examined are indirect in nature. The overall evaluation of potential for water pollution has shown that the effects are indirect and unlikely and that the worst case analysis shows no significant of long term impacts.

2. Missile Components and Water Pollution Potential

An adequate assessment of water quality impact requires a knowledge of missile chemical constituents and their amounts (e.g., structural metals and propellants), rates of solution or corrosion of these constituents, and the effect of dissolved or suspended constituents on water quality. Constituents which corrode very slowly or which do not dissolve easily in water do not have much potential for causing pollution since there is no efficient mechanism which could distribute them in the water.

The missile itself, at the time of launch, weighs about 73,000 pounds. This weight is approximately distributed as follows:

Stage III structure guidance and control unit	2,100 lbs
Stage III propellant and reentry vehicle (RV)	3,600
Stage II structure	2,200
Stage II propellant	14,000
Stage I structure	5,400
Stage I propellant	46,000

As can be seen, about 87% of the total missile weight is devoted to the propellant, which is a solid. Of this 87%, the breakdown for Stages I and II is:

Propellant Stage I

Powdered Aluminum:	7,400 lbs
Ammonium Perchlorate:	32,000 lbs
Rubber Binder and Epoxy Resin:	6,600 lbs

Propellant Stage II

Powdered Aluminum:	2,100 lbs
Ammonium Perchlorate:	10,000 lbs
Rubber Binder:	1,700 lbs

Information on Stage III propellant is not needed, since the substance doubles as a destruct explosive if the missile needs to be destroyed and no Stage III propellant reaches water resources.

The structural weights of Stages I, II, and III and the RV are distributed among a wide variety of plastics, fiberglass, and metals. Excluding the plastics and fiberglass, which are wholly resistant to corrosion or dissolution in water (Ref. 3-63), leaves a variety of metals comprising the remaining weight. For Stages I and II this weight of metal is almost entirely alloys of aluminum, titanium, and magnesium, which are light structural materials chosen for a high strength to weight ratio. Such alloys are highly resistant to corrosion due to the formation of tightly adjering metal oxide surface layers (Ref. 3-64). In the metallic state, they are highly insoluble in water and thus have little water polluting potential (Ref. 3-63). The Stage III guidance and control (G&C) unit and reentry vehicle (RV) materials range over a wider variety. Approximately two-thirds of the weight of Stage III the G&C unit, and the RV is comprised of the structural materials given for Stages I and II. The vast percentage of weight is distributed among the following elements, or alloys thereof: iron, copper, beryllium, tungsten, chomium, nickel, silicon, silver, vanadium, manganese, tin, and gold. None of these metals are soluble in water (Ref 3-63) and their entry into water solution must occur through the mechanism of corrosion, which amounts to a slow oxidation and solution of the metal oxide (Ref. 3-65). None of the oxides or hydrated oxides expected to result from corrosion of these materials are more than very slightly soluble in fresh water (Ref. 3-63). Accordingly, these metals enter the true water environment at a very slow rate so that their concentration in water is very low and does not build up appreciably, due to dilution by the continual input of fresh water. No effect on water quality is predicted for these structural materials of MINUTEMAN II. In addition to the major structural components, a minor constituent which was examined was the approximately 40 pounds of beryllium used in the spacer which connects the RV to Stage III. Although finely ground beryllium dust is dangerous when inhaled, it was found that there is no indication that beryllium in any form is harmful to humans or animals when taken into the digestive system (Ref. 3-66). In addition, beryllium is highly insoluble in water and has an extremely slow corrosion rate (Ref. 3-64) and thus presents negligible potential for water pollution.

As previously pointed out ~87% of the prelaunch weight of the vehicle is the solid propellant. The most important potential water quality effects can be ascribed to the propellant, specifically to the very large fraction of the weight which is ammonium perchlorate. Other components are highly insoluble and are nontoxic. The $NH_4 ClO_4$ by itself is highly water soluble (Ref. 3-63) and can be toxic to plant and animal life if sufficiently high concentrations are allowed to build up (Ref. 3-66). The maximum acceptable concentration (MAC) is 90 mg/l with a medium tolerance limit (TLm) of 280 mg/l for 24 hours for goldfish (Ref 3-67). Maximum acceptable concentrations of a pollutant in water are those which have little or no lasting effect on the biota being considered. The medium tolerance limit is the concentration of pollutant in which 50% of the test organisms are able to survive for the 24-hour exposure.

Fortunately, the NH_4 ClO_4 is bound up along with other propellant species in a rubbery binder which is not at all water soluble. Accordingly, the rate of solution of NH4 ClO_4 will be determined by the rate at which it can be exposed to water as the protective covering of the rubber binder is broken down under the powerful oxidation conditions generated by that NH_4 ClO_4 which has already been dissolved. Since the rate will depend on a number of uncontrollable conditions, worst case analyses have been based on the assumtion that total solution will occur in not less than one week.

3. Effects From Normal Launch - A normal launch and flight will result in the impact of the empty Stage I casing in a remote region of Idaho and Stages II and III will land far into the Pacific Ocean.

By the time the Stage I lands in Idaho, the booster is little more than a shell formed of steel with attachments formed of structural metals (including aluminum, magnesium, titanium, and fiberglass). The most likely event upon landing is that the booster will impact on snowpack-covered ground. In this event the expected impact on water quality will be effectively zero, since the booster and impact fragments will be recovered as soon after launch as possible. In the case where recovery is not possible (e. g., the Stage I debris cannot be found) the 4, 800 pound casing will remain in the wilderness and will be subject to weathering processes. Since the structural components of the stage are deliberately chosen to be corrosion and weathering resistant, these components will become incorporated into the soil environment during a time estimated to lie between 10 to 100 years (References 3-64, 3-65, 3-68). The products of this weathering will be oxides of the indicated structural metals. No widespread water quality effects from the distrubution of the oxides are expected, since these oxides are quite insoluble and will be retained by the soil. They will only affect the soil in the immediate vicinity of landing.

A much less likely event would be for the Stage I booster to land in a body of water. For the SIERRA launch the only large body of water in the vicinity of the booster landings is the Dworshak Resevoir which is on the north fork of the Clearwater River. Other potentially affected bodies include Benton Creek, Isabella Creek, Clearwater River (north fork), Silver Creek, Skull Creek, Quartz Creek, and Collins Creek. No large bodies of water will be near the Stage I landing zone for the GOLF launches. Smaller bodies, however, include Newton Creek, Goddard Creek, Big Elk Creek, O'Hara Creek, Selway River, American River, and Clearwater River (south fork). Assuming a worst case in which the entire booster is assumed to be dissolved in the lake or resevoir (e.g., Dworshak Resevoir), the total concentration of all constituents of the booster would be 0.001 ppm or 0.001 milligrams/liter, a value which lies far below recommended limits for the indicated metals, including copper (Ref. 3-69, 3-70).

The effects on water quality due to impact in a major creek would be minimal. If this very unlikely event were to occur, the booster structural components would corrode over a period in excess of 6 years. Since the dissolving or corroding constituents would be entering running water, a continual buildup of dissolving constituents would not occur. Assuming for worst case analysis a total corrosion time of 6 years, a uniform corrosion rate over the 6 year period, and a creek flow of 10 gallons/sec, the total weight of components added to the creek water would be less than 30 milligrams/liter (of the oxides of aluminum, magnesium, and of the components of steel. Accordingly, additions of structural metals even for this worst case analysis do not exceed established criteria (Ref. 3-69, 3-70) even in the immediate region of the Stage I casing. Concentrations further downstream would usually be diluted further due to additional run-off and the joining up of creeks and streams.

The effects resulting from the impact of Stages II and III in the ocean are far less than that for the resevoir, as computed above. The masses of the spent Stages II and III are less than that of the Stage I, and the volume of the ocean is millions of times greater than the resevoir. No detectable increases in ocean water contents of metals will occur. Water pollution due to the reentry vehicle impacting in Canton Island Lagoon is discussed in Section J.

4. Effects From In-Flight Destruct

A much less likely occurrence during launch is that the missile will malfunction and require destruction by the range safety officer. Under these curcumstances missile structural components and propellant fragement will be dispersed near the flight area in order to reduce probability of impact in a single area.

The potential area affected increases as the missile gains altitude and velocity, and thus the expected concentration of material which would land on a given area decreases significantly as flight time increases. Early time destructs would give an average weight dosage of only~0.0005 pounds per square foot (lb/ft^2) as a worst case in the immediate vicinity of the launch site. Later in the flight the weight dosage would drop to 0.0000001 lb/ft^2. In addition, after 52 seconds of flight a high percentage of the propellant would be consumed by burning prior to impact. (The propellant not consumed would not be burning on impact.) From the foregoing discussions, it can be seen that the average doses are very small and, thus, no wide area water quality effects are expected even if missile destruct is required.

There is a potential for localized water quality effects at the immediate location of debris fragments if they land directly in water. An analysis of possible effects on bodies of water lying within the debris area showed no significant effects on water quality. For example, calculation of the effects on the Bynum Reservoir (approximately 15 miles downrange from the SIERRA site) showed that concentrations of well dispersed $NH_4\ ClO_4$ would be thousands of times smaller than levels found to be harmful to fish, wildlife, plant life, or man. In addition to the $NH_4\ ClO_4$ from the propellant, approximately one quart of guidance and control cooling water containing small amounts of sodium dichromate could be released, but this would not have any significant effects due to the extremely small amounts present. Thus, it is predicted that no detectable impact on water quality of important reservoirs or lakes would result from missile destruct or from propellant fragments from a destruct.

A potential indirect source of water pollution would be the fire retardants used to contain a fire started as a result of an early destruct of the missile. Although there is a very small chances of fire even if destruct occurs, firefighting chemicals would be used by local agencies and the Air Force. The fire retardants are known by the trade name Phof Chek, Firetrol 100, and Firetrol 193 1 LC. The three types of chemical fire retardants presently used on fires by the forest service and other agencies responsible for fire control in the debris corridor have the following makeups (by weight):

Type 1)	Ammonium biphosphate	89%
	Modified polysaccharides	8%
	Iron oxide	1%
	Corrosion inhibitors	2%
Type 2)	Ammonium sulfate	61%
	Attapulgite clay	36%
	Iron oxide	1%
	Corrosion inhibitors	2%
Type 3)	Ammonium biphosphate	93%
	Attapulgite clay	4%
	Iron oxide	2%
	Corrosion inhibitor	1%

These fire control chemicals have been used extensively and very little environmental damage has been noted. In particular it should be noted that the primary constituents, ammonium compounds, are used in chemical fertilizers, and as a result these fire retardants promote the recovery of plant life after a fire. Doses of these chemicals dumped directly in water by firefighting equipment may reduce water quality depending upon the dose. However, firefighting crews are trained to deliberately avoid bringing retardants into or near water supplies, and the net effect of the use of these chemcial fire retardants is beneficial.

G. SOCIO-ECONOMIC IMPACT

1. Evacuation History and Procedures

a. The evacuation requirements for GIANT PATRIOT launches may be compared to those used at the Missile Test Range at Holloman AFB, New Mexico, which is an inland test range. This test range, used by the Department of Defense to test to a wide variety of missile hardware, has a long history of successful evacuation operations.

b. The basic instrument for evacuation is a land use agreement which is contracted for by the Corps of Engineers with land owners, their tenants and mineral rights lessees. This agreement provides for government use of land expected to be in a hazardous area and the requirements for evacuation, the time periods involved and the amount of reimbursement to be received during the evacuation period. The agreement also establishes that landowners will be compensated for any damage to property or livestock during the test period.

c. In the case of this inland test range, there is also a formal agreement with the leaders of the Navajo Indian reservation in Utah. This contractual agreement is similar in all aspects to the normal land use agreements except that it enables the Navajo government to establish their own patrol procedures to ensure the evacuation of personnel from designated hazard areas.

d. The test range also enters into agreements with the Fish and Game Commissions of the two states involved (New Mexico and Utah), which essentially restricts missile launches during normal and special hunting seasons. In general, the test range is also responsive to the requirements of special ranching activities such as cattle drives.

e. The response by the general population to the requirements of the test range and to the procedures which have been established for evacuation has been highly cooperative. The population involved generally views the situation as one in which they are fairly compensated by the government for any personal inconveniences and risks to property. Thus far the only negative reaction that has been encountered, and this has been rare, has been by "transients", i.e., those who may be drilling or mining under mineral rights agreements during desired test periods. In these cases the basic problem has been that the mineral rights lessees have not been informed by the landowners that they have entered into agreements with the government. Once these agreements have been aired, however, cooperation has been most satisfactory.

f. Prior to the GIANT PATRIOT launches, the Air Force will effect land use agreements defining evacuation and reimbursement agreements with all residents and property owners in the launch and first stage evacuation areas. These persons will be compensated on a per diem basis for the periods that they are away from their residence and for any special inconveniences caused the residents by the launches. A survey of all residents in the hazard area will be made to ensure complete evacuation. The hazard areas are in sparsely populated regions. To ensure complete evacuation, land and airborne surveys will be made of the area. In addition, formal notification of impending launches by the U. S. mail will be made to all permanent residents in the launch hazard areas. Also, assistance in completing the evacuation will be given by the local county sheriff and the local highway patrol or state police. To ensure that no unauthorized entry is made prior to a launch, manned road blocks will be erected.

2. Indemnity Plans for Accidents and Damage

a. Indemnity plans for accidents and damage is covered in leasehold interests acquired by the Seattle District Engineer over property in the hazard areas. These agreements will specify the coverage supplied to private and personal property including dwellings, livestock, and real property.

b. In the past, indemnity plans have served to protect the private land owner from economic loss. Claims made have been settled in a reasonable time period. Claims for damage patments not covered by indemnity agreements are settled with property owners after a site survey team makes an assessment that a real loss attributable to the OBL launch has occured.

3. Economic Impact of GIANT PATRIOT Expenditures

a. Malmstrom Air Force Base

(1) Malmstrom Air Force Base significantly adds to the economy of Central Montana. Malmstrom AFB is located in Cascade County, Montana, and is the support base for the first MINUTEMAN Missile Complex in the United States Air Force. That complex encompasses approximately 23,000 square miles of Central Montana.

(2) Data and statistics for calendar years 1972 and 1973 indicate that Malmstrom contributes almost \$66 million annually in payrolls and about \$20.6 million for other non-pay expenditures to the Great Falls economy for a total of \$86.6 million. Based upon the principle that money spent is income for someone else who invariably spends it again and in turn generates more income, a multiplier of 2.5 is applied to the \$86.6 million to determine the economic impact of Malmstrom on Cascade County. Thus the application of the multiplier produces a total overall economic impact by Malmstrom of \$216.4 million in the central Montana area for 1973. The multiplier is based upon the assumption that three-fifths of income is spent and two-fifths is saved. Because impact is related to the portion spent, the 2.5 multiplier is considered to be conservative and is used solely to point out that the impact of any activity goes far beyond any direct cash layout. Thus the multiplier indicates the relationship between the original government expenditure and the total impact on the local economy.

b. Economic Impact of GIANT PATRIOT on Great Falls

(1) GIANT PATRIOT expenditures in Cascade County are estimated to be \$1.2 million for construction, personnel, temporary lodging, and related items for personnel temporarily assigned to the area for the testing. The expenditures using the economic multiplier of 2.5 will benefit the local economy by increasing retail sales by approximately one percent. This impact would not result in strong economic upturn or decline following the conclusion of the tests.

(2) It is anticipated that the principal beneficiaries of these expenditures will be the proprietors of hotel/motels, restaurants, car rental agencies and local airlines. Many of these businesses are not locally owned but do generate a cash flow into the local economy. Thus it is anticipated that the Cascade County economy will benefit favorably from expenditures

by Air Force and contractor personnel, but will not be dislocated to any significant degree, nor burdened with overcrowding or capital facilities construction.

c. Economic Impact on Regions Outside of Great Falls, Montana

(1) Landowners who lease their properties to the Air Force for the duration of the test launch phase will be given the options of retaining all constructed facilities, communications, power lines, and roads or having the land restored to its original condition. Landowners who option to retain all constructed facilities will benefit economically to the extent of the value of the improvements. No economic loss either real or appraised is expected to occur to the landowners in these areas as all conditions of land restoration will be met to the owners specifications as contained in the lease agreeements.

d. Impact on Social and Planning Organizations in Cascade County

(1) Because the activities associated with GIANT PATRIOT launches do not require permanent relocation of military or civilian personnel, no requirements exist for planning or construction of community services and facilities. There will be no requirements for additional schools, changes in social structure, or dislocation of residents. All personnel assigned to the launch effort will either be from local labor sources or be temporarily relocated using Malmstrom facilities.

H. EFFECT ON AIR TRANSPORTATION

Air traffic on the following airway/jet route segments is near the launch and drop areas. The remainder of the flight path does not affect airways since the missile is well above the atmosphere:

ROUTE	AIRPORTS	PEAK FLOW 24 Hr.	Nite
J-70/90	Mullan Pass-Lewiston	30	5
J-16	Pendleton-Whitehall	12	2
J-517	Boise-Spokane	16	2
V-253	Lewiston-McCall	10	1
V-187	Lewiston-Missoula	12	0
V-298	Pendleton-McCall	5	1

For each launch the estimated time of delay is 15 minutes for Route J-70/90 and 30 minutes for the other five routes. OBL launches are most likely to be scheduled for late night (between 12 midnight and 3 AM). The OBL launches will be publicized fully and coordinated with appropriate airline and FAA officials (as discussed in Section I.C) and thus no effects on airways are expected other than the minor delays mentioned above.

I. EFFECT ON HISTORIC SITES

1. The National Register of Historic Sites was reviewed to identify all sites which could potentially be impacted as a result of GIANT PATRIOT launches. While there are many sites within the complete flight path area, the possibility of causing damage is extremely low.

2. The National Register of Historic Sites lists no locations within the launch hazard area. During the ground surveys, St. Peter's Mission, a historic site of local interest, was identified in the G-5 hazard area. Mr. Ashley C. Roberts, the State Historic Preservation Officer for Montana, reported that the mission has been conditionaly approved by the Historic Sites and Antiquities Advisory Council for National Register status pending additional information. The mission is located approximately one-half mile from the G-5 launch facility. Potential impact to the mission would be principally from burning propellant fragments if the early destruct (between 7.9 and 16.3 seconds) occured; however, the chances of impact of any fragments on the mission as a result of the G-5 launch is less than 1 in 4 million.

J. EFFECT ON CANTON ISLAND

The MINUTEMAN II missile to be launched from Malmstrom AFB will be targeted for the Canton Island Lagoon in the Phoenix Islands group. The reentry vehicle (RV) is scheduled for splashdown in a designated spot within the north central section of the lagoon, in an area that will be least affected ecologically. The RV will be recovered by divers using either helicoptors or a small marine craft. The RV and other debris will be returned to the United States for analysis. No significant environmental effects on Canton are anticipated as a result of the GIANT PATRIOT launches. Many MINUTEMAN missile launches have used lagoons in the South Pacific for impact target points without adverse effects, and the possible effects on the Canton Lagoon for GIANT PATRIOT have been studied by several government agencies. The analyses and studies show that the environmental effects on the islands as a result of human activity has been successfully minimized by the Air Force; that effects on water quality, plant growth, and wildlife due to heat, noise and debris would be minimal; and that no effects on air quality, facilities, or personnel are expected.

IV. ALTERNATIVES

A. GENERAL

This section presents alternatives to conducting GIANT PATRIOT launches from the operational MINUTEMAN Wing at Malmstrom AFB. Each alternative is to be evaluated both in terms of degree of satisfaction of GIANT PATRIOT objectives and to assess the probable environmental impact resulting from the alternative action. Since the alternatives are to be compared with the proposed Operation GIANT PATRIOT, a review of the proposed operation is presented below.

Operation GIANT PATRIOT would provide an unmistakable demonstration that the high accuracy and reliability shown by the launches from Vandenberg AFB apply to the operational environment. The operational base launches would serve to validate the total system concept including accuracy, reliability, modernization, modifications, and communication interconnections with individual launch facilities, squadrons, wings, and overall command and control. Due to the overland flight path, gravity effects models could be verified and any measured deviations could be applied to other operational wings. Successful GIANT PATRIOT launches from Malmstrom AFB would significantly increase the credibility of the retaliatory capability of land-based strategic missiles and of the national will to respond to any aggressor. Based on the concept of deterrence, the launches would decrease the risk of misjudgment by an adversary that might lead to nuclear attack on the United States.

The environmental impact due to the launches (summarized in Section V) would be minor and very short term, and has been minimized by precise selection of specific launch facilities and launch directions. The cost of the program (for planning, preparation, and test support) would be relatively small in comparison with original cost of the system or current expenditures for Vandenberg testing. There would be a small risk of accident or incident, which has been mitigated by selection of lowest risk silos and by stipulated safety and precautionary actions.

The alternatives considered cover other ways to demonstrate and confirm that the existing operational missile force is a viable, credible deterrent to a nuclear attack by any aggressor. These alternatives are listed below and are addressed individually in this section with advantages and disadvantages of each and concluding remarks in each case, followed by an evaluation of all alternatives.

Section	Alternatives
B.	Conduct GIANT PATRIOT from a different MINUTEMAN Wing
C.	Conduct GIANT PATRIOT from a Vandenberg AFB test launch facility
D.	Construction of an operational base launching facility on the coast of the United States.
E.	Launch through Stage I flight only from existing operational base
F.	Exercise without launch
G.	Do not conduct GIANT PATRIOT

B. CONDUCT GIANT PATRIOT FROM A DIFFERENT MINUTEMAN WING

1. Description of the Alternative

This alternative consists of conducting the planned GIANT PATRIOT project from an operational wing other than Malmstrom AFB. Malmstrom AFB, Montana, was selected for OBL following careful consideration of flight safety and test objectives. MINUTEMAN II is deployed in three of our Western states; all were considered. The overriding consideration in the selection of Malmstrom AFB was that it provides the safest and shortest flight corridor to the Pacific Ocean. Safety is most dependent upon minimizing population in the launch areas, staging debris drop areas, and the flight corridor. However, a possible alternative to Malmstrom would be to launch from either of the other two MINUTEMAN II wings (Ellsworth or Whiteman).

2. Advantage of the Alternative

Launching from a wing other than Malmstrom AFB would provide a longer overland flight path, thus providing a larger amount of data for verification of gravity models.

3. Disadvantage of the Alternative

a. The potential environment impact would be slightly greater than for a Malmstrom launch due to overflight of a larger land area.

b. MINUTEMAN wings other than Malmstrom do not have both major MINUTEMAN weapon systems. Thus the GIANT PATRIOT objective to demonstrate both types of ground equipment could not be met except at Malmstrom AFB.

c. Due to the longer overland flight path, more land area and population would be affected and thus the risk level would be higher.

4. Conclusions

Launch from existing operational missile bases is the best way to demonstrate the total system as a credible deterrent to any adversary. This alternative does provide for an operational base launch but would not test both types of MINUTEMAN ground systems. The environmental impact and expected risks from this alternative would be comparable to those from a Malmstrom launch, but could be expected to be slightly higher due to the longer flight path. Thus, from an environmental standpoint this alternative is less desirable than the proposed project and also decreases the ability to accomplish all test objectives.

C. CONDUCT GIANT PATRIOT FROM A VANDENBERG AFB TEST LAUNCH FACILITY

1. Description of the Alternative

This alternative consists of launching the GIANT PATRIOT missiles from test launch facilities at Vandenberg AFB. GIANT PATRIOT launches have been conducted from Vandenberg and more are planned as part of the SAC operational test program. Because the OBLSS-configured MINUTEMAN II test missile is as identical as possible to an operational missile, these launches provide valuable data for evaluation of weapon system accuracy. Specifically, accuracy data from these launches will be compared with the total MINUTEMAN II accuracy data base from fully instrumented missile tests. This alternative would involve an attempt to use OBLSS-equipped MINUTEMAN launches from Vandenberg AFB to accomplish all of the objectives of GIANT PATRIOT.

2. Advantages of the Alternative

a. Environmental impact would be limited to the local area of Vandenberg Air Force Base. Hundreds of launches have been conducted from this area and the effect of the additional GIANT PATRIOT launches would not be significant compared to the number of current test launches.

b. This alternative would save the incremental cost of operational base demonstration launch test preparation and execution. It should be noted that the cost of the GIANT PATRIOT missiles would not be saved since they are already part of the programmed launches. In other words, GIANT PATRIOT launches are directly subtracted from the Vandenberg operational test program.

c. It would eliminate any risk of accident or incident from launches from operational bases. Local and downrange risks associated with MINUTEMAN II launches would still exist.

3. Disadvantages of the Alternative

a. The Vandenberg Complex is limited in its representation of operational base complexes.

(1) Each launch silo is configured for repetitive firings.

(2) Missiles and crews must be physically moved to Vandenberg for each launch.

(3) It uses the built-in Vandenberg range safety system and equipment, thus requiring modification of the missiles to be tested.

(4) It is not interconnected with squadron-wide launch and command control facilities.

(5) It is geodetically different from operational base areas.

b. Launches from Vandenberg AFB cannot completely validate the accuracy of launches from operational bases. One specific area is that of gravity models. Since all MINUTEMAN operational flight tests have been conducted from Vandenberg and inertial guidance systems such as MINUTEMAN cannot measure gravitational forces, we have had to develop gravity effects models for use in missile targeting. While we have high confidence in the effectiveness of these models, they could be further verified by test flights over land.

c. A launch from Vandenberg cannot completely duplicate a test of a missile as it exists in an operational environment which has been undisturbed for up to 5 years, except for routine maintenance which is identical to that applied to every other MINUTEMAN missile.

d. The operational testing conducted from Vandenberg has been highly successful and has established substantial confidence in the deterrent capacity of the MINUTEMAN force. Additional testing of the MINUTEMAN system will continue to support the present confidence level, but will not have the added value of providing actual demonstration of the operational base launching capabilities.

4. Conclusions

The Vandenberg OBLSS tests are considered important for accomplishing accuracy objectives. Still, these launches lack the demonstration and confidence value of actual test launches from operational sites. In addition, full squadron participation in the launch process is not accomodated at Vandenberg. Thus, while this alternative would result in confining the environmental impact to the local Vandenberg area, it does not fulfill the basic GIANT PATRIOT objective of unmistakably demonstrating MINUTEMAN capability as a fully integrated operational weapon system.

D. CONSTRUCTION OF AN OPERATIONAL BASE FACILITY ON THE COAST OF THE UNITED STATES

1. Description of the Alternative

This alternative would consist of building a complete operational MINUTEMAN launching facility on the coast of the United States. This facility would have operational missiles, a command and control system which is integrated into the strategic communications network, and sufficient launch and control facilities bases to be representative of the existing operational wings. Operational base launch tests could then be conducted from this facility.

2. Advantages of the Alternative

a. The environmental impact from launches would be limited to the local area surrounding the coast facility since the major portion of the flight would be over the ocean.

b. Testing from operational coast facility would eliminate any risk of accident or incident from launches from existing operational bases.

c. The coast facility could be used for training, accuracy and reliability studies, operational test and evaluation, research and development launches, and operational base demonstration and proof tests.

d. The nation would gain additional modernized missile facilities.

3. Disadvantages of the Alternative

a. It would be a violation of the Strategic Arms Limitation Agreement. The Air Force is limited by the Strategic Arms Limitation Agreement to 1,054 operational launch facilities. There is presently no way the Air Force can establish an additional operational site.

b. A new operational complex would not be identical to existing operational sites in either age or geodetic characteristics. Launches would thus not be representative of those from existing operational bases in the areas of age and maintenance effects on missiles and ground equipment, modeling of gravity effects, and effects on accuracy from long term strategic alert status of missiles.

c. The location of an operational complex at most coast locations would not be as effective as those in current locations. The most important factors are reduced targeting flexibility for most otherwise acceptable sites and increased susceptability to sea-based attack.

d. Cost of a new operational complex would significantly exceed the incremental cost of operational base demonstration launch test preparation and execution from present bases. In addition to the costs being prohibitively high, the economic impact on local communities would be extremely large compared to that from the proposed Malmstrom AFB launches.

e. Environmental impacts from construction of the facility would be far more severe than those from proposed launches. The impact would include disruption of the local environment, use of relatively large land areas, increased human and mechanical activities, and associated impacts which result from increased development.

f. The environmental impacts would also be very long term, especially when compared to the short term effects of the operational base launch program, and the planned restoration after the tests.

4. <u>Conclusions</u>

A new operational complex on the coast is currently prohibited by the Strategic Arms Limitation Agreement, would not be representative of existing operational bases, and launches from such a facility would not demonstrate the operational capability of existing bases. In addition, the environmental impacts due to construction of such a base would be longer term and would be more adverse than those due to the proposed Malmstrom launches.

E. LAUNCH THROUGH STAGE I FLIGHT ONLY FROM AN EXISTING OPERATIONAL BASE

1. <u>Description of the Alternative</u>

This alternative consists of modifying a MINUTEMAN II missile to contain only enough propellant for first stage. An operational base launch could then be conducted with a reduced area of impact due to the smaller area under the flight path. The OBLSS destruct system, Mobile Range Safety System, and launch area evacuations would still be required.

2. <u>Advantages of the Alternative</u>

a. A smaller area would be under the flight path since the total flight trajectory would be shorter. Total risks would thus be lower due to smaller total population levels along the flight path.

b. This alternative decreases the risk of accident or incident by removing all propellant from the upper two stages.

3. Disadvantages of the Alternative

a. The environmental impact would be slightly greater in the Stage I impact zone since the complete missile upper stages, reentry vehicle, and destruct package would return and impact on land.

b. Substantially greater funds would be required for design of a destruct system (OBLSS depends on Stage III propellant), modification of the missiles, and recovery in the Stage I drop zone.

c. Since the missile would have to be removed from its silo and modified, the operational environment would be disturbed.

d. The total missile system would not be demonstrated.

e. This alternative requires acceptance of any uncertainties associated with the performance of three-fourths of the missile.

4. Conclusions

Launch and flight through Stage I only from operational bases is not a demonstration of the total system. Local environmental impact would be similar to that from GIANT PATRIOT and risks in the local area would be comparable; however, impact in the Stage I drop zone would be greater. The costs of performing the tests would be greater than for GIANT PATRIOT due to the requirement for modification of the missile system for Stage I flight only.

F. EXERCISE WITHOUT LAUNCH

1. Description of the Alternative

Under this alternative, demonstration would be conducted by full-scale exercise of command, control and communication system, with electronic exercise up to the point of actual ignition of the MINUTEMAN engine. In conjunction with the current operational testing program (in which missiles are removed from operational silos and launched from Vandenberg), a form of demonstration would be provided by this alternative.

2. Advantages of the Alternative

a. There would be no environmental impact from the exercise process.

b. It would save the incremental cost of demonstration launch test preparation and execution.

c. It would eliminate any risks of accident or incident from test launches from operational silos.

3. Disadvantages of the Alternative

a. The value of the exercise would be limited by safeguards to absolutely prevent any chance of inadvertent launch of the missile being exercised.

b. This alternative does not permit total system operation or demonstration.

c. Evaluation of the results of exercise requires discrimination between system equipment and simulation equipment if deficiencies occur.

d. The alternative does not even approximate the basic OBL program ability to enhance the credibility of the retaliatory capability of land-based strategic missile forces.

4. Conclusions

Exercise without launch is a continuing requirement for training and for limited operational evaluation of the system but cannot demonstrate total system capability. Environmental impacts would be negligible. However, the alternative would not provide any significant increase in the deterrent credibility of the MINUTEMAN weapon system.

G. DO NOT CONDUCT GIANT PATRIOT

1. Description of the Alternative

This alternative is to not conduct launches from operational bases. The alternative is the "no action" alternative which is considered along with other possible alternatives.

2. Advantages of the Alternative

a. There would be no direct environmental impact from operational base launches.

b. It would save the cost of demonstration launch test preparation and execution.

c. It would eliminate any risk of accident or incident from test launches from operational bases.

3. Disadvantages of this Alternative

a. This alternative does not provide for exercise of the Minuteman System from an operational location. This type of demonstration has never been conducted.

b. Without conducting GIANT PATRIOT there would be no significant increase in the credibility of the retaliatory capability of land-based strategic missiles.

c. This alternative does not provide the means of proving unquestionably to friend and foe alike that the Minuteman System possess the deterrent capability that we seek.

4. Conclusions

This alternative provides no means for demonstrating the total system capability. There is inherently no direct environmental impact or cost associated with this alternative. However, environmental impact of the proposed program is short term and not significant, and the incremental cost of GIANT PATRIOT is small compared to the cost of the MINUTEMAN system. While the significance of GIANT PATRIOT is difficult to quantify, it should be clear that the alternatives of not conducting GIANT PATRIOT would represent a missed opportunity to enhance our strategic deterrent capability with minimal impact on the environment and with relatively small expenditures of funds.

H. EVALUATION OF ALTERNATIVES

The alternatives considered have been evaluated in terms of the environmental impact of each of them and the degree to which they fulfill the objective of the GIANT PATRIOT program. The objective of GIANT PATRIOT is to unmistakably demonstrate the capability of the operational MINUTEMAN Weapon System (both configurations: WS-133B and WS-133A-M) and deliver a test warhead to a designated target in response to a valid order. The evaluation of the alternatives considered is summarized in Table 4-1.

Alternatives F and G (exercise without launch and do not conduct GIANT PATRIOT) have little or no environmental impact but do not satisfy the objective of the program in any meaningful way.

Alternative C (launch from Vandenberg) is in fact currently being conducted in support of accuracy evaluations. Launching from Vandenberg does have some impact on the local environment. However, Vandenberg

TABLE 4-1

EVALUATION OF ALTERNATIVES TO GIANT PATRIOT PROGRAM

No.	Alternative	Environmental Impact	Fulfillment of GIANT PATRIOT objective
A	Conduct GIANT PATRIOT as discussed in Section I (Proposed Action)	Local, short term, no serious impacts on people, vegetation, animals, structures or general environment. Remote possibility of hazard from failure.	Demonstration and test of deterrent capability. Increase in confidence and credibility of the system.
B	Conduct GIANT PATRIOT from a different MINUTEMAN wing.	Comparable to above except that risk may be slightly greater.	All major objectives accomplished. Desire to test both MINUTEMAN configurations cannot be accomplished at a single wing.
C	Conduct GIANT PATRIOT from a Vandenberg AFB test launch facility.	Local environmental impact at Vandenberg. Risk to local population only.	Does not demonstrate operational ground systems. Partially satisfies missile accuracy testing requirements.
D	Construction of an operational base launching facility on the coast of the United States.	Impact from launches similar to at Vandenberg. Significant economic impacts due to extremely high cost of construction. Political impact due to violation of SALT I provisions. Long term impacts.	Partially satisfies demonstration objective. Does not provide realistic test for older existing missile wings. Does not completely provide for accuracy assessments (gravity modeling).
E	Launching Stage I only from an existing operational base.	Impacts similar to local GIANT PATRIOT impacts. Small area and population for risk from failure. Increased impacts in Stage I drop area. Additional expenditures for system modifications.	Satisfies ground system demonstration objectives. Partially satisfies missile system demonstration objectives. Does not allow accuracy comparisons. Some uncertainties in results due to modified operational systems.
F	Exercise without launch	Negligible environment impact. Possible increased expenditure for simulation, analysis, and evaluation.	Minimal satiafaction of demonstration objectives. No effect on accuracy evaluation and only small effect (if any) on credibility of system.
G	Do not conduct GIANT PATRIOT	No direct environmental impact	No increase in credibility or our strategic deterrent capability. No final proof test of the complete system

launches cannot satisfy any of the demonstration objectives of GIANT PATRIOT since the launch facilities at Vandenberg are test facilities which are not interconnected with the operational command control system and are slightly different from the operational facilities due to a requirement for relaunching. In addition, there are no missiles at Vandenberg which have been in an undisturbed operational environment for any length of time immediately prior to launch.

Alternative B (conduct GIANT PATRIOT from a different wing), satisfies most of the test objectives but has the same environmental impact as the proposed launch with a greater number of people and amount of land area under the flight path.

Alternative D (construct a coast-located OBL facility) also satisfies some important GIANT PATRIOT objectives but is currently prohibited by SALT agreements. The cost of constructing a new facility would be extremely large (with associated economic impact) and the final results would not be directly demonstrative of the other significantly older missile facilities. In addition, the environmental impacts of constructing a new facility would have a long term nature compared to the transient effects from four launches.

Alternative E (launch Stage I only from operational base) provides a partial GIANT PATRIOT-type test. However, the most important environmental impacts remain (launch area and 1st stage drop site) and the demonstration would still leave three-fourths of the missile system undemonstrated as launched from the operational environment.

The proposed GIANT PATRIOT program (OBL from Malmstrom) best satisfies the demonstration and accuracy objectives, has only short term environmental effects, and represents the most effective way to increase the credibility of the existing strategic deterrent force, with minimized environmental impact and minimal cost.

V. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED.

A. CONSTRUCTION

Construction in support of GIANT PATRIOT will have minimal environmental impact, and no adverse impact of a long-term or permanent nature. All structures (poles and towers) will be removed and all roads and pads (gravel or concrete) will be restored to original condition at the choice of the land owner.

B. LOCAL SHORT-TERM AIR POLLUTION

Missile launch exhaust will cause some local short-term pollution of the air. This pollution is expected to be below all applicable public standards, and will rise and disperse rapidly, thus causing no long-term pollution of the atmosphere, nor hazards to population from exhaust toxicity. Planned evacuation distances are ample to protect personnel from exhaust pollution.

C. MISSILE NOISE

Missile noise from propulsion will be present in the local launch area from ignition up to one minute after launch. Aside from the annoyance factor, there will be no impact on people or structures from propulsion noise. There is a possibility of a sonic boom focus in a localized area downrange from the launch facility. The theoretically predicted magnitude would be high enough to cause some damage to structures within the relatively small focus area and would be expected to result in complaints from the areas affected. Tests are planned to gain empirical data on this subject. (See Section III. C.)

D. DEBRIS

For a normal launch, the empty first stage casing will drop in Idaho. The high risk portion of the first stage drop area will be evacuated and the first stage debris will be recovered if possible. In the case of a failed missile (destroyed), an area along the flight path will be impacted by debris of various sizes. Size and number of objects depend on the altitude at destruct. In this event, the Air Force will recover all remaining parts and debris. Exact calculation of debris impacts and associated risks were performed as part of the hazard analysis and are discussed in Sections I. D and III. D.

E. FIRE PROBABILITY

Environmental impact through fire started by a destroyed missile is a remote possibility. It is our intent to test launch only during a fire index of "no-spread" or "fire-out" conditions. In other words, through winter temperatures and snow cover, the natural fuels (wheat fields, undergrowth, forests, etc.) will not sustain fire. Additionally, a fire watch corridor will be established supported by surveillance aircraft and the Modular Airborne Fire Fighting System (MAFFS). If an accidental fire is caused, it will be rapidly contained and extinguished.

F. HISTORIC SITES

There is a remote probability of impact to a local historic monument due to the launch from G-5. St. Peters Mission (which is not yet on the National List of Historic Places but has been conditionally accepted) is slightly over one-half mile from the G-5 launch site and has a small chance of sustaining impact due to destruct early in flight. If a piece struck the mission and were burning there could be some possibility of fire, but overall chances are low due to very high missile reliability in early flight. In the SAC Operational Test Program at Vandenberg (63 MINUTEMAN II and 29 MINUTEMAN III flights) there have been no failures in the period of flight which could cause an impact on the St. Peter's Mission.

G. PUBLIC HAZARDS

Detailed hazard calculations indicate that the combined hazard of a normal case and failure case is 3.1 chances in 100,000 of an injury occurring from a missile debris impact. This is the total chance that at least one person might be injured due to a single launch.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

A. MISSILE RESOURCES

In a practical sense the MINUTEMAN II missiles used in GIANT PATRIOT are irretrievable. The materials other than the propellants represent a relatively few number of pounds of metals and plastics. A very few automobiles would equal the unfueled vehicle weight of a MINUTEMAN missile, for example. Of this hardware, the materials are easily replaceable from domestic sources with relatively small expenditures of manpower and energy. The missile propellant is an energy source that is already committed in that it can only be used to launch the missile. This commitment was made at the time the missiles were manufactured.

A significant point concerning missile resources is that the MINUTEMAN II missiles launched in support of GIANT PATRIOT will come from the test assets of the ongoing MINUTEMAN operational test (OT) program. In other words, the number of missiles launched in support of GIANT PATRIOT will be subtracted from the total Vandenberg AFB MINUTEMAN II OT Program which has a specific number of assets allocated. The GIANT PATRIOT launches do not, therefore, represent a net change in the number of missiles to be launched.

B. CONSTRUCTION RESOURCES

As discussed in Section III. A, some construction will be required at seven support sites for range safety and command and control purposes. The commitment of resources for construction of these facilities will be minimal and includes materials for the construction of the concrete pads, access roads and communications support equipment. The impact on the land where construction will occur can be considered reversible because of the small area affected and the fact that the terrain will be restored to its original condition at the discretion of the land owner.

C. ENVIRONMENTAL QUALITY

Environmental quality is an important natural resource in itself, and it should be stressed that the environmental effects of the

GIANT PATRIOT launches will be minimal. All of these are localized, short-term effects, and will result in no long-term degradation of the environment. No irreversible or irretrievable commitment of environmental resources is involved.

VII RELATIONSHIP BETWEEN LOCAL SHORT TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

In considering the environmental impact of a program such as GIANT PATRIOT, the final conclusion which must be drawn is whether or not the proposed action will result in any cumulative or continuing degradation of the environment. The propriety of any such action must be carefully weighed against any effects which would narrow the range of beneficial uses of the environment or pose long term risks to health or safety. Environmental impact statements are prepared in recognition of the fact that each generation is a trustee of the environment for all succeeding generations.

This Environmental Statement has given careful attention to the considerations mentioned above with respect to operation GIANT PATRIOT. A summary of the major conclusions is presented below:

- Each missile flight will affect the continental United States for only 102 seconds. Extensive measures have been taken to insure the safety of all citizens.
- No long term or widespread health risks will result from the proposed launches.
- There will be no significant hazard to indigenous wildlife.
- There is a remote possibility of damage to one historical landmark as a result of launch from the G-5 site.
- Land use for Operation GIANT PATRIOT will be minimal and short term.
- The proposed launches will result in no significant depletion of any irreplaceable resources.
- No permanent degredation of the aesthetic quality of the environment will take place.

In the preceding sections, it has been demonstrated that GIANT PATRIOT will have minor, infrequent, transient and non-persistant impact on the environment. None of the effects described will in any way preclude or change any potential use of the land, air, or water areas involved. The resources committed will be minimal. In conclusion, there are expected to be no long term detectable effects from this program.

VIII. CONTROVERSY

The Operational Base Launch (OBL Program) was announced by the Office of the Assistant Secretary of Defense, Public Affairs on 28 December 1973. The initial announcement resulted in both favorable and unfavorable articles in the newspapers. Since the OBL Program has promoted a certain degree of apprehension among some residents of the states involved, comprehensive briefings have been presented. The briefings were presented to the Representatives and Senators and their staffs as well as the Governors of the states involved. Direct communication between the Air Force and local civic groups was also pursued to establish good faith in the OBL program. These briefings and direct communication explained the necessity of the flight, the safety procedures planned, the work which had to be performed before the Air Force had the necessary answers to some issues; and the probable environmental impact of the project. The purpose of these briefings was to provide information about GIANT PATRIOT. Following submission of the Draft Environmental Statement (ES), public hearings were held to receive public comment on the Draft ES. Transcripts of these hearings can be found in Appendix B of this document. A list of all briefings and hearings conducted to date is given in Table 8-1.

Two categories of controversies have emerged over the GIANT PATRIOT Program. One is the category directly related to the effect on the environment; comments in this category were primarily requests for more specific information. The other category is that of national policy issues including the need for operational base launch tests and the use of that program to debate the more profound principles of assured destruction, counterforce, first strike and the impact of the program on strategic arms limitations talks and detente. While this second category does not relate directly to the question of environmental impact, a limited discussion of these policy questions is included as an introduction to the PublicHearing transcripts in Appendix B. Public Agency comments and responses are contained in Appendix A. Public Hearing Transcripts and Responses are contained in Appendix B. No major environmental controversies were identified at public hearings, by written comment or from public agencies.

Table 8-1. OPERATIONAL BASE LAUNCH "GIANT PATRIOT" BRIEFINGS

DATE	LOCATION	AUDIENCE
3 Jan 1974	Old Senate Office Bldg. Washington DC	Staff members of Senate Armed Services Committee; Foster, Lynch and Goldsmith
9 Jan 1974	Old Senate Office Bldg. Washington DC	Senate Staff: Spine (Magnuson), Beckstader (Mansfield), Follefson (Jackson), Dine (Church), Roe, (Metcalf), Timothy (McClure), Frost (Cranston), Evans (Hatfield), Wilson (Tuney), Crowley (Packwood).
10 Jan 1974	Old Senate Office Bldg. Washington DC	House Staff: Whitsitt and Reidman (Melcher)
	Rayburn Building Washington DC	House Staff: Bruner, Johnson (Hansen), Dahl (Shoup), Whitsitt (Melcher), Bay (Simms), Branch, Range (Foley), Braid (Dellenback), Alberger (Ullman), Bruner (Johnson), Sherman (Leggett), Douglas, Salin (Frenzel), Duff (Shoup)
	Rayburn Building Washington DC	Congressman Leggett (D-CA)
11 Jan 1974	MAFB, MT	Great Falls, MT Chamber of Commerce
14 Jan 1974	MAFB, MT	Malmstrom Press Conference
15 Jan 1974	Pentagon, Wash DC	Mr. Fayer (Sen Church staff)
	State Department Wash DC	State Dept. staff; Mr. Sloss (Dep Dir Pol/Mil Affairs), and staff

Table 8-1. OPERATIONAL BASE LAUNCH "GIANT PATRIOT" BRIEFINGS (Cont'd.)

DATE	LOCATION	AUDIENCE
16 Jan 1974	Missoula, MT	Missoula Rotary Club
	Great Falls, MT	Great Falls Optimist Club
17 Jan 1974	Olympia, WA	Gov Evans of Washington
18 Jan 1974	Boise, ID	Gov Andrus of Idaho
22 Jan 1974	Old Senate Office Bldg. Washington DC	Senator Church (D-ID)
	Rayburn Building Washington DC	Congressman Shoup (R-MT) Congressman Hansen (R-ID) Congressman Dellenback (R-OR) Congressman Ullman (D-OR)
23 Jan 1974	Old Senate Office Bldg. Washington DC	Senator McClure (R-ID)
	New Senate Office Bldg. Washington DC	Senator Parkwood (R-OR)
	EPA Bldg., Wash DC	Mr. Meyers (Dir of Fed. Activities - EPA) and staff
	Great Falls, MT	Great Falls Jaycees
	MAFB, MT	Great Falls Chamber of Commerce Military Affairs Committee
	Lewistown, MT	Chamber of Commerce Military Affairs Committee
24 Jan 1974	Pentagon, Wash DC	Gov Reagan of California
	Longworth Building Washington DC	Congressman Symms (R-ID)
	Pentagon, Wash DC	Dr. Peterson (Presidential Council of Environmental Quality)

Table 8-1. OPERATIONAL BASE LAUNCH "GIANT PATRIOT" BRIEFINGS (Cont'd.)

DATE	LOCATION	AUDIENCE
24 Jan 1974	Great Falls MT	Great Falls Lions Club
25 Jan 1974	Department of Interior Washington DC	Dr. Currie (Assoc Dir of Nat'l Park Service - Dept of Interior)
	Great Falls, MT	Great Falls Labor Leaders
28 Jan 1974	Great Falls, MT	Great Falls Kiwanis Club
29 Jan 1974	Pentagon, Wash DC	Sec. Rush (Dep Sec of State)
30 Jan 1974	Helena, MT	Montana State House Committee on Administration
31 Jan 1974	Missoula, MT	Montana Civil Defense Conf.
	Missoula, MT	Missoula County Commissioners and Missoula City Alderman
1 Feb 1974	Pentagon, Wash DC	Gov Judge of Montana
	Salem OR	Gov McCall of Oregon
4 Feb 1974	Stanford, MT	American Legion Masonic Lodge
5 Feb 1974	Great Falls, MT	Great Falls Rotary Club
	Fairfield, MT	Fairfield Town Meeting
14 Feb 1974	Great Falls, MT	Great Falls Civilians
15 Feb 1974	MAFB, MT	Great Falls Civic Leaders
18 Feb 1974	Cascade, MT	Cascade Lions Club
19 Feb 1974	MAFB, MT	Air Force Assn - Great Falls Chapter
22 Feb 1974	MAFB, MT	Amer. Right of Way Assn.

Table 8-1. OPERATIONAL BASE LAUNCH "GIANT PATRIOT" BRIEFINGS (Cont'd.)

DATE	LOCATION	AUDIENCE
22 Feb 1974	Denton, MT	American Legion
25 Feb 1974	Great Falls, MT	Scottish Rite Lodge
26 Feb 1974	Hobson, MT	American Legion
1 Mar 1974	Great Falls, MT	Great Falls Elks Club
5 Mar 1974	MAFB, MT	Chapel Wives Club
8 Mar 1974	Circle, MT	American Legion
9 Mar 1974	MAFB, MT	Canadian Cadets
13 Mar 1974	MAFB, MT	Navy Junior ROTC, Billings, MT
14 Mar 1974	Helena, MT	Environmental Impact Statement Public Hearing
19 Mar 1974	Choteau, MT	Kiwanis Club
	Ft. Benson, MT	Kiwanis Club
	Boise, ID	Environmental Impact Statement Public Hearing
21 Mar 1974	Great Falls, MT	Senior Citizens of Great Falls
	Salem, OR	Environmental Impact Statement Public Hearing
6 Apr 1974	MAFB, MT	Canadian Cadets
8 Apr 1974	Nez Perce Indian Reservation, ID	Nez Perce Indian Council
9 Apr 1974	Lewiston, ID	Environmental Impact Statement Public Hearing
10 Apr 1974	Grangeville, ID	Environmental Impact Statement Public Hearing
	Great Falls, MT	Kiwanis Club
27 Apr 1974	Great Falls, MT	Northwest Regional Eagles

Table 8-1. OPERATIONAL BASE LAUNCH "GIANT PATRIOT" BRIEFINGS (Cont'd.)

DATE	LOCATION	AUDIENCE
1 May 1974	Vandenberg AFB, CA	Air Force Assn Symposium
	Helena, MT	Kiwanis Club
9 May 1974	MAFB, MT	Chaplins Conference
	MAFB, MT	Oregon State VIP Group

APPENDIX A. RESPONSE TO AGENCY COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT

In accordance with Section 102 (2) (c) of the National Environmental Protection Act, copies of the Draft Environmental Statement Operation GIANT PATRIOT were sent to various public agencies for their comments. The letters which have been received from these agencies are reproduced in the following sections. Each letter is followed by a response to the comments presented. Paragraph numbers have been added to the letters and are referenced in the responses.

A. Comments of the State of Idaho State Planning Community Affairs Agency

CECIL D. ANDRUS
GOVERNOR

ROBERT N. WISE
DIRECTOR

STATE OF IDAHO

STATE PLANNING AND COMMUNITY AFFAIRS AGENCY
BOISE, IDAHO 83720

April 12, 1974

Mr. Billy E. Welch, Ph.D
Special Assistant for Environmental Quality
Department of the Air Force
Washington, D.C. 20330

Dear Mr. Welch:

(1) The State Clearinghouse, State Planning and Community Affairs Agency, has completed its review of the draft environmental statement, Operation Giant Patriot. The following State agencies were notified and given the opportunity to comment:

Water Resource Board	Department of Environmental and Community Services
Water Administration	Highway Department
Public Lands	Parks and Recreation
Fish and Game	Soil Conservation Commission
Historical Society	

While no negative environmental concerns were identified by the State, this in no way indicates support for the proposed project.

We thank you for the opportunity for review. If we can be of any further assistance, please let us know.

Sincerely,

Karl Tueller

Karl Tueller
Associate Director for
Intergovernmental Coordination

KT:rt

Response to the State of Idaho

(1) The Air Force is grateful to the State of Idaho for its review of the Draft Environmental Statement.

B. Comments of the United States Environmental Protection Agency Office of Federal Activities

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 19 1974

OFFICE OF THE
ADMINISTRATOR

Billy E. Welch, PhD.
Special Assistant for Environmental
Quality
SAFIL, Room 4D873
The Pentagon
Washington, D.C. 20330

Dear Dr. Welch:

(1) The Environmental Protection Agency has reviewed the draft impact statement (EIS) prepared by the Department of the Air Force entitled "Operation Giant Patriot" dated February 1974. The EIS does not contain sufficient information to assess fully the environmental impact of the proposed test. However, from the information submitted, the Agency has made a preliminary determination of the impact on the environment. We have no objection to the proposed action, as described in the EIS. We do however, request that additional information be provided. The EPA classification LO-2 (LO - Lack of Objections, Category 2 - Insufficient Information) will appear in the Federal Register in accordance with our responsibility to inform the public of our views.

Our detailed comments and suggestions for additional information follow:

Air Quality Aspects

(2) The Minuteman exhaust cloud probably contains a high enough temperature for the formation of some nitrogen oxide species from the nitrogen and oxygen present in the ambient air. Therefore, the final statement should contain some estimate of NOx formation in the exhaust cloud area.

(3) The use of time-weighted averages to derive short-term Public Limits or Public Emergency Limits for HCl is

in direct conflict with the Occupational Safety and Health Standards (37 CFR 22102, G.1910.93). It seems unreasonable to expose the public to limits in excess of that permissible for occupational exposure.

(4) Relative to the scavenging effect (page 3-25) and formation of acid aerosol, what will be the specific good weather criteria for the launches?

(5) What is meant (page 3-31) by the statement "CO emitted will have no practical adverse impact"?

(6) The results of the numerous studies currently being carried out in support of this project should be included in the final statement.

(7) The EIS should contain an estimate of the ground level air pollution problem related to on ground or early flight abort based on similar analysis of Titan studies cited.

(8) Table 3-1 (page 3-7), "Combustion Products from Minuteman II Stages," should clearly state the quantities of the chemical components of the missile exhaust to be released to the environment.

(9) The discussion in section 4, page 3-13 regarding the nature of the ground exhaust cloud should be more specific as to the time the cloud may persist. Presentation of the worst possible case, i.e. with all circumstances exerting a negative influence on the situation, could be a helpful decision tool.

Noise Aspects

(10) The subject statement presents adequate background information concerning the effects of intense sound fields on man and structures.

(11) Empirically obtained peak noise data for the Minuteman missile shows the potential noise impact on personnel and communities close to the launch site (distances less than 100 miles) to be severe; measured overall peak noise levels of 132 dB at 1000 feet from a Minuteman launch site can produce overall peak noise levels of about 80 dB at ranges of approximately 100 miles. (See page 3-40.) Although the anticipated duration of such noise levels might only be on the order of 40 to 60 seconds, considerable attention must be given to the protection of personnel and structures within a 5 mile radius

of the launch site. The topography of the area plus the fact that launches are scheduled for winter months can result in noise levels that seriously exceed permissible damage risk limits. It is essential that OSHA regulations governing occupational noise exposure be enforced for personnel under direct control of the Air Force.

(12) The problem of protecting uncontrolled population has not been given adequate attention. Although noise exposure times are short and thus do not pose serious risk to human hearing at ranges in excess of about six (6) miles from launch site, adverse physiological effects may result from fright, sensory shock, etc. This is particularly applicable to elderly citizens and should be addressed in the final draft of this statement.

(13) It is stated in the EIS (pg. 3-37) that sonic boom will accompany both the ascent of the missile and the descent of its exhausted booster stages some 125 miles down range. However, the statement does not address the impact of sonic boom on communities close to the launch site (Great Falls, Montana is within 70 miles of the launch site) or booster stage reentry point. The fact that sonic boom from previous Minuteman launchings has not produced adverse reaction from the population is primarily due to over-ocean ascent and descent paths. This is not the case for Operation Giant Patriot and consequently the potential impact should be determined.

(14) In view of the planned trajectory for the missile, which will result in a 20 mile altitude within 50 miles down range, and an ultimate altitude of 350 miles, it is unlikely that exhaust related noise or sonic boom will have a discernible impact on communities along the flight path once launch and booster reentry are completed.

Solid Waste Aspects

(15) The EIS includes information on the formation of toxic substances which enter the air and water environments during launch operations, but it does not cover the matter of toxic/hazardous wastes which would remain at the launch site or on the debris and would require post-launch handling, treatment or disposal. If no toxic or hazardous substances are formed or present during or after launch, at the launch site or on the debris, under normal or missile destruct conditions, which would require disposal; a statement to that effect should be made in an appropriate section of the EIS. If some are formed or present, the EIS should include the identification of these substances, a description of how they are to be handled or

disposed of, and a statement of any expected impact on the environment resulting from the method of disposal used.

Water Quality Aspects

The statement indicates that the first stage tanks will
(16) impact in one piece and, being empty, will not cause explosion. Experience with other fuels indicates that in order to ignite, the fuel must be converted from a solid or liquid state to a gaseous form. Therefore, a certain amount of volatility must exist. This would tend to leave gaseous fumes in the tank. Such fumes are usually highly explosive. Explosion upon impact could, therefore, be expected to ignite fires over a considerable area which would require large doses of extinguishing chemicals and which, in turn, could have an impact on the surface waters in the area. Therefore, further explanation of the fuel system and expected conditions in the tank should be provided,

The statement failed to provide a description of
(17) conditions within the silo during and after launch. The description should indicate whether there is a water cooling system for the launch pad and what provisions are made for containing and treating the cooling water. A description of the treatment system should indicate the amount and quality (including thermal) of the effluent from the system.

The last sentence of subparagraph 3, page 3-57 should be
(18) deleted. This is an unacceptable extrapolation of effects on fresh water species to marine species. There is no evidence to support the implication that any buffering effects of saline ocean water will reduce toxicity.

Other Aspects

Some evidence should be presented to show how public
(19) apprehension over the proposed action has been allayed. To that end we suggest that briefings and other communications with Federal, State and local groups be chronicled in the final EIS.

Sincerely yours,

Sheldon Meyers

Sheldon Meyers
Director
Office of Federal Activities

Response to the United States Environmental Protection Agency
Office of Federal Activities

(1) The comments of the Environmental Protection Agency have been addressed in preparation of the Final Environmental Statement. Considerable new information has been added to the statement, and it is felt that a thorough assessment of the environmental impact of Operation GIANT PATRIOT has been provided.

Each of the detailed comments and suggestions of the Environmental Protection Agency is addressed below:

<u>Air Quality Aspects</u>

(2) Oxides of nitrogen (NO_x) are not directly emitted by the MINUTEMAN II, but are produced by the high temperature of the rocket exhaust interacting with the N_2 and O_2 in the ambient atmosphere. Estimates of NO_x production by high temperatures vary due to the exact nature of the combustion process, however, most estimates fall between 1% to 6% by weight for the ratio of NO_x to fuel consumed. Because of a lack of any direct measurements, a worst-case estimate of 6% is used for the emission factor.

Although both NO and NO_2 would be expected to be produced in the missile exhaust cloud, the remainder of this treatment will assume that all of the NO_x is present as NO_2. This is a worst-case assumption, since NO_2 is more toxic than NO.

The MINUTEMAN II emits about 20% HCl by weight. The NO_2 concentrations can be scaled to the predictions for HCl concentrations as follows:

$$\text{Concentration } NO_2 = \text{Concentration HCl} \times \frac{6\%}{20\%} \times \frac{36}{40} = 22\%$$

The factor 36/40 is the ratio of the molecular weight of NO_2 to HCl and is needed to convert mass concentrations to molecular concentration.

Using the data presented in Section III.B, the (10-minute average) NO_2 concentrations can be estimated as

Normal Launch - 0.1 ppm
Aborted Launch - 0.4 ppm

The STPL for NO_2 is 1 ppm and the PEL is 5 ppm. The 10-minute average for both the normal and abort situations are thus well below the STPL and PEL standards. No significant hazard from NO_2 is therefore expected as a result of the GIANT PATRIOT launches.

(3) The Occupational Safety and Health standards were established

for persons exposed to various levels of hazardous substances for 7 to 8 hours a day and 40 hours a week over a lifetime of work. These standards are conservative for short-term public exposures. For this reason, (as discussed in Section III.B) short-term exposure levels have been established by noted authorities.

(4) Section III. B. 8 presents a discussion of precipitation scavenging of HCl. As stated, visual tracking of the missile is necessary until it reaches an altitude of approximately 50,000 feet (9.5 miles). A cloud-free line of sight to the missile from the visual tracking site during this initial period will be required for launch, thus there should be no scavenging effect.

(5) As discussed in Section III. B. 8, the concentrations of carbon monoxide (CO) are not expected to exceed ambient standards even if no oxidation to carbon dioxide (CO_2) occurs. However, the temperature of the missile exhaust is such that almost all of the CO emitted will be converted to CO_2, further reducing any potential CO hazard.

(6) The studies referenced have been completed, and the results are incorporated in Section III.B of this statement.

(7) Section III.B has been extensively revised, and detailed analyses of each of the air pollutants involved are provided with respect to both normal and failed launches.

(8) A delineation by altitude of the chemical quantities emitted in the missile exhaust is presented with Table 3-1.

(9) The concentrations of the emissions on the ground are shown in Figures 3-9 through 3-14 in Section III.B.

Noise Aspects

(10) Section III.C on missile noise effects, has been updated to include additional analyses.

(11) On the basis of the more refined data presented in Section III.C, it appears that maximum sound levels will not approach 80 dB at ranges greater than approximately 20 miles (see Figure 3-15). In general, the distant overall noise levels will be considerably lower than those obtained by extrapolation for the Draft Environmental Statement.

Since a 1.8x6 mile area immediately surrounding the launch facility will be cleared of all non-essential personnel (see Section I.C), members of the general public will not be subjected to sound levels in excess of standards. Any Air Force personnel within the launch area will be protected by the standard Air Force procedures established in Air Force Regulation 161-35 which are more conservative than OSHA.

(12) As discussed in Section III.C.1, the predicted maximum noise levels from a GIANT PATRIOT launch are significantly lower than the audible hearing loss criteria at ranges in excess of the 1.8 mile evacuation radius. Although the noise at greater ranges could cause some annoyance among citizens, the Air Force plans to undertake notification measures (including radio, television, and newspaper announcements) to insure that no one in the affected area is unduly startled.

(13) A detailed analysis of sonic boom effects from the GIANT PATRIOT launches is given in Section III.C.2. A sonic boom is anticipated from the ascent. The descent of Stage I will cause a low intensity sonic boom which will have no adverse effects, especially considering the remote location of the Stage I impact region.

(14) The analysis presented in Section III.C.2 supports this conclusion.

Solid Waste Aspects

(15) No toxic or hazardous wastes are formed or present at the launch site as a result of a MINUTEMAN launch. The environmental impact of missile debris is discussed in Section III.D of this statement. The Air Force plans to recover all debris resulting from either a normal or an aborted flight, and will dispose of all such debris in accordance with the proposed EPA guidelines for solid waste disposal.

(16) It is true that the solid fuel is converted to a gaseous state as it burns. However, in the case of a MINUTEMAN missile (and most solid-fuel missiles), the combustion process takes place in the casing itself, rather than in a seperate combustion chamber. Once ignited, the fuel will burn until it is entirely consumed; no combustible fumes can remain in the casing since they would also burn. Thus an explosion will not occur on impact.

Response to the United States Environmental Protection Agency Office of Federal Activities (continued)

Water Quality Aspects

(17) An operational MINUTEMAN launch silo is not designed to be reusable, and no special cooling or protective apparatus is used. No water or other liquid is discharged from the silo during or after launch.

(18) Section III. F on water pollution effects has been revised. A detailed analysis of the effects of possible pollutants is provided.

Other Aspects

(19) This appendix contains all of the letters received from the many Federal and State agencies who were asked to comment on the draft environmental statement. Extensive briefings on the proposed launches have been presented in press releases and at public hearings in the local areas affected. Transcripts of the five public hearings which were held are included in Appendix B. Section VIII contains a list of the briefings and public hearings which were held (Table 8-1).

C. Comments of the Department of Health, Education and Welfare

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION X
ARCADE PLAZA BUILDING
1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

March 25, 1974

OFFICE OF THE REGIONAL DIRECTOR

HQ USAF/PREV
Attn: Dr. Billy E. Welch
Washington, D.C. 20330

Dear Sir:

This letter is in response to the draft Environmental Impact Statement on Operation Giant Patriot.

(1) We suggest that an alert and early warning system be coordinated with State and local educational authorities within the hazard corridor in order that the welfare of students may be reasonably maintained.

Thank you for the opportunity to comment.

Sincerely,

David P. Miller

David P. Miller
Acting Regional Environmental Officer

Response to the Department of Health, Education and Welfare

(1) Extensive local announcements of the time and date of the launches will be made by the Air Force. Since all of the launches planned will be late night launches, no special provisions concerning schools will be necessary.

D. Comments of the Federal Aviation Administration (Northwest Region)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NORTHWEST REGION
FAA BUILDING, BOEING FIELD
SEATTLE, WASHINGTON 98108

MAR 2 5 1974

Colonel Herbert E. Bell, USAF BSC
Chief, Environmental Protection Group
Directorate of Civil Engineering
HQ USAF/PREV.
Washington, D. C. 20330

Dear Colonel Bell:

(1) We have reviewed the draft Environmental Statement for the proposed Operation Giant Patriot. Based on the limited details which were provided, we envision some delays to IFR traffic on the following airway/jet route segments within the Northwest Region:

1.	V-120	Mullan Pass - Great Falls
2.	J-70/90	Mullan Pass - Lewistown
3.	J-34	Ephrata - Helena
4.	V-187	Lewiston - Missoula
5.	J-16	Pendleton - Whitehall
6.	J-517	Boise - Spokane
7.	V-253	Lewiston - McCall
8.	V-298	Pendleton - McCall
9.	J-20	Pendleton - McCall

(2) Through use of the distance and location information provided, we plotted the operation upon an F-16 Navigational Chart. We found that the impact area for the Stage II panels would be very close to the town of Grangeville, Idaho (Population 3,642). This town is located on Highway 95 between Lewiston and McCall, Idaho. This does not agree with the statement on Page 5-1 of the booklet where under C it is stated that debris from both the first and second stages will drop in remote areas of Idaho.

(3) Grangeville has an airport with two runways. The hard-surfaced E/W runway is 4,700 by 60 feet. The gravel ENE/WSW runway is 2,300 by 40 feet. At last report there were 13 single engine general aviation aircraft based at the airport. Seven were listed as four-place or more. Our plotted location for the Stage II impact appears to agree with the location shown on Figure 1-9, Page 1-19 of the draft Environmental Statement booklet.

The discussion of the drop areas on Page 2-9 and the illustration on the following page indicate that there could be some variance in the drop areas. Other airports that might fall under a drop area are:

2

IDAHO

1. Cottonwood Municipal
2. Kooskia Municipal
3. Kamiah Municipal
4. Nezperce Airport
5. Craigmont Municipal
6. Lanham Airport

Aircraft are based at all of these landing areas. There are also ranch and Forest Service strips in the general area.

(4) We have not considered a delay to traffic on airways/jet routes southwest of a line from Pendleton to McCall. The missile will then be at a very high altitude. This is a calculated risk as it is stated that the possibility of having to destroy the missile during the time it overflies the United States is low due to missile reliability. However, in the event destruction was required during this period, it is indicated that pieces weighing from 100 to 1,960 pounds will fall close to the flight path.

(5) The path of the missile will pass over only one electronic facility, the Cottonwood RCAG, which should have no environmental impact on this individual RCAG.

(6) It is imperative, in the interest of both civil and military aviation safety, that you keep us abreast of the progress of project Operation Giant Patriot in order that we can take the necessary action to set aside the block of airspace required for the project, and so that we can keep all aircraft clear of this airspace during the time you will be using it.

Should you desire to review the plot of the missile flight we made on the F-16 Navigational Chart or wish additional information, please feel free to call on us.

Sincerely,

C. B. Walk, Jr.

C. B. WALK, JR.
Director

Response to the Federal Aviation Administration (Northwest Region)

(1) The Air Force is grateful to the FAA for its comments and information. The information has been used in the preparation of this Final Environmental Statement.

(2) The drop areas presented in the draft statement were general and were intended as examples. Specific impact areas are dependent upon the exact launch sites which were not selected at the time that the draft statement was prepared. The specific planned location of each impact has been determined and is presented in this final statement. No debris will impact close to Grangeville. The revised impact areas are detailed in Section I. C.

(3) All of these airports, as well as farm houses, lumber camps, and all other inhabited areas were carefully considered when the specific launch sites were selected. As detailed in Section I. D, the sites were chosen so as to minimize the hazards to any human activity in the launch and drop areas.

(4) At the time the missile crosses a line from Pendleton (Oregon) to McCall (Idaho), it will be at an altitude of approximately 150 miles (800, 000 feet). This is well outside the earth's atmosphere and is higher than many satellites. This is also relatively late in the missile's flight, during which the chance of failure is low.

(5) The GIANT PATRIOT launches are not expected to have any impact on the RCAG.

(6) Subsequent to the publication of the Draft Environmental Statement, extensive communication has taken place between the Air Force and the FAA. A detailed set of procedures have been evolved to handle the aviation safety problem. These procedures are substantially the same as those which have been used successfully to ensure air traffic coordination for over 1400 launches for Vandenberg AFB, and are detailed in Section I. C.

E. Comments of the Office of the Assistant Secretary of Commerce

OFFICE OF THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

March 25, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

The draft environmental impact statement for Operation Giant Patriot (Operational Base Launch Program), which accompanied your letter of February 13, 1974, has been reviewed and the following comments are offered for your consideration.

(1) A thorough analysis of low level air pollution as a result of the missile launch has been performed and we have no further comment on this aspect. We are concerned about the impact on land surfaces of missile debris. The speed and direction of the winds along the launch path are a factor in computing the impact area. The report does not demonstrate how these meteorological variables are to be determined at the time of launch. Unless special wind soundings are taken, the routine information available from the National Weather Service will be 6 to 12 hours old at the time of launch.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R. Galler
Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Response to the Office of the Assistant Secretary of Commerce

(1) Further analysis of the air pollution effects resulting from the GIANT PATRIOT launches is provided in Section III.B.

It is not necessary to obtain meteorological data at the time of launch for the purpose of predicting missile debris impact areas. The calculated impact risk areas presented in Section I were obtained using computer simulations which incorporated statistical averages of wind conditions over the past decade for the planned month of the year, time of day, and launch site areas.

F. Comments of the Department of Housing and Urban Development (Region VIII)

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL BUILDING, 19TH. AND STOUT STREETS
DENVER, COLORADO 80202

March 21, 1974

REGION VIII

IN REPLY REFER TO:
8M

Mr. Billy E. Welch, Ph.D
Special Assistant for
Environmental Quality
Department of the Air Force
Washington, D.C. 20330

Dear Mr. Welch:

This is in response to your letter of February 13, 1974, which requested our comment on the Draft Environmental Impact Statement for Operation Giant Patriot.

As you know, HUD is primarily concerned with (1) the effects of a proposed action on the urban environment and (2) the compatibility of the action with the Comprehensive Planning for the area. Assessing these considerations, this office offers the following comments.

(1) Several references are made in the Draft Statement to studies and surveys to be made in the future. On page 5-1, for example, it is stated that, "exact presentation of debris impacts and associated risks will be provided once site surveys and hazard studies have been completed". On page 3-51 it is suggested that such information will be made available in the Final Environmental Statement.

(2) In order for HUD to make a thorough review of the proposed program, a specific site plan and projection of hazard areas would need to be evaluated. Without this information the present Draft Environmental Impact Statement is inadequate and any review of the statement would be premature.

Therefore, it is the recommendation of this office that further consideration of this program be suspended until such time as detailed site and hazard information can be made available in a revised draft environmental statement.

We appreciate this opportunity to assist you. If you have any question regarding our comments, please feel free to contact this office.

Sincerely,

Leo R. Buttrill

for Robert J. Matuschek,
Assistant Regional Administrator
for Community Planning and Development

Response to the Department of Housing and Urban Development (Region VIII)

(1) The detailed site surveys and hazard studies have been completed. The results of these efforts form the basis of this Final Environmental Statement. This statement will be filed with the Council on Environmental Quality and will be available for review by all agencies.

(2) An environmental statement has to be filed early enough to allow the public to have input before the decision is made, yet late enough to have sufficient information on which to comment. The Air Force believes it reached that balance in this environmental statement and thus is not required to file a revised draft environmental statement. All additional information has been included in the final environmental statement.

G. Comments of the Federal Aviation Administration (Western Region)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WESTERN REGION
P. O. BOX [illegible], WORLDWAY POSTAL CENTER
LOS ANGELES, CALIFORNIA [illegible]

March 22, 1974

Herbert E. Bell, Colonel, USAF BSC
Chief, Environmental Protection Group
Directorate of Civil Engineering
HQ USAF/PREV
Washington, D. C. 20330

Dear Colonel Bell:

We have now completed the review of the Department of Air Force draft Environmental Statement regarding Operation Giant Patriot (Operational Base Launch Program) dated February 1974.

(1) The draft statement as presented appears to have considered all environmental issues from an air traffic control standpoint. However, we would like to advise that there are certain operational considerations concerning management and use of airspace that must be resolved prior to actual operation if the project is to be considered environmentally acceptable.

Any questions relative to this matter should be directed to our Mr. Don Davis, Chief, Airspace and Procedures Branch who may be reached at, 213-536-6180.

Sincerely,

W. BRUCE CHAMBERS
Regional Planning Officer

Response to the Federal Aviation Administration (Western Region)

(1) The GIANT PATRIOT launches will be fully coordinated with the FAA, as detailed in Section I.C. (See also Section D of this appendix.)

H. Comments of the Department of Agriculture

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

1974

Honorable William P. Clements, Jr.
Deputy Secretary of Defense
The Pentagon
Washington, D.C. 20301

Dear Mr. Clements:

Thank you for sending information and a draft Environmental Statement on the proposed operational demonstration of the Minuteman Missile System.

(1) The proposal deals with and affects National Forests in three Forest Service Regions, with the major interest in the Northern Region which includes Forests in Montana and Idaho. Responsibility for administration of that area lies with the Regional Forester in Missoula, Montana. As Mr. Dorrell of the Forest Service, Division of Fire Management, discussed with Colonel Crutchfield by phone, it is desirable that the Regional Forester of the Northern Region be the first point of contact in all activities related to this proposal. The Regional Forester's complete address and telephone number are as follows:

Steve Yurich, Regional Forester
U.S. Forest Service, Northern Region
Federal Building
Missoula, Montana 59801

(406) 549-6511

We will count on Regional Forester Yurich to keep all other Departmental offices fully informed and involved as necessary.

Sincerely,

Paul A. Vander Myde

PAUL A. VANDER MYDE
Deputy Assistant Secretary

5161

Response to the Department of Agriculture

(1) The Air Force is greatful to the Department of Agriculture for its comments. Further environmental information will be coordinated through the Regional Forester's office. (Please refer to Section L in this appendix.)

I. Comments of the Department of Health, Education and Welfare

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
50 FULTON STREET
SAN FRANCISCO, CALIFORNIA 94102
Office of Environmental Affairs

OFFICE OF THE REGIONAL DIRECTOR

March 29, 1974

Billy E. Welch, Ph.D
Special Assistant for
Environmental Quality
Department of the Air Force
Washington, D.C. 20330

Dear Dr. Welch:

The draft environmental impact statement on Operation Giant Patriot was received in this office on March 6, 1974 and reviewed in accordance with DHEW procedures as required by Section 102(2)(c) of the National Environmental Quality Act.

(1) The action described in the draft will result in a series of missile tests which will initiate in Montana and terminate in the Pacific Ocean near Canton Island. The potential for human as well as other animal and plant, population trauma as a result of debris fallout, chemical pollution or fire is described. The safeguards described appear adequate with the recognition that unforseen problems may occur with unpredictable (by location) results.

This office offers no specific comment or recommendation and appreciates the opportunity to review the statement.

Sincerely yours,

J D Knochenhauer

James D. Knochenhauer
Regional Environmental Officer

cc: Phyllis Hayes
Warren Muir

Response to the Department of Health, Education and Welfare

(1) The Air Force appreciates the review of the draft Environmental Statement by HEW.

J. Comments of the Department of Transportation (Federal Aviation Administration)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

April 3, 1974

Department of the Air Force
HQ USAF/PREV
Washington, D. C. 20330

Dear Sir:

We have reviewed the draft environmental impact statement on Operation Giant Patriot. The only comments we have to offer that involves the Federal Aviation Administration's (FAA's) jurisdiction or expertise on this project concerns the following two items:

(1) 1. Coordination with the FAA on airspace clearance before and during the missile launch operation. Although Section IE3(g) does provide for this safety aspect, it is suggested that the final environmental impact statement incorporate specific arrangements on this matter so that airway users can be notified well in advance of the launch operation.

(2) 2. Delineation of missile sonic boom levels in relation to structural impacts beyond that reported in Section IIIC7. Although it is unlikely that any large problems exist the report's conlusions would be bolstered by some quantitative data.

Sincerely,

John O'Brien

for R. P. SKULLY
Director of Environmental Quality

Response to the Department of Transportation (Federal Aviation Administration)

(1) Specific arrangements for the coordination of the GIANT PATRIOT launches with the FAA are described in Section I. C. (See also Section D of this appendix.)

(2) Section III. C. 2 provides a thorough analysis of sonic boom effects.

K. Comments of the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In reply refer to:
(ER-74/257)

APR 1 1974

Dear Dr. Welch:

Thank you for your letter of February 13, 1974, requesting the Department of the Interior to review and comment on your draft environmental statement for the Operation Giant Patriot (Operational Base Launch Program). Accordingly, we offer the following comments for your consideration. Generally, we find the proposal, as presented in the environmental statement is not specific enough particularly as it relates to the proposed drop areas in Idaho and possibly Western Montana. As project plans are finalized we suggest that special consideration be given to:

(1) The possibility that some unstable slopes may slide or slump and avalanches may occur under the added impact of sonic booms;

(2) Impacts on the recreation and wildlife environment within the designated drop areas, particularly endangered species;

(3) Presenting a comprehensive discussion on the reduction of fire and injury hazards in the event of missile destruction through dispersal of small fragments over a larger area. Dispersal of a larger number of fragments over a larger area automatically increase the potential of injury or fire compared to debris from a normal launch;

(4) More discussion of the impacts of each alternative rather than dismissing them in terms of the objectives of the test, and;

(5) Consulting with the State Historic Preservation Officers for Montana and Idaho to determine if any existing or eligible sites on the National Register of Historic Places will be impacted upon. Full consideration should also be given to existing units of the National Park System. Results of such consideration should be reported and documented in the final environmental statement. The State Historic and Preservation Officers and addresses are presented below for your convenience:

Chief of Recreation & Parks Division
Department of Fish & Game
State of Montana
Mitchell Building
Helena, Montana 59601

Director
Idaho Historical Society
610 North Julia Davis Dr.
Boise, Idaho 83706

We appreciate the opportunity to review and comment on the statement and hope that our comments will be of assistance to you in preparing the final environmental statement.

Sincerely yours,

Royston C. Hughes

Assistant Secretary of the Interior

Dr. Billy E. Welch
Special Assistant for
Environmental Quality
Department of the Air Force
Washington, D.C. 20330

Response to the Department of the Interior

(1) An extensive analysis of sonic boom effects is presented in Section III.C.2. The predicted area for sonic boom effects does not contain terrain in which avalanches or landslides are likely.

(2) Although the winter launch schedule drastically reduces the probable recreational use of the drop areas, extensive procedures will be undertaken to notify the public of the areas in which the hazards are significant. Evacuations of all known personnel from the drop areas will be implemented as discussed in Section III. G. 1.

A detailed discussion of the wildlife indigenous to the drop areas can be found in Section II. B. The impact on these animals (including endangered species) will be minimal, consisting of a very remote possibility of injury due to falling debris and possible brief startling due to noise or sonic boom.

(3) Injury and fire hazards from both normal launch and missile abort situations are detailed in Sections I. C, I. D and III. E, respectively. It should be noted that although there are a large number of fragments from destruct, a major portion of the missile is reduced to dust by the explosion.

(4) The alternatives to Operation GIANT PATRIOT are considered in detail in Section IV.

(5) The State Historic Preservation Officer in each of the affected states has been contacted. Full consideration has been given to all historic sites and National Parks in the process of launch site selection. (Please refer to Section II and Section III.I.)

Comments of the Forest Service (Regional Forester, 20F
Northern Region)

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FEDERAL BUILDING MISSOULA, MONTANA 59801

TELEPHONE: 549-6511
AREA CODE 406

8420

APR 9 1974

Colonel R. K. O'Connor
Headquarters, Strategic Air Command
Att: XPQT
Omaha, Nebraska 68113

Dear Colonel O'Conner:

Following are our comments on the Draft Environmental Statement for Operation Giant Patriot.

(1) Publishing the draft statement before selecting the specific launch pads makes it impossible, apparently, to make more than general projections of the impact areas for Stage II fallout. The draft states that definite impact areas will be identified in time for the final statement. We need to know as accurately as possible the locations of these areas before we can evaluate the specific impacts on National Forest resource activities and the environment. Maps and figures used to describe the areas are presently too general. We suggest that for the final statement locations of Federal lands, local communities, and impact areas in relation to these be shown on maps of a minimum scale of ½" = 1 mile.

(2) Page 2-9 indicates the Selway-Bitterroot Wilderness is being considered as a possibility for impact areas. From recent conversations with Major J. Howard Verdery, Offutt Air Force Base, Nebraska, we understand that this has changed and no impact areas will be selected within the Wilderness. We agree with this because we believe such use would be in violation with the Wilderness Act of September 3, 1964 (78 Stat. 890; 16 U.S.C. 1131-36). Should it become necessary for you to reconsider this decision we suggest that you study this Act to gain an understanding of the Wilderness principle and the constraints which are placed on activities within units of the National Wilderness Preservation System. Public involvement is definitely a prerequisite to any operation affecting the Wilderness resource.

(3) The safety factor is low according to the statement but a possibility does exist that a problem could occur. Public safety within National Forest lands during Stage II operations concerns us. Should Stage II need to be destructed the implications of this action are not adequately explained. What precautions should be taken along the path from the Great Falls area of early missile flight to the point where Stage II drops occur? Should timber sale operations, recreation use, or other activities be prohibited along the flight path during the launch period?

(4) Actual physical damage to resources within impact areas would appear to be negligible. We believe that all debris should be removed from National Forest lands. It is assumed that debris can be retrieved by helicopters without building roads or cross-country vehicle travel. If this assumption proves incorrect and it becomes necessary to construct helispots, roads, or trails to facilitate removing the debris close coordination between the Air Force and Forest Service would be necessary regarding the authorization, location, and construction of such improvements.

(5) Page 2-9 alludes to the fact that Nez Perce Indian land is under Federal ownership. These lands are not public and should not be treated the same as publicly owned lands. This same page does not consider nor list the Nezperce and Clearwater National Forests, both of which appear to be within the impact area.

Sincerely,

Keith M. Thompson

for: STEVE YURICH
Regional Forester

Response to the Forest Service (Regional Forester, Northern Region)

(1) The final site selections have been made and are described in Section I.C. Maps and figures have been chosen in the interests of clarity and are considerably more detailed than those in the draft statement.

(2) The impact areas presented in the Draft Environmental Statement were included as examples of the general areas involved. It was not possible to be more specific until the final site selections were made. The actual drop areas will not impact any wilderness preserves.

(3) Safety provisions are discussed in Section I.C. Any areas of lumbering, recreation or other activity which are within the specific drop areas will be evacuated overnight as detailed in Section III.G. Public announcements will be extensive in all affected areas.

(4) The Air Force plans to retrieve all debris resulting from the GIANT PATRIOT launches. Any operations which are necessary in National Forest lands will be fully coordinated with the Forest Service.

(5) The Nez Perce Indians have been contacted and briefed regarding the proposed launches. Any necessary arrangements will be made directly. As mentioned above, all impact areas are detailed in Section I.C.

M. Comments of the State of Oregon (Executive Department)

EXECUTIVE DEPARTMENT

LOCAL GOVERNMENT RELATIONS DIVISION

240 COTTAGE STREET S.E. • • • • SALEM, OREGON 97310

TOM McCALL
GOVERNOR

J. N. PEET
Director

April 2, 1974

Dr. Billy E. Welch, Ph.D.
Special Assistant for Environmental
Quality
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

Subject: Operation Giant Patriot
PNRS #7403 4 030

(1) We have distributed copies of your Draft Environmental Impact Statement to the appropriate state agencies for their review and comments in conformance with the guidelines of the Council of Environmental Quality and Office of Management and Budget Circular A-95. In addition, a notification of its availability has been published and distributed to all state agencies and all Councils of Governments inviting their inquiry.

The attached responses suggest points to be considered and included in your final statement.

We invite you to communicate further with the interested agencies if you require clarification or assistance. Please forward copies of correspondence to the Clearinghouse using the file number we have assigned as reference.

We will expect to receive (5) copies of the final statement for review and comment as required by CEQ guidelines.

Sincerely,

Robert K. Logan

Robert K. Logan
Administrator

RKL:Rt
Enc.

Response to the State of Oregon (Executive Department)

(1) The Air Force is grateful to the State of Oregon for its comments, and will provide the required copies of the Final Environmental Statement.

N. Comments of the State of Oregon (Department ~~of~~ Environmental Quality)

OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

Local Government Relations Division
240 Cottage Street S.E., Salem, Oregon 97310
Ph: 378-3732

PNRS STATE REVIEW

LOCAL GOVERNMENT RELATIONS DIVISION
MAR 2 2 1974

Project #: 7403 4 030 Return Date: MAR 22 1974

ENVIRONMENTAL IMPACT REVIEW PROCEDURES

1. A response is required to all notices requesting environmental review.
2. OMB A-95 (Revised) provides for a 30-day extension of time, if necessary. If you cannot respond by the above return date, please call the State Clearinghouse to arrange for an extension.

ENVIRONMENTAL IMPACT REVIEW
DRAFT STATEMENT

( ) This project does not have significant environmental impact.

( ) The environmental impact is adequately described.

(X) We suggest that the following points be considered in the preparation of a Final Environmental Impact Statement regarding this project.

( ) No comment.

REMARKS

(1) The Environmental Impact Statement indicates that if destruct action is initiated within a certain period of time during the flight, debris will fall on the State of Oregon. Considering this possibility, the following points should be delineated in the final EIS.

1. The time range during which the destruct action would have to be initiated to cause debris to fall on Oregon.

2. The total hazard value (the sum of the normal case and the failure case) to the population of the State of Oregon.

3. The environmental impact on the State of Oregon if destruct action is initiated at the time that it will cause debris to fall on the state.

ROBERT L GAY, ~~DIRECTOR~~
DEPT OF ENVIRONMENTAL QUALITY
MAIL ROOM STATE OFFICE BUILDING
PORTLAND OREGON 97201 P

Agency DEQ By H M Patterson

Response to the State of Oregon (Department of Environmental Quality)

(1) The exact time range during which destruct would have to be initiated to cause debris to fall on Oregon will be different for each of the proposed launch sites. A variance will also apply to the total hazard value. There is no hazard to Oregon in the case of a normal launch. Specific time ranges and hazard exposure levels are broken down by city and county in Appendix C, and a summary of all hazards is presented in Section I. D. Should any debris impact in Oregon, the environmental impact would be limited to that described in Section III. D.

O. Comments of the State of Oregon (Nuclear and Thermal Energy Council)

NUCLEAR AND THERMAL ENERGY COUNCIL

(1) It seems that assessment of the risk posed by the project is a key point in determining attitudes towards it. The Draft Statement does not include a numerical determination of this risk. We will expect additional and detailed risk studies to be included in the Final Environmental Impact Statement.

- Mr. Walter E. Pollock
NTEC
4263 Commercial, S.E.
Salem, Oregon 97310

Response to the State of Oregon (Nuclear and Thermal Energy Council)

(1) A complete hazard analysis forms the basis for Section I. C on safety and is summarized in Section I. D. Detailed data in the form of computer outputs can be found in Appendix C.

P. Comments of the Department of State

DEPARTMENT OF STATE

Washington, D.C. 20520

BUREAU OF INTERNATIONAL SCIENTIFIC
AND TECHNOLOGICAL AFFAIRS

February 27, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
Office of the Assistant Secretary
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

(1) In response to your letter of February 13, the Department of State has no comment on the draft environmental statement on Operation "Giant Patriot," as it appears that the environmental impact of the operation would be exclusively domestic.

It is my understanding that other aspects of Operation "Giant Patriot" have been coordinated with the State Department through other channels.

Sincerely,

William C. Trueheart
Office of Environmental Affairs

Response to the Department of State

(1) The review of the Department of State is greatly appreciated.

Q. Comments of the Office of the Secretary of Transportation

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

14 MAR 1974

Billy E. Welch, Ph.D.
Special Assistant for Environmental Quality
Office of the Assistant Secretary
Department of the Air Force
Washington, D.C. 20330

Dear Dr. Welch:

The Department of Transportation Environmental Affairs Office has provided this office with a copy of your draft environmental impact statement, Operation Giant Patriot. While our comments are more safety oriented than environmental, we feel that you or your safety staff may be interested in our observations which follow:

(1) Reference paragraph E-3, page 1-15 to 18: Since all previous first stages and panel covers have impacted at sea, this will be the first opportunity to assess the land impact damage from these components. It is assumed that the USAF will conduct such an assessment and report same. This information will be useful for projecting other overland tests which might occur in the future, including perhaps the space shuttle. The possible damage to roads, farms and timberland as well as an estimate of potential impact force and scatter would be useful.

The same comment applies to non-nominal impact of any other debris/stages/components which might inadvertently be caused to fall on land (page 1-21 to 24).

(2) An early failure of one of the first launches would be cause to reassess the probability predictions and to modify precautions if range/flight safety does not appear to be as assured as this plan assumes.

(3) Page 1-28 and 29, paragraph (4)(b) and (c): Is the public to be told what these probabilities and risks are? They should be low enough to dispel apprehension if explained in simple terms.

(4) The winter launch schedule should be adhered to since much of the overflight land is more densely populated in the summer months. Considerable recreation land containing campgrounds and vacation attractions is found under the flight path.

(5) Even though the risk hazard assessment shows low probability of endangerment, emergency medical services should be on standby with provisions for rapid communication, transportation, and search capability. Helicopter and surface units should be on alert and coordinated through the state and local transportation departments.

Sincerely,

Philip H. Bolger,
Director
Safety Affairs

Response to the Office of the Secretary of Transportation

(1) The Air Force plans to assess the impact due to overland flight of the GIANT PATRIOT launches as completely as possible.

(2) The safety provisions to be used on GIANT PATRIOT launches are similar to those used by the Air Force for many years for hundreds of test launches. A failure in any series of launches is always fully studied and corrections applied before proceeding with further tests.

(3) Section I.C on safety provisions and section I.D on hazards provide a full discussion of public risk resulting from the proposed launches. Appendix C presents a complete numerical breakdown of the risks in each area affected.

(4) All of the GIANT PATRIOT launches will occur during the winter months (January through April). The populations presented in all hazard areas during these specific months has been included in the hazard calculations summarized in Section I. D.

(5) Provisions for emergency communication and transportation are an integral part of the safety system which will be used for the proposed launches. The Air Force plans to fully coordinate these measures with state and local authorities.

NORMAN B. LIVERMORE, JR.
SECRETARY

Department of Conservation
Department of Fish and Game
Department of Navigation and Ocean Development
Department of Parks and Recreation
Department of Water Resources

RONALD REAGAN
GOVERNOR OF
CALIFORNIA

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814

Air Resources Board
Colorado River Board
San Francisco Bay Conservation and Development Commission
Solid Waste Management Board
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

JUN 20 1974

Mr. Billy E. Welch
U. S. Department of the Air Force
Office of the Assistant Secretary
Washington, D.C. 20330

Dear Mr. Welch:

The State of California has reviewed the draft environmental statement for the Department of the Air Force "Operation Giant Patriot", which was submitted to the Office of Planning and Research (State Clearinghouse) within the Governor's Office. The review accomplished by the State fulfills the requirements under Part II of the U. S. Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969.

The statement was reviewed by the State Departments of Food and Agriculture, Transportation, Health, Housing and Community Development, Conservation, Fish and Game, Parks and Recreation, and Water Resources; the State Water Resources Control Board; the Air Resources Board; and the Solid Waste Management Board.

We have no comments to offer. Thank you for the opportunity to review and comment.

Sincerely yours,

N. B. LIVERMORE, JR.
Secretary for Resources

By Paul Clifton

cc: Director of Management Systems
State Clearinghouse
Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814 (SCH No. 74030466)

APPENDIX B PUBLIC HEARING TRANSCRIPTS AND RESPONSES

A. GENERAL

Public hearings were held to receive comments on the Operation GIANT PATRIOT Draft Environmental Statement which was released in February, 1974. The Public Hearings were scheduled and held at the capital cities of the three affected states:

Helena, Montana	14 March 1974
Boise, Idaho	19 March 1974
Salem, Oregon	21 March 1974

Two additional hearings were conducted:

Lewiston, Idaho	16 April 1974
Grangeville, Idaho	17 April 1974

The hearings were chaired by Colonel Jordan, a Judge Advocate from Strategic Air Command (SAC). An Air Force panel with knowledge of Operation GIANT PATRIOT, the Draft Environmental Statement, (ES), range safety and overall Air Force plans and policy was also present at each hearing. All proceedings at the hearing were recorded by the court reporter for later transcription. After an introduction by Colonel Jordan, brief presentations were made on Operation GIANT PATRIOT and on the Draft Environmental Statement. Following the Air Force presentations, members of the public were invited to comment on the Draft ES.

Transcripts of the hearings are contained in Section C of this Appendix. For the Helena, Boise, and Salem hearings, a single copy of the Air Force presentation is given, since the same information was presented at each hearing. At the Lewiston and Grangeville hearings, a slightly different procedure was followed in that questions on the Operation GIANT PATRIOT presentation were received and answered prior to continuing with presentation of the summary of the Draft ES. Thus the Lewiston, Grangeville transcripts are included in their entirety. Following the Air Force presentations, public comments were received and recorded. Letters received after the hearings are also included following each public hearing.

The Final ES contains responses to comments regarding the Draft ES. Very few of the comments made related to environmental questions. The majority of comments were related to questions of national policy. For comments related to environmental issues, a reference is made in the transcripts to Section (s) and page numbers where answers may be found. Comments not related to environmental issues, are discussed in Section B of this Appendix. They are not addressed in depth since they do not pertain to the environmental issues addressed in this Final ES.

B. PUBLIC COMMENTS NOT RELATED TO ENVIRONMENTAL IMPACT

A large number of the comments presented at the public hearings related to national policy rather than directly to the environmental effects of the proposed GIANT PATRIOT launches. A summary of specific issues voiced by the public is listed in Table B-1.

TABLE B-1 POLICY ITEMS

1. Timing and Location of Public Hearings

   A. Addressed in TABLE B-1
2. Need for tests/what more can be learned;
3. Replacement with new missiles/why test what we have now;
4. Compromise SALT and detente;
5. Overcapacity of missiles/how much is enough;
6. Need for show of strength;
7. Failure would destroy confidence;
8. Increased accuracy;
9. First strike capability;
10. Counterforce capability;
11. Gravity anomalies;
12. Possibility of additional or continuing tests.

C. TRANSCRIPTS FROM PUBLIC HEARINGS

This section contains the transcripts from the five public hearings. Section 1 contains the general Air Force presentation (the one from the Salem hearing is used). Sections 2-4 contain the comments portions and letters from the Helena, Boise and Salem hearings. Sections 5 and 6 contain complete transcripts from the Lewiston and Grangeville hearings. After each comment or letter, a reference to the section and paragraph where the answer may be found has been entered into the transcript. For example, "(II. A. 2)" refers to Section II, paragraph A.2. References to more than one section are provided where appropriate. References for answers to comments are given for each individual who commented. All references are listed after the last statement made by each individual.

1. Air Force Presentation

The Air Force presentation made at all five hearings is continued in this section. The Salem, Oregon presentation (21 March 1974) is used as an example.

PUBLIC HEARINGS - SALEM, OREGON

PROJECT GIANT PATRIOT
(21 March 1974)

COL JORDAN: Good evening, ladies and gentlemen, it is indeed a pleasure to be in your beautiful State of Oregon. It's my first visit here and I certainly hope I will have the opportunity to visit Oregon again.

My name is Colonel Jordan, I am the Chief of the Civil Law Division, Office of the Staff Judge Advocate, Headquarters, Strategic Air Command, Offutt Air Force Base, Nebraska. We have tonight, on the panel, Mr. Benn, who is from Vandenberg Air Force Base, he is a Missile Control Officer. We also have Captain Needham and Captain Olson, they are also stationed at Headquarters, Strategic Air Command, at Offutt Air Force Base. Now, why are we here this evening? We are here to receive public comments on the Draft Environmental Impact Statement, relating to the Strategic Air Command's Operational Base Launch Program, known as OBL or GIANT PATRIOT. We are here to get your comments, your contributions, your reactions to the Draft Environmental Statement. As a predicate for this meeting tonight, I thought it appropriate to have a briefing on this. First, Captain Olson will give you the description of the OBL and this forms the first part of the Draft Environmental Impact Statement -- a description of the where, what and how of the program. The second portion of the Draft Environmental Impact Statement -- actually, there are seven portions in all -- but the second and remaining portions of the Statement will be dealt with by Captain Needham. He will give you an overview of the Draft Environmental Impact Statement. Now, that would give us, therefore, some idea as to the Statement and then we will receive your comments, because that is the main purpose for our being here -- to receive the comments of the public.

Now, what is my role here? I am an impartial Judge Advocate Officer, I am not a hearing examiner, I will make no recommendations on the project, I did not participate in the development of the OBL project, I will not be asked to participate in any decisions relating to whether the program is to proceed, to be abandoned or to be modified. I am here to see to it that you, the public, have an opportunity to make a statement here, relating to the Environmental Impact Statement. When you make your statements, please come up to the podium, identify yourself, address, and, if you wish, any affiliations you might have -- whether you represent a group or not, that's just your desire. The reason for this is that we would like to have it for the record, and would like to send you a copy of the transcript of this proceeding. Because we will tape the proceedings, as you know, Mrs. Morgan, our reporter there, is taking down the proceedings. You will have a verbatim transcript and, as I indicated, all persons who will fill out the forms or make a statement will receive a copy. Now, we will get to the preliminaries, introductory previews. First, I will call on Captain Olson.

CAPT OLSON: While we are waiting on the lights, I will make some comments on this briefing. I wish we could be more specific than we will be tonight, as to precisely where we are coming from and where we are going to. The sites back in Montana where we want to test from, we first have to have a site survey. This survey does cost a certain amount of money and, at the moment, the program, the money, as a matter of fact, is being held up by the House Appropriations Committee. Could be that it will remain that way. At any rate, that is why at this point we still are not precise as to what our ground track is, precisely what our hazards are, etc.

Now this will be about 20 minutes long. I honestly wish we could be more specific in the briefing and in the Environmental Impact Statement at this time.

The Air Force has been directed to plan safe demonstration launches of Minuteman II intercontinental ballistic missiles, without their warheads, from operational silos in Montana during the winters of 1974-1975 and 1975-1976. These launches are called Operational Base Launches or OBL. The nickname for the launches is GIANT PATRIOT.

We can't escape the fact that a most significant military threat to the security of the free world is the tremendous buildup of the Soviet strategic nuclear forces.

During the 1950's, the United States enjoyed a 15-1 numerical nuclear superiority over the Soviet Union. By 1962, when the Cuban Missile Crisis occurred, that lead had dwindled to about a four- or five-to-one advantage. Still it was a distinct advantage, and we feel this was one important reason the Soviets withdrew their missiles from Cuba. But, the Soviets had learned a valuable lesson, and by January 1969, our massive lead in nuclear delivery capability no longer existed. The Soviets had moved forward with a buildup of their nuclear forces and, today, the United States and the Soviet nuclear capabilities stand at rough parity; the Soviets with the numerical advantage and the

United States with the technological advantage. But the technological gap is closing.

As a deterrent to any potential enemies, the Department of Defense has developed what is called the TRIAD -- referring to the trilateral forces of SAC's manned bombers, SAC's landlaunched ICBM's, and the sea-launched ballistic missiles of the Navy. This mixed force concept provides us the best possible nuclear posture.

Each of the systems complements and supplements the other two. The TRIAD poses several problems for a potential enemy. Offensively, he must target each of these weapon systems and is also faced with the impossible task of timing an attack to strike all three simultaneously. Defensively, a potential enemy must split his defenses and thereby weaken his overall defense structure.

The TRIAD is also a hedge against a breakthrough in technology. It is highly unlikely that such a breakthrough would degrade all three systems at the same time.

The Strategic Air Command operates two of the three components of the TRIAD. These are the U.S. manned bombers and the intercontinental ballistic missiles; the major portion of the free world's nuclear delivery capability.

SAC's nearly 400 B-52's, 70 FB-111's, 54 Titan II's, and 1,000 Minuteman Missiles represent a formidable potential for retaliation against any country considering war. But simply having the bombers and ICBM's is not enough. Nor is it sufficient that we know they are reliable. To be most effective in deterring nuclear war, our bombers and missiles must have credibility. That is, the enemy must believe that if we launch the aircraft and missiles they will destroy the intended target.

Our bombers have that credibility. Since 1955, when SAC received its first B-52, daily flights from world-wide locations have demonstrated its launch and flight reliability. Its performance in Southeast Asia, prior to the signing of the cease-fire and return of our POW's, added to its credibility.

The credibility of the ICBM has also been demonstrated by firings from Vandenberg Air Force Base, California. Since the more realistic the conditions under which the missile is demonstrated, the more credibility is gained, we want to add the final degree of credibility through the OBL program.

The Soviets have understood the advantages of a land-based system foryears. Their extensive deployment and their aggressive research and development programs aimed at technological improvement testify to this. The Soviets have also long recognized the importance of operational base launches to credibility and have made many such launches. Our Minuteman missile, the mainstay of our ICBM force, has never been flown from an operational base to target impact. For these reasons, we feel it is time to conduct such a launch to demonstrate to our friends and potential adversaries that the Minuteman II system has the deterrent capability we seek.

As background for the operational base launch concept, we need to look at how we test the Minuteman now.

Under the current testing concept, a Minuteman II missile is randomly selected at an operational base, the nuclear warhead is removed, and the missile is transported to Vandenberg Air Force Base. There, a telemetry and destruct system and test re-entry vehicle are added. The missile is placed in a silo by a task force of people from the operational base and, after receiving an execution order from SAC Headquarters, a missile combat crew, also brought from the operational base, launches the missile to a target area in the South Pacific.

Through test-range tracking and sensor systems, the missile is closely monotored from launch to impact, both to gather performance data and to insure safety.

These tests from Vandenberg have given us high confidence in the reliability of the Minuteman missile. However, in order that the missile be successfully fired, the missile itself, and the launch control center, known collectively as the Weapon System, must all function correctly. Because of modifications necessary on Vandenberg facilities to permit frequent reuse for follow-on tests, the weapon system at Vandenberg cannot exactly duplicate that at the operational base.

Under the Operational Base Launch concept, the missile will remain in its silo with its physical and electrical environment undisturbed. The re-entry vehicle containing the nuclear warhead will be removed and replaced by a range safety tracking and destruct mechanism. A range safety countdown will be conducted during which we evaluate the safety criteria in the flight corridors and the "GO" status of the destruct device. Once cleared by flight safety, an execution order from SAC Headquarters will direct the missile combat crews to launch the missile to the target in the Pacific. These launches will boost credibility for the weapon system and allow us to evaluate the gravity and geodetic factors in the operational launch region. In addition, the program will provide added reliability and performance data on the Minuteman that has been in its silo on strategic alert for a sustained period.

As I said earlier, the Soviets have made many operational base launches. While we have never flown a Minuteman from an operational silo to impact in the Pacific, the idea is not new to defense leaders.

SAC Minuteman testing began at Vandenberg in January 1963. From 1965 through 1968, four limited range test launches were conducted with modified missiles containing only seven seconds of propellant and capable of less than a mile of flight. That program proved unquestionably that tests of actual missiles could be conducted safely in the operational base environment.

In 1968, we began to develop a comprehensive test to completely check out the ground electronics systems from start to first-stage ignition under operational conditions. These tests continue to provide valuable data.

In 1970, a proposal for full-range launches was presented to Congress. While funds were approved to finish developing the hardware and to exercise the system from Vandenberg, money for launches from an operational base was deleted in an Appropriations Committee Conference. The conferees agreed, and I quote, "If a firm decision is made that such firings are required, consideration will be given to a budget request in a future fiscal year." Unquote. That decision -- that the launches are required -- has now been made and Congress is being asked to provide the money to conduct the GIANT PATRIOT program.

The GIANT PATRIOT Concept proposes a series of eight Minuteman II launches, four in the winter of 1974-1975 and four the following winter.

We've been testing missiles for years with launches from Vandenberg and we know from these tests that the Minuteman II missile is reliable. We made four short-flight launches between 1965 and 1968 to prove that missiles can be fired safely from an operational base. Since then, we have tested operational base ground electronic systems from start to first-stage ignition. So we know the components of the Minuteman II weapon system are reliable. All that remains is to demonstrate this with the utmost realism through GIANT PATRIOT.

This, basically, is the Minuteman II system. The Minuteman II is a three-stage missile, is 55 feet long and uses a solid propellant.

5

It is housed in a hardened launch facility and would be launched by missile combat crews in hardened launch control centers. A crew in each launch control center is responsible for ten launch facilities -- called a missile flight. Five flights are electrically interconnected to make up a missile squadron. Each launch control facility is responsible for its ten missiles but has back-up responsibility for another flight of ten missiles. The Minuteman squadron is configured so that any launch control facility can monitor all 50 of the squadron's missiles.

One of the preparatory tasks that must be accomplished prior to testing is the development of comprehensive safety rules by the nuclear weapons safety specialists. These rules will provide stringent safeguards to insure that only the OBL missiles are able to respond to launch commands.

Moreover, there are existing day-to-day safeguards, one of which is the crew's capability to inhibit the launch of a missile.

However, additional special and stringent safety precautions are needed for the OBL missile that will launch. To show you why, we'll look at the flight characteristics of the Minuteman II missile.

After missile stage I burnout occurs on a normal flight, the empty stage I -- 24.5 feet long and weighing 4,800 pounds -- would land an estimated (172) 198 miles down-range. The four-stage I/II interstage panels, each weighing 68 pounds, would land an estimated (50) 57 miles further down-range, or about (222) 255 miles from launch.

However, the missile trajectory is such that after 102 seconds of powered flight from a Malmstrom OBL site -- regardless of subsequent events -- all remaining components of the missile would impact in the Pacific Ocean.

Stage II burns out when the missile is (123) 142 miles down-range and the empty stage II impacts in the Pacific, approximately (600) 690 miles off the coast. After stage III burnout occurs, the re-entry vehicle with the empty third stage exits the coastline at an altitude of approximately (350) 400 miles.

NOTE. All miles in this briefing are statute except those in parenthesis, which are nautical.

With those flight characteristics in mind and safety paramount, we have made an exhaustive study to determine where and when the launch should originate. The primary criteria for the study were:

1. Minimum launch and space trajectory over land, and

2. Minimum population in the area of the missile launcher and along the ground path of the space trajectory.

Malmstrom Air Force Base near Great Falls, Montana, was chosen as the test location. Malmstrom is the Minuteman base closest to the Pacific Coast. Launching from Malmstrom, we can use existing western test range facilities including Canton in the Phoenix Islands target area. This is important because the necessary Pacific area tracking radar to give us detailed flight information is already in place. And, the population along the ground path of the space trajectory is less dense than that of any other location.

We have been able to tentatively identify candidate test-launch facilities. Through air reconnaissance of the launch area and the space trajectory ground path, we first identified areas where the first stage and panels could impact on uninhabited areas. By working back from these safe impact areas, we identified a group of candidate launch sites. Final selection is pending completion of detailed ground surveys.

The example ground path shown here is from one specific Malmstrom launch facility selected for minimum risk. The entire area is remote and very sparsely populated. Pending the detailed surveys, it is intended that any expended components would impact on Federally-owned lands or in the Pacific Ocean. The ellipses shown are impact areas associated with the first stage and interstage panels. Their dimensions are 26 x 12 miles for the first stage and 19 x 8 miles for the interstage panels. Considering the size of the impacting missile components, these are considered very ample for this purpose.

We plan to evacuate a tear-shaped area (5.2) 6 miles downrange and (1.6) 1.8 miles radially about the silo. The reason is that if the missile were not flying properly and had to be destroyed in the first eight seconds of flight, the debris would fall in a very dense pattern in the immediate vicinity of the silo. This procedure has been established through experience at Vandenberg Air Force Base where over 10 years we have conducted 1,200 missile launches with no injuries.

Clearing the area will mean evacuating a small number of families during the countdown and launch of the GIANT PATRIOT missiles. Those evacuated would be relocated for a 24-hour period for each launch and would be compensated by the Government. These evacuation procedures have been routinely used for more than 300 Pershing and Athena missile launches from Green River, Utah, to White Sands Missile Range in New Mexico.

Safety control in the launch area would be accomplished through use of optical skyscreens, one behind and one to the side of the silo. A skyscreen is a glass plate on which a precomputed trajectory is plotted. The actual, observed trajectory will be compared to the precomputed one by range safety officers to verify the missile is flying properly.

Once the missile has cleared the launcher site evacuation area and can no longer be seen by the skyscreens, long-range tracking radars acquire the missile and feed data to an instantaneous impact prediction system. This system gives the range safety officers a computer-driven visual display that is updated every one-tenth second. The display shows the impact dispersion of the missile debris should the destruct signal have to be sent. On the same display, each population center is shown, thus giving safety officers the capability for "Selective Destruct" of the missile outside an area where debris might present a hazard to those centers.

As I mentioned earlier when talking about the Vandenberg testing concept, test-range tracking and sensor systems are required to monitor the missiles' space trajectory. The tracking equipment in the up-range area is extremely important because the missile is thrusting during that phase of flight. Since there is currently no tracking equipment at the operational base, special mobile equipment had to be designed.

This mobile safety system was specifically designed to support operational base launches. The system contains all of the necessary elements of fixed installations found at Vandenberg for support of a missile launch from there. These elements, including countdown control, optical observation, radar tracking and command destruct were simply redesigned to combine, condense and make them transportable to the inland test site. The equipment is shown here as it would be deployed.

I mentioned the skyscreen used to augment radar data. But the most important elements are the tracking radars which will obtain precise position and velocity data on the missile, and the monitor and control vans where the path and performance of the missile will be continuously monitored to insure safety. It is from these vans that the command to destroy the missile would be issued, if necessary.

The destruct system used at Vandenberg incorporates a telemetry device added between the guidance system and the re-entry vehicle spacer and explosives placed along the length of the missile. Since we want to maintain the existing mechanical and electrical hookup between the OBL missile and the ground equipment, a new tracking and range destruct system was designed. This system contains a beacon for tracking purposes and shaped charges that, if necessary, would be set off to cause a high-order detonation of the missile third stage, destroying the entire missile.

This design was chosen to reduce thepossibility of burning propellant reaching the earth should the missile have to be destroyed in flight. This is not only a safety concern but an ecological one because the missile will be flying over forested land. This is also the reason the launches will be conducted in the winter, when snow will provide added protection for the land in some areas.

$6.3 million is required in FY 1974 to prepare to conduct the OBL during the winter of 1974-1975. The FY 1974 funds can be made available from existing appropriations. Funds required in FY 1975 will be included in the FY 1975 budget request. In summary, with any weapon system it is important to demonstrate its capabilities under the most realistic conditions possible. The supporting systems have now been funded, developed and tested. We have the capability to safely conduct these launches now, and demonstrate to our friends and potential adversaries that the Minuteman system possesses the deterrent capability we seek.

9

COL JORDAN: Thank you, Captain Olson. Now we will hear from Captain Needham.

CAPT NEEDHAM: Ladies and Gentlemen, before I continue with the summary of the Environmental Impact Statement, I would like briefly to address the National Environmental Policy Act, and just exactly why we are here. In 1969, Congress passed the National Environmental Policy Act. This Act was signed into law on 1 January 1970. Basically, the Act requires that the environment be given appropriate consideration in the decision making process. It required that all actions, federally funded actions, that are either controversial with regard to environment quality or that could have significant environmental impact -- the Act required then an Environmental Impact Statement be prepared on these. There are seven parts required by law to make up the Environmental Impact Statement. We will address these tonight. Captain Olson has addressed the first part.

Tonight we have a Draft Environmental Impact Statement. Now, this is a draft in the true sense of the word. We are distributing this to Federal Agencies that are affected, to the States that are affected, and to the public. We are asking for these agencies and the public to comment on these. The public hearing, such as we have here, is one method that comments are received on the draft Statement. Those that are not here tonight that would have an interest in commenting on it, can do so by writing to an address that Colonel Jordan will give at the end of the hearing. So, I would like to address the second part of the Environmental Impact Statement, that is, to characterize the existing environment.

The two areas that will be directly affected by the launch are: the area in the immediate vicinity of the launch, and the first stage of the panel impact areas. The area in the immediate vicinity of the launch will, of course, be in Montana, near Malmstrom Air Force Base. As Captain Olson pointed out, the specific launch sites have not yet been selected; therefore, it is impossible to characterize the specific environment; therefore, we will address both the launch area and the panel impact area in general.

We find that the launch areas are located primarily in agricultural land. The Draft Environmental Impact Statement has pictures of the typical launch site. If you have had the opportunity to see this, you can see that it is farmland, primarily wheatfield country. Also, as Captain Olson pointed out, as the slide projector shows, the first stage of the panel drop area -- the gross area -- the general area that is now being considered as a potential impact area, involves and contains the Nez Perces Indian Reservation, the Lolo National Forest, the Wallowa and Nez Perces National Forest, and the Selway-Bitter Root Wilderness area. Captain Olson explained there that we looked for areas that are very sparsely populated to impact the first stage and that is what this area, that I described above, generally that's what is contained in this area. We also considered the endangered species or the wildlife that is on the endangered species list that are in this area. We determined that this launch will have no significant effect on them, because of the very small areas that are involved, that are directly affected.

The third part of the Environmental Impact Statement is the probable environmental impact. So, this says that if we are to look at all the possible, all the probable ways that the environment may be affected by the proposed actions. So, in accomplishing this part of the statement, we find that the environment will be affected by the construction of support facilities. Roads, gravel roads, will be constructed for access to sites and sites will be prepared for placing of the radar and communications equipment. These will be small concrete pads. We also find that the environment will be affected by missile exhaust, or will probably be affected by missile exhaust. The primary products of interest are carbon monoxide, hydrogen chloride, and aluminum oxide. These products will be of significance in the immediate area of the launch, this is in Montana at the launch site. Captain Olson described the area that is to be evacuated near the launch site, an area of some six miles by two miles. Based on the experience at Vandenberg, as well as the use of computer models, this area will be sufficient so that population will not be exposed to a toxic concentration of these gases.

Also considered was the missile, or the noise that the missile will make. The combustion and exhaust noise in the immediate area of the launch will be of concern up to about 900 feet. So you can see that this will be contained well within the evacuated area. Outside of this, it will be a short-term nuisance noise. The missile will also present a sonic boom when it goes supersonic. The configuration of the flight will be such that this boom will not reach the earth, it will not be received on the ground. So, there will not be a sonic boom over Oregon.

Another probable environal impact is missile debris. Safety being the overriding consideration here, Captain Olson addressed this in some detail. Another probable environmental impact will be the probability of fire. In studying this, we find that the probability of forest fire is not likely after 40 seconds of flight. It will not occur after 40 seconds of flight. This means that when the missile is launched, if it has to be destroyed, it is probable that burning pieces of propellant will reach the ground, if it is destroyed within the first 40 seconds of flight. To deal with this problem, a fire-watch corridor has been established. That is some 20 miles down range and 4 miles wide from the launch area. So, if the missile is destroyed and a fire starts, someone will be watching the area. This will be reported and there will be available to the Air Force, an air modular, airborne firefighting system. This is a system that the Forest Service uses to combat forest fires. I believe that the people of Oregon are familiar with this. To further decrease the probability of fire, forest fire, the Air Force has determined to launch the missile in the wintertime when there is a snow cover.

We also considered water pollution and found that this launch will not present water pollution problems. We are also required to consider the socio-economic impact of the action. We find that this will be short-term, that the local economy will benefit without over-crowding or without building these facilities. This will be in the immediate area of the launch near Malmstrom. We are also required to consider the alternatives to the program. The alternatives that are discussed in the Impact Statement are to conduct the launch from a different site, to continue to conduct the launch from Vandenberg, using the OBL configuration, and to not conduct the launch at all. The Impact Statement addresses why these alternatives are not considered acceptable to the Department of Defense.

The fifth consideration of the Environmental Impact Statement is the adverse effects which cannot be avoided. What this means is that after we have looked at all the probable effects of the action, after we determine what can be done to reduce these, or eliminate these effects, then what's left, what cannot be avoided. We find that the effects of the construction cannot be avoided, these are local short-term effects, the Air Force has agreed to restore the area that has been affected to as much of the original condition as possible; that is, to remove the roads, remove the concrete pads, at the option of the landowner. Another thing that cannot be avoided is that of missile exhaust. In studying this, we find that it will be short-term and that it will be only in the immediate area of the launch. Another adverse effect that cannot be avoided is that of missile debris. Under a normal launch, debris impacting in the Continental United States will be the first stage and the second stage panels. The impact point will be carefully selected to present no significant environmental impact or hazards to population centers. Debris is also possible in in-flight failure, in the event the missile must be destroyed in flight. Captain Olson has explained to you that selective destruction will be employed so that no population centers will be affected. We also considered the -- let's see -- I didn't address the fire.

Another possible adverse effect would be a fire in the immediate area of the launch, if the missile had to be destroyed. This would quickly be contained by the fire-fighting systems that will be available. We are also required to address the short-term use of the environment versus long-term productivity. We find that short-term use of the environment will have no effect on long-term productivity. And finally, we considered the irreversible and irretrievable commitments of resources. This program, the only irreversible and irretrievable commitments of this program, would be the construction materials, that used in the concrete pads. The missiles are already committed, they are not being developed, they are not being built for this specific purpose of this program. So, in summary, we believe that the launch can be conducted in a way that will be environmentally safe and will not present significant hazards to population centers.

2. Comments Received at the Helena, Montana Hearing

This section contains a transcript of the public comments received at the Helena, Montana hearing. Responses to the comments are provided via section and paragraph references as explained above.

HELENA, MONTANA, PUBLIC HEARINGS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON GIANT PATRIOT

14 March 1974

MR. WILLIAMS: Thank you very much. My name is Pat Williams - for the record, my address is 2005 Jerome Place here in Helena. The Pentagon has asked for 20.6 million dollars in new money and 6.3 million dollars in what is called reprogrammed money from the United States Congress. We need that for numerous shots - in the next two winters, they say. Sometimes they say that. However, recently the Deputy Secretary of Defense, William Clements, writing in an Air Force magazine said and I quote, "These shots would be adequate to validate in a statistical sense the soundness of the system" and I quote - continues - "as a matter of fact we plan to have the launches on a continual basis." And I think the question is - how long will it be before they are backed by the extra 26 point some millions to go after it and spend it with the same arrogance that they have spent two trillion dollars since World War II ended. I don't believe we can stand these kind of expenditures in times of inflation, rampant as it is. At Vandenberg, they had 90 percent success. Would that 10 percent unsuccess - nonsuccess - have killed people had those tests been in Montana? In the 60's, they had the "pop-up" test in North and South Dakota, which were 66 percent unsuccessful. Would that nearly 40 percent have killed people had those tests been in Montana? How wide will the debris cloud be and how heavy will the material be that will be impacting unknown areas? Perhaps in Montana, perhaps in Idaho. The report says that the first and second stage panels may land on the land of the Nez Perces in Idaho. Chicken Little never had it so good and I hope the Pentagon will understand if Montanans are a little chicken. Thank you very much - I think it would be unfair for me not to state - and I do not think inappropriate for me to state that I am a candidate for Congress. I think this will be an issue in the campaign and as for Pat Williams - he's against lighting these fire crackers. (Appendix B. B. I. C. 2 & 3; III. D. 2)

COLONEL JORDAN: Thank you, Mr. Williams. The next card I have here is Mr. Tom Behan - I hope I have pronounced your name correctly.

MR. BEHAN: Mr. Chairman - I, too, am an announced candidate, not for congress but the legislature. You are going to hear, I believe, from a couple more office seekers this evening and from current office holders. What I would like to do if possible, is step out of that roll for a moment and speak for myself as a citizen and for my children. I dream of the day when they will grow up and the word "nuclear" to them means energy not bombs. I dream of the day of international peace. We are not moving in that direction. Instead, we are becoming devastatingly efficient in the art of killing. Jeannette Rankin, Montana's and the nations first Congresswoman said, "Mankind must learn the way of settling disputes is not by eliminating people." But these are dreams that I hold. Something I hope and believe that people in this rrom hold as well, but I fear we waiver in our pursuit of these dreams at times. I would like at this time, then to address sheer reality. It is my belief from this presentation - from the presentation I heard when your officers talked to the Joint Conference Committee of the Legislature that these tests are unneeded. I say that because they told us then that you have an accuracy ratio close to 99 percent. You know what these missiles are going to do. You referred in your presentation twice - and I quote, "all that remains is to demonstrate" end quote, this particular test. I maintain that this is not a tactical decision - it's not a 'will it work' or 'will it not work' decision. You have every conceivable reason to believe that it will work. Therefore, it must be a value decision. And I believe you've decided simply to rattle sabres. You asked for my comments for tonight - I am gratified that you were here. I don't value sabre rattling. You say the first stage is scheduled to land on federally-owned land, therefore no problem. Well I contend that this is not military land - it belongs to all of us. It's not yours alone to believe that you can drop two tons of scrap iron. I happen to believe this scrap is going to land on my portion of that federal land and I'm not going to like it. You say that the local economy under the socio-economic portion of your presentation - the local economy will benefit. Well I ask - why is it a benefit? And - what makes you think that it will benefit the local economy, not localize inflation? It is known when sums of money are dumped into an area, where there is only a given supply of goods and services - and more money simply makes these goods and services scarcer - therefore, inflation. In summary, gentlemen, and I appreciate the fact that you are travelling the states where this test will cover, I appreciate and am gratified that you are here this evening and are willing to hear us. But - I do dream of peace as I hope you do. I do not believe weapons are a step in the direction to peace. Granted we do have these weapons and granted we know they work, but not granted that they should be fired in Montana. Thank you very much. (Appendix B.B. , II.B.7; III.G.3)

COLONEL JORDAN: Thank you, Mr. Behan. Mr. John Bell.

MR. BELL: Colonel Jordan, gentlemen, citizens: I am John Bell, Representative, Montana Legislature, District 12. I'm from Jefferson, Lewis & Clark Counties. Lewis & Clark County is one of those counties over which these birds will fly, hopefully. I came here for two reasons. One - to get a little better informed and educated in this. I read the material that was issued previously - I read the draft environmental impact that has been prepared. And, secondly, I came to apologize for the time, trouble and expense that has been put to here, to respond to some shouting and complaining by some ill-informed Montanans, and I say ill-informed advisedly.

Looking now at House Joint Resolution 48 which was introduced early in the session - Joint Resolution of the Senate and the House of Representatives of the State of Montana, the Secretary of Defense, (spelled d-e-f-e-n-c-e) of the United States and to the Montana Congressional Delegation urging that the proposed Minuteman launchings from Montana be cancelled. They have some rationale as to why these launchings should be cancelled, including a statement whereas: There is a significant degree of danger to livestock and people of Montana due to malfunction, as witnessed by the fact that the Air Force will require a complete evacuation of the areas around the launch sites. Well - for that I would submit, as shear prudence - a fact of ill-informed-ugh - of the 19 sponsors of this resolution which was soundly defeated in the House and therefore, never went to the Senate. (I.C.1)

Question by unidentified man from the audience: Soundly defeated, sir? What was the final poll?

MR. BELL: I don't know. I don't recall - I think somewhere in neighborhood of 52-40.

UNIDENTIFIED MAN: Was that soundly defeated?

MR. BELL: I am not going to argue about it.

COLONEL JORDAN: Allow the speaker to continue please.

MR. BELL: Now - of the 19 co-sponsors of this ill-informed resolution - I see only one here - another candidate for Congress, who - to Pat Williams, I would respond is thinking of cost. Mr. Williams, peace isn't cheap - it's not free, it's terribly expensive and in more things than dollars. Now - here we have people wanting to stop the operational testing of a complicated weapons system. Mr. Behan - he says they say twice this is a demonstration. In "militaryese" I guess perhaps it is a demonstration. The Soviets in their numerous testings of their land-base ICBM's have also called it demonstration. A show of the flag, if you will. I look on it, however, as the operational testing of a very complicated weapons system and they don't know and you don't know and I don't know that that bird is gonna work with a nuclear warhead in it, with all of the electronic components that are outside the bird. And - I don't believe that we, as civilians, have any business whatsoever interferring with the operational testing of a complicated weapons system. I thank you.

COLONEL JORDAN: Thank you, Representative Bell. I call upon Mr. VanDyck.

MR. VANDYCK: Mr. Chairman - can I yield to Mr. Silverman?

COLONEL JORDAN: Yes, of course.

MR. SILVERMAN: Mr. Chairman - I am here this evening with 3 or 4 people from Missoula, Montana, who would like to make statements if they could - they filled out cards - Mr. Lemnitzer, Mr. VanDyck and myself.

COLONEL JORDAN: Would you, for the record, please include your address?

MR. SILVERMAN: Yes, I will. My name is Arnold Silverman, 509 Daly Avenue, Missoula, Montana. Mr. Chairman, I am the Chairman of the Western Montana Scientist Committee for Public Information. The Western Montana Scientist Committee for Public Information is a group of scientists who gathered about 10 years ago to bring information to the public about matters of public policy related to science. We are affilliated with the National Science Institute for Public Information, past chairman, Margaret Meade and current chairman, Barry Cohen. We believe that the Air Force's proposal to launch Intercontinental Ballistic Missiles from silos in central Montana is one that merits full public discussion, and we, therefore, present this statement.

(Dr. Silverman read the attached statement.)

Mr. Chairman, I have 2 minutes remaining that I would like to call on my colleague, Professor Pfeiffer to fill the final two minutes.

COLONEL JORDAN: Certainly. Thank you, Dr. Silverman. The written statements will be appended to this hearing.

MR. SILVERMAN: Thank you.

MR. PFEIFFER: Thank you very much. I am E. W. Pfeiffer, Professor of Zoology, University of Montana and a member of Western Montana Scientists Committee for Public Information. I want to take this opportunity to quote from Dr. George Rathjens who has been mentioned in Dr. Silverman's presentation. I want to quote from what I think is one of the most significant parts of his statement which is Appendix A in our material that we have supplied to you. Because I think it emphasizes the primary --- the most important aspect of the Giant Patriot Program. He sees it and we see it as the first step in the implementation of a changed policy with respect to our nuclear capability. Are we going to go for a first-strike counter-force capability or are we going to retain our time tested deterrent posture. Dr. Rathjens says as follows: "If our missiles are primarily for "assured destruction", they need not have pin-point accuracy. Based on tests already made, we can be confident that their accuracy is far better than required to destroy Soviet cities. And those tests also provide us with adequate confidence in their reliability. More importantly, in the light of the very successful test program from Vandenberg, the Soviet Union could not attack us in the expectation it could escape destruction. But, if we plan to use our missiles in limited numbers against Soviet military targets we will want the highest possible confidence in their reliability and accuracy. This will be especially true if we contemplate striking Soviet underground missile silos. The case for the Giant Patriot tests depends then, critically on whether U. S. policy is to move in the directions suggested by Secretary Schlesinger in the Department of Defense, who recently said --- called for, I should say "a nuclear war-fighting" policy, or whether our time tested "assured destruction" deterrent policy should continue to be the cornerstone on which our strategic planning is to rest. Dr. Rathjens concludes, "It's a difficult choice, but one that the country must face." And - I hope that these hearings will be part of that developing debate which I think is necessary in this country. Thank you. (Appendix B.B. 8, 9, & 10)

COLONEL JORDAN: Thank you very much - Mr. Van Dyck, did you wish to speak now?

MR. VANDYCK: Mr. Chairman - My remarks are addressed to Section 4c of the Environmental Impact Statement where we are talking about alternatives and also certain environmental insinuations which we have not discussed in Dr. Bayer's presentation. The term environment I am taking to mean the aggregate of surrounding conditions or influences as affecting the existence or development of someone or something. And this testimony, directed against the proposed missile firings speaks at the level of cultural and ideological fallout. I invite you to consider the projected impact of such demonstration firings on the cultural, ideological, moral and human world environment for us and our children. If anyone thinks that the $30 million dollar exercise suggested for Montana over the years 1974 and 1976, is routine, insignificant and totally harmless, he should remember that more tests will be planned in the future with new equipment and ever more sophisticated weaponry. Are there alternatives? Are there other kinds of futures which man could design? Is there a possibility of stepping off the hell-bent escalator where one nation's sabre-rattling gesture responds to another, in round after round of the hazardous spiral of nuclear one-upmanship? The alternative, surely is in terms of generating a world consciousness, as contrasted with a parochial style of national consciousness - I speak of the consciousness which perceives millions of Chinese, Indians, Russians as well as Americans as human beings worthy of a liveable future. It is a consciousness that sees our survival in the necessary context of global survival. As the most powerful nation state in history, with the technological capability to destroy civilization many times over. it is surely America's opportunity to generate this new consciousness. We are called to take a giant step in the imagination, and to a new act of policital will. Christ said to Peter in the garden of Gethsamane, "Put up your sword. All who take the sword die by the sword." I am not suggesting that we should at once throw away our nuclear "swords" or missiles - merely that we pull them back little by little from the brink of holocaust and use every power that political persuasion can muster - as the SALT negotiations intend - to invite a reciprocating response. Theologian Matthew Fox wrote, "Today the United States is possessed of an overdeveloped technology, an underdeveloped capacity for effective moral control, and a compulsion for private and national security." I would challenge us in terms of imagination, and global politics, and survival to see that private and national security must be pursued from now on in the context of world security. Some look to science to resolve the difficult problems that man confronts. Others peruse ancient scriptures and various religious traditions, and I do not knock any one of these; however, a third place to resort for a rekindling of survival imagination is the sensitive mind of a modern poet or novelist. It is with one such example that I would conclude this statement:

In his 1959 novel "Alas Babylon", Pat Frank describes a small community in the Florida Everglades which survived a massive and accidental nuclear exchange between the United States and the Soviet Union. Without adequate food, water, light, power or transportation, the area was totally surrounded by deadly radiation and totally isolated for nearly a year - there was virtually no news from the outside world. Many months after the catastrophe, the survivors were finally visited by a military helicopter. After promising to bring in medical supplies and other necessities, the helicopter crew were about to leave once more for their base in an uncontaminated zone far in the rural midwest. The author then records this closing dialogue between Randy, a leader of the Florida survivors, and Paul, the ranking Air Force officer on board the helicopter: "They all walked out on the porch, and Randy went out with Paul to the helicopter. They shook hands. Randy said, "There's one more thing. Who won the war? Paul put his fists on his hips and his eyes narrowed, "You're kidding! You mean you don't really know?" "No, I don't know. Nobody's told us." "We won it. We really clobbered 'em." Hart's eyes lowered and his arms drooped. He said, "Not that it matters." "The engine started, and Randy turned away to face the thousand year night." Thank you, sir. (Appendix B.B.

<u>COLONEL JORDAN</u>: Thank you, Mr. VanDyck. Reverend Lemnitzer?

REV LEMNITZER: Gentlemen - My name is Reverend John G. Lemnitzer, pastor of a small church in Missoula, Montana. I represent an organization called the Citizens Opposed to Missile Firing. We are a loosely knit organization but we are very sincere in our opposition to your plan to fire missiles from Malmstrom. Althougn I am not representing people in Oregon, Washington, or California, I feel qualified to do so, since in the last six years I have been a resident and taxpayer in each of these states. I have sat through one of the Air Force briefings and feel like Robert Brown of Missoula, a retired Marine Lieutenant Colonel, who said the briefings left him feeling the same as he did before - opposed to the whole idea. I can't see any reason for the tests. I have a number of items that I would like to present tonight before this hearing. I personally feel that they should be included in the Final Environmental Impact Statement if we are using Webster's definition of "environment", which is: "All the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms." It seems to me, under this broad definition of "environment", the following items surely should be included. I would like now to read all or part of each of them: The first is a statement from the Congressional Record, dated January 24, 1974, by Senator Mike Mansfield: "The Minuteman II missile system is one of the more sophisticated and successful weapon systems in our program. It is my understanding that the testing at Vandenberg has been highly successful. The risk involved is likely to be negligible, but it is a matter of sincere concern to many. Should a missile misfire at the launching site, the immediate damage would, of course, be tremendous. Also there is considerable apprehension on the part of our neighboring states of Idaho and Oregon should the flight pattern or operation of the missile malfunction. The safety question is not the only area of concern. Primarily, I question whether the appropriation of $26.9 million is necessary at a time when the nation is faced with an unusual number of budget requests of competing priority. Information available to me indicates that the Minuteman II system is a highly successful and sophisticated one and the testing at Vandenberg supports this premise. At a time when we are endeavoring to bring about the international peace, the inland testing of such missiles seems to be entirely unnecessary. While the administration has not said so in so many words, I get the distinct impression that one of the compelling reasons for these tests is the flexing of our muscles in the ongoing debate on international arms control. The use of this weapons system in our international negotiations is untimely and unnecessary in my estimation. The announcement has generated some concern in my state through the newspapers, radio and television and a number of letters from individual constituents. The outcry has not been tremendous, but it is sincere and has come from many different walks of life - businessmen, ranchers, farmers, legislators, and even military personnel. The Department has had the authority to proceed, but I strongly urge Congress to take a stand in opposition through the appropriation process, to further consideration of any testing from operational bases within the continental United States. I do not believe that it is necessary and it would be an unwise expenditure of Federal funds." Now - an editorial in the Montana Standard of Butte dated January 10, 1974, was made a part of the Congressional Record and I quote in part - "The Pentagon wants to shoot a few missiles downrange from an operational base - Malmstrom - to impress the Soviets, we're told. It would be in the spirit of detente if the Russian ambassador would send a note to the Pentagon assuring us that they're already impressed with our capabilities and that no shot is needed. Of course, it would be in the spirit of detente not to want to impress the Soviets with a nuclear missile in the first place, so maybe the spirit really isn't there". Secondly, I will quote from the Congressional Record dated February 5, 1974, which is a letter by Senators Mike Mansfield, Lee Metcalf, Frank Church and Mark Hatfield to Secretary of Defense James Schlesinger: "As United States Senators representing the Pacific Northwest, we share a great concern about the Department of the Air Force's plan to proceed with the testing of Minuteman II intercontinental ballistic missiles from operational silos in the Malmstrom Air Force Base complex and several other sites. We believe benefits from such a test will not be commensurate with potential dangers to lives, properties, and international implications. The Minuteman II reportedly has performed very well during a series of tests at Vandenberg Air Force Base in California. What more can be learned from the proposed launches in Montana? Publicity associated with these tests and the extensive safety precautions would not contribute to a realistic combat situation. We doubt that data provided by such tests would contribute anything that has not already been determined from the heavily instrumented test range in California. Based on information available, we find it difficult to justify an expenditure of 26.9 million for this purpose. In addition, our constituents have expressed grave concern with regard to lives and property. We recognize that, as envisioned, the danger would be relatively small and it would be limited to sparsely populated and National Forest areas. Should something go wrong, however, the risks would be far more serious in one or more of our states. A disaster of this nature would serve repercussions for domestic attitudes toward the military. Also there is no guarantee that the chartered course of the missiles is firm. Newspaper accounts indicate that in several tests our U. S. missiles have gone off course and crashed in Mexico and as far away as Brazil. Presentations made in behalf of these tests have indicated that they may be an important part in our international negotiations. The need for a show of strength is questionable and, should be inland test fail, it would erode United States confidence in, and reduce Soviet respect for, the United States nuclear deterrent. At the present time, the Minuteman Missile System is considered to be very reliable and we question the need for additional test sites. The budget for Fiscal Year 1975, containing funds for the Minuteman II testing proposal, will be scrutinized in great detail and we ask that your office review this matter in light of the concerns expressed above and withdraw your budget request for the Minuteman II Operational Base Launch." A statement made by the Missoula County Trades and Labor Council, AFL-CIO criticized the proposed testing and I quote: "The Missoula County Trades and Labor Council passed a resolution Thursday night criticizing the proposed test-firing of Minuteman missiles from Malmstrom Air Force Base near Great Falls. The labor group termed the proposal a "blatant attempt to rekindle a national fear complex as a means of promoting billions of dollars more in appropriations for the military establishment." The resolution endorsed House Joint Resolution 48, which is pending before the state legislature. The resolution asks that the testing scheduled for 1974 and 1975 be cancelled. In addition to the cost of the test firing, the resolution cited the danger to human and animal life and range and forest lands. The labor resolution noted that the first stage of the rockets will fall near Missoula, which could pose a danger. Instead of endangering the lives of the people of Missoula and the Northwest, we think the planned $27 million expenditure could be much better spent in building schools hospitals, highways and other public works which will benefit mankind and also provide a constructive source of badly needed jobs." I submit for the record a letter from Thomas L. Judge, Governor of Montana, in which he said: "I'm not convinced the project warrants the expense that would be incurred." My next quote is from a letter printed as an editorial in the Missoulian on January 14, 1974 - I quote: "I am a former Minuteman Missile Combat Crew Commander. I spent three years working directly with the Minuteman, underground, in the control capsule. I know the Minuteman system. In order to test this missile system, four basic things must be examined. One - the ability of the launch facility and support system to accomplish launch. Two - the ability of the missile to function. It must be noted that the Minuteman is completely on its own once it leaves the ground. No type of equipment can steer it, stop it, or in any way control it. Three - the accuracy of the guidance and control system. Four - the effectiveness of the warhead. Let us examine these one at a time. First, the ability of the launch facility and support system is tested regularly. Some tests are run daily. In addition, several 'pop-up' tests have been conducted. All but a little fuel in the first stage is removed, a dummy warhead is installed and missile is launched. It leaves the underground silo, goes a few hundred feet in the air and falls back to earth. Everything is as real as can be, the missile simply does not continue on its journey. These are done from real operational silos - probably some have occurred at Malmstrom. Secondly, the Minuteman missile functions beautifully. Missiles are regularly fired from Vandenberg Air Force Base in California over the uninhabited Pacific Ocean. The silos and equipment are the same as at Malmstrom. They are even fired by certified combat crews. Many of these Minutemans have been so fired. Again I must emphasize that once in the air the Minuteman is completely independent of where it was fired. Exactly the same test of a missile is accomplished whether fired from Vandenberg or Malmstrom. It becomes obvious that "testing" is not the reason for proposing these launchings. Either some generals want to play with their toys or the reason is entirely political. The Minuteman is a very sophisticated, reliable weapon system. And everyone, including our supposed enemies know it. In reality this is a multimillion dollar waste of money and surely in this time of concern and trial we can find something more useful to do with over 20 million

25

dollars. I therefore urge you to resist these attempts. It is about time we the people said "No" to some of these nonsense schemes." Two editorials written by Sam Reynolds, editor of the Missoulian, criticizing the proposed firing: "Comes now the United States Air Force with a proposition to blast off eight Minuteman missiles from Malmstrom Air Force Base near Great Falls. Malmstrom was chosen said the Air Force, because it's way out in the West and the missile can impact in the Pacific. The 4,000 pound first stage unit drops off about 170 miles down range. Whether it blows up, burns up, is blown up or collides with the ground is unclear in the scanty news reports about this project. It is clear that about 170 miles down range as the crow flies is right overhead, stretching from about Missoula to about Kalispell and westward. But - the Air Force told the nation, the danger is little because the trajectory area contains an average of only two persons per square mile. And suddenly all of us in Missoula, Hamilton, Darby and the like become the natives in breechclouts, thinly inhabiting the landscape. It appears that we've been willing to risk Pacific islanders because two people per square mile sounds thin as thin but when we are the thin as thin inhabitants, it's a different story. There is nothing like 4,000 pounds zipping overhead to make one honest. Aside from the feat that some pieces of these rockets could come spattering down to splatter us, there are two other objections to the Minuteman tests. One - the missiles are of a type being replaced. If they haven't been tested before from an operational site, why start now when they are being phased out? The tests, moreover, would cost 26.9 million dollars. Two - A Pentagon spokesman said part of the purpose of the tests is to impress the Soviet Union. Well, having nuclear rockets is important, but of those of us who might have to duck it occurs that perhaps some better way of impressing them could be found." In another editorial by Sam Reynolds, he said, "The Air Force certainly cares where 4,800 pounds of Minuteman II collide with earth near Missoula. On the other hand, it is willing to risk damage and death to get the eight test rockets into the air. It is reasonable to conclude that the Air Force is more interested in getting the rockets up than in anything else. But Air Force spokesmen are trying to soothe us. On January 11, Colonel Ralph D. Scott, Commander of a strategic missile wing at Malmstrom Air Force Base, told a Great Falls audience that the probability of an accident in the test firings is one in ten million. On January 14th, Major General John W. Pauly of Malmstrom estimated the danger of human injury at one in 5,000 test firings. In a January 15th news story from Great Falls, one paragraph was especially interesting. It said - "The Minuteman II weapons were selected for the tests instead of more advanced, multiple-warhead Minuteman III missiles because their capability of being fired from operational bases has been verified at Vandenberg." Vandenberg is the Air Force Base from which test missiles are lobbed over the uninhabited Pacific Ocean. There's a circular pattern to that paragraph that falls smack in the Lewis Carroll tradition - Minuteman II is being tested because it has been thoroughly tested. That follows - round and round it follows, raising again the crucial question - if Minuteman II is a tested reliable weapon as the Air Force would have us believe, why risk even one in ten million or one in five or one in anything to test it some more? The real reasons for the tests seem to be twofold. One - the Russians have tested their missiles from operational bases, so for some reason we should copy their stupid, callous example. It is a matter of demonstrating our capacity to keep up with them in every manner. Air Force prestige is at stake. Two - the Minuteman II missiles are being phased out, and some generals, as a local comment mentioned Monday on this page, want to shoot these missiles before progress snatches them away. The Air Force has failed to make its case. Congress should refuse to fund this irresponsible nonsense." In an article from the Missoulian dated January the 10th, 1974, and entitled "Faulty Missile Parts Said Not Uncommon", Don Schwennesen, a Staff Writer states: "Defective or improper components are not uncommon in defense equipment such as the Minuteman missiles according to a former project supervisor who quit his job with a major defense subcontractor that he said was knowingly selling the government defective guidance system components for the Minuteman I missiles. And although the Minuteman I missiles have since been replaced by newer Minuteman II versions, the former supervisor says, "I am sure it's happening today." An article dated February 23rd headlined "Air Force Still Plans Missile Tests" states: "The Air Force will test fire Minuteman II missiles from Montana, despite the opposition of Senate Majority Leader Mike Mansfield, the Director of Project Giant said Thursday. Major General John W. Pauly said, "I don't think the senator's opposition will diminish the need for the test." Pauly said the first four missiles would be launched in January 1974 from underground silos near Great Falls, Montana, by crews from Malmstrom Air Force Base and four additional missiles would be fired the following winter. Pauly told a news conference that the tests will strengthen the credibility value of the Minuteman II as a deterrent weapon." I will now play part of a tape from a speech made by Senator Harold Hughes, Democrat from Iowa, who is a member of the Senate Armed Services Committee. Senator Hughes spoke in Billings on December 1st, 1973.

(Reporter's Note: The tape played by Reverend Lemnitzer was inaudible to me and the back-up take recorder sound is very garbled, therefore, the exerpt of Senator Hughes' speech is not included in this transcript.)

Reverend Lemnitzer continued -

What he is saying is how much is really is enough. How long should we continue financing these plans by our Defense Department to prove that we are the strongest nation in the world. Maybe to overprove that we are the strongest nation in the world. Again I would like to say - Senator Harold Hughes is a man of maybe the greatest integrity that we have in the Senate - he will be leaving shortly. Again I do represent the Citizens Opposed to Missile Firing - an organization who have put together maybe fifteen hundred names on a petition opposing the missile firing. And I would like to read to right now five reasons why we are opposed to the firings. Number one - because the cost to the taxpayer of firing these missiles approximately 33.3 million dollars, could better be spent in more needed areas such as: one - lowering our taxes; building more low and middle income housing· cleaning up the environment; building community and recreation centers to name just a few. Because of the possibility - no matter how small - of environmental injury and damage. Number three - because the Minuteman II has been thoroughly tested - and that's been documented through Vandenberg Air Force Base. Number four - is like Senator Harold Hughes said - we already have the capacity to destroy any nation many times over and no longer need to flex our muscles, militarily towards the Soviet Union or anyone else. And - number five - because this is a threat to international peace and the work President Nixon is doing to bring the countries of the Soviet Union, China and the United States closer together. I do pray with all my might that this program will be voted down by the House and Senate and that this money, if it still is available which it seemed to be for these missiles, will be turned over to the people to build hospitals, to clean up our environment, and maybe even lower our taxes. Thank you very much. (I.B.1 & 2; Appendix B.B.

COLONEL JORDAN: Thank you, Reverend Lemnitzer. Mrs. Maddox?

MRS. MADDOX: I yield to my husband.

COLONEL JORDAN: Mr. Maddox - would you like to ----

MR. MADDOX: After all these erudite statements and all these folks who know so much about this I feel a little naive. However, my basic position is that uh - I do have confidence in the expertise that we have delegated our defenses to. However, I'd like to keep my mind open and have a little more input on some very simple questions that I haven't heard covered. As I say - it is kind of basic questioning here. One of them is - I would like to have further information as to the alternative launch sites, possibly personal - but I have a son-in-law in the Air Force who is in missiles - and I would like to know more about that - and I am not referring to Vandenberg, I would like to get the answer and I have asked for a copy of the hearing and the transcript and I would hope that once you get on this mailing list - you will get some further answers and perhaps throughout the media. I would like to know the answer to the alternative of a mis-drop somewhere. Obviously there is a lot of private property in the trajectory and I have a friend who is a retired Air Force colonel who is living over here on the Idaho border - what indemnity plans do you have for private loss? I think that's a calculable possibility. As you know insurance contracts generally exempt coverages of payments for war-time coverages - is this war-time, similar war-time, or does the government plan an indemnity program in the event of this? And - I didn't hear anything or anybody mention - I heard about the trajectory of so many seconds - and 2,000 feet. Well - I fly at 35 and 40 thousand feet, and I just wondered about what are your plans for that day or those days for private and commercial air traffic - no one mentioned that. Just by accident we have come awfully close up there two or three times and this would be an uncontrolled point unless there is some very specific stoppage of all air traffic during this particular second or minutes. And - finally, just to uh --- or before I make up my mind, I would like to know what the impact chart or speculation shows with regard to what is our next move if there is a miss - if there is a failure and we are embarrassed world-wide. That is very serious and I haven't seen that in the media and I haven't seen it in any of the Air Force information. So basically I would like to add here a comment that some of those folks here who spoke didn't make any complaint on those some 87.1 million dollars spent in Montana in installing this missile complex and we have benefited economically when that was going on. And with that I would like to just put this in here to try to get some return, when you have put it all together. (IV. B; III. G. 2; I. C. 1; Appendix B. B.

COLONEL JORDAN: Thank you, Mr. Maddox - your questions, of course, will be incorporated in the record of this hearing. Would you please, for the record indicate your address, we don't have it.

MR. MADDOX: Thomas Maddox, Box 123, Helena.

COLONEL JORDAN: I take it, Mrs. Maddox, you do not desire to make a statement at this time.

MRS. MADDOX: I had better not.

COLONEL JORDAN: A Mr. John Tierney?

Answer from Unidentified person in the audience: Mr. Tierney had to leave.

COLONEL JORDAN: Mr. Jacobson?

MR. JACOBSON: I am Herb Jacobson, an architect here in Helena, 1129 Hauser. I really hand't intended to get up here at all when I walked in, I came in with Mr. Bell trying to learn something and to hear what is going on with this mis-ile firing. And - uh - as I think about it - I just wonder if this isn't a situation where the horse is already out of the barn, closing the barn door - trying to shut off these firings. I think these hearings should have been held 15 years

ago and some of these issues should have been discussed at that time instead of now when the missiles are built, and I don't think we are going to try to turn them back into plowshares. I don't expect you guys to take off your uniforms and start growing beards - so I believe that more than likely we're going to have to have some testing - I spent about 3 years in the Navy in World War II and we had the best of rifles in the world, but they weren't any good at all unless we got out there pretty near every day and practiced to keep the crews on their toes and so I'm afraid that whether I like it or not, that is a fore-gone conclusion that these boys are gonna fire those missiles as tests. I'm concerned deeply, though, about one result of these tests. And that is - the uh - the uh burned out materials after propellants have been fired. I noticed hydrogen chloride - 10,000 pounds and carbon dioxide, carbon monoxide, aluminum oxide - I just wonder how much real testing has been done with these materials deposited in the atmosphere. And - it isn't just on the ground - I know these things - I've watched on TV some of the firings of other missiles and that burn goes on a long way past 900 feet - and this just doesn't apply to military missile only. But all missiles that burn in the stratosphere and on beyond the troposphere and whatever else there is up there in space. And uh - if you read some of the things in the magazines and also in the recent article in the Fortune magazine - people are greatly concerned about the fact that we are depositing thousands and millions and maybe even billions of pounds - many more if these tests go on - that we really don't know what in the world is going to happen. I mean - we could have this greenhouse effect whereby the radiation from the sun can get through to heat the earth but the infra-red that the earth can radiate cannot get out. So - we may have some drastic changes - maybe they are already started - we don't know for sure. Those are the kind of things that I believe the Air Force - or whoever you have contracted this to make these studies - should really delve into. And - it wasn't mentioned much tonight - it was just glossed over - this dumping 2,000 pounds per missile into the air. This just about concludes my concern.
(III. B. 1, 3 & 7)

<u>COLONEL JORDAN</u>: Thank you, Mr. Jacobson. Representative Baucus?

31

MR. BAUCUS: Gentlemen of the military, and ladies and gentlemen of the audience - my name is Max Baucus and I am Representative from Missoula County. My address is 525 Southeast, Missoula. I am a member of the House Plans and Claims Committee and look at this somewhat from that point of view - that is as a member of the House Plans and Claims Committee - as if I were in Congress, particularly a member of an appropriations committee how would I pass on this appropriation. I might also add that I am a candidate for Congress - so should that arise I think this would be particularly appropriate. Basically as I look at the question - the proposal - and as I have read about it and studies comments from both sides, I have to tell you in good faith that I am somewhat disappointed in the military, because I don't think you have really sat down and told us, that is told Montanans, and told the country just what is in the back of your mind - just what this is all about. More particularly, I don't think that you have told us about the other alternatives and why you cannot fire these at Vandenberg, and why, as Arnold Silverman also suggested - you cannot come up with some other means as well. Now you say that after you fire these in Montana, that is Malmstrom, because it more approximates military conditions - warlike conditions - to me that is a conclusory statement. You really haven't sat down and told us what why those differences are so necessary and why those differences that tests have to be at Malmstrom. Now I can conjecture that well, perhaps, the climate might have something to do with, gravitation, something, but you really haven't told us why that is so different and why the climate in Montana is so different - why the climate in Montana effects silos - effects the apparatus within the silos, in the missiles, in the guidance. And I wish that you would do this and until you do, I must frankly tell us that I just cannot, any way at all, support your proposal. My reasons go back to all those that you have heard this evening, and that you know anyway, that is the environmental impact - uh - sabre rattling, etc., on down the line. Essentially, when I look at this, it comes down to a question of need. I just don't see the need to do this. Don't see the necessity - don't see the necessity of spending the 20 million dollars at this point, when you have testified that your reliability at Vandenberg is 99 point some odd percent. Then when you look at the reliability - I have a question too. Because you tell us in the first instance that the first stage is going to fall on Montana, in a national forest, and then lately I see that no - the first stage is not going to fall in Montana, it's gonna fall somewhere else. It's going to fall in Idaho. To me this raises certain questions about - with all due respect to good faith. And I am even somewhat speculate that the reason you have changed, if this is the reason at all, as to where the first stage is gonna land, is because you want not to offend the Senate Majority - because it seems to me that this statement came out after the Senate Majority leader strongly opposed the firing. Essentially, I don't want to embarrass you, but I do think there is a question of good faith here, and I say this because you changed your statement as to where the first stage is going to land and second you know that most people are wondering about this question of alternatives and you haven't addressed yourself to that question. Until you do, I must say that I cannot in any way at all support the proposal. I might also make one suggestion - it's been somewhat touched upon here this evening. That is that you make some special reparation account for persons who may be injured or for any property damage. In addition, I think that there should be some provision to cut through any red tape if someone wants to make a claim for property damage or personal injuries as well. I think that would be a milestone - a noteworthy step. But even if you were to make those steps, I tell you I cannot support it until you come out and four-square and fully explain beyond a reasonable shadow of a doubt, why these cannot be fired at Vandenberg or why they must be fired at all. You haven't addressed yourself to those alternatives - to those questions and I think that you owe it, not only to Montanans, but to all Americans who want an answer to those questions. Thank you. (IV; III.G.2; I.D.2)

COLONEL JORDAN: Thank you very much, Representative Baucus. Are there any other persons who desire to make a statement? Perhaps some members of the audience would like to submit a statement in writing. They may do so to me - I'm at Headquarters Strategic Air Command, Office of the Staff Judge Advocate, Offutt Air Force Base, Nebraska. I would appreciate such statements - if you desire that they be made a part of this record, reach me not later than 22 March. If you desire to submit the statements directly to Headquarters Air Force, you may send the statement to the Special Assistant for

Environmental Quality, Secretary of the Air Force, Dr. Welch. I am certain that he would appreciate receiving such statements not later than 8 April. As I indicated to you earlier, your comments will be addressed in the preparation of the Final Environmental Impact Statement. I thank you very very much for being here and for taking the time to make your statements. We will transcribe your statements and all persons who have signed the forms will receive copy of our transcript.

Question from audience: Colonel - could I ask - does that include the introductory statement by Captain Olson?

COLONEL JORDAN: Why yes -----

Question: I found that a very interesting statement and I would like to study it in some detail. We will get that?

COLONEL JORDAN: Yes, you will.

COLONEL JORDAN: Thank you very much. Good night.

/ / / / / / / / / / / / / / HELENA / / / / / / / / / / / / / / / /

Attached is the statement from Dr. Arnold Silverman, Chairman, Western Montana Scientists' Committee for Public Information.

Comments Of
Western Montana Scientists' Committee For Public Information
On The Environmental Impact Statement
Of The United States Air Force Concerning
Project Giant Patriot

Western Montana
Scientists' Committee for Public Information

208A Natural Science Bldg.
University of Montana
Missoula, Montana
59801

The Western Montana Scientists' Committee for Public Information is a group of scientists who gathered together about ten years ago to bring information to the public about matters of public policy related to science. We believe that the Air Force's proposal to launch Intercontinental Ballistic Missiles from silos in central Montana is one that merits full public discussion, and we, therefore, present this statement.

We have reviewed the preliminary Environmental Impact Statement submitted for public consideration, and we have no comment to make about environmental problems associated with falling debris and other in-flight problems that may result from the test firings. We believe that the Air Force has handled the local risk problems adequately.

Environmental Impact Statements must concern themselves with alternatives to the proposed course of action and here we find the discussion woefully inadequate. The Air Force mentions two alternatives:

A) that the missiles could be fired from the Vandenberg, California launch facility, instead of from Malmstrom Air Force Base, and

B) that there could be no firings at all.

Both of these alternatives have been inadequately discussed and summarily dismissed by the Air Force. We however, will examine them in detail. Our discussion of these alternatives draws heavily upon recent conversations with Dr. George Rathjens, Professor of Political Science at the Massachusetts Institute of Technology. He was formerly deputy director of the Defense Department's Advanced Research Projects Agency and was Director of the Weapons System Evaluation Division of the Institute for Defence Analysis. Rathjens also served on a Department of Defense ad hoc committee specifically concerned with Minuteman missiles. He has prepared for us a detailed analysis of Project Giant Patriot which we place in the record and attach as Appendix A to this statement .

With respect to the Vandenberg alternatives, we wish to make the following points:

1) Missile identical to those to be fired from Montana can be fired from the Vandenberg test site. This means that missiles exactly equivalent in size, weight and guidance systems and missile crew systems can be fired from Vandenberg just as easily as from Malmstrom and at a fraction of the cost of Montana launchings.

2) The question of the effect of gravity on the missile flight path has been raised as a reason for the Montana firings. We agree that the firing of missiles from Malmstrom will give some incremental information about gravitational effects upon flight characteristics of missiles originating from Montana, but such tests will tell us nothing about the gravitational problems involved in firings from the five other major missile sites in the United States. We can only believe that if a gathering gravitational information is a major reason for these tests, then it will be necessary to make tests from the five other major ICBM installations in the United States. We should point out here that such tests will involve many more problems of safety for the down range population than these initial tests from Montana. If gravity field testing is an essential part of the Giant Patriot Program, then the Environmental Impact Statement does not fully describe the full extent of the dangers of evaluating gravitational field problems from other installations.

We are skeptical of this rationale for the Giant Patriot Program, because we have learned from competent authorities that there are current tests of terminal guidance systems which are capable of inflight correction during the latter part of the missile flight which make gravitational problems irrelevant.

3) Further, in connection with the problem of the effect of gravity upon a missile's flight, the Air Force states that it needs to improve accuracy but it does not discuss the implications of such inproved technology. We offer here some thoughts of the meaning of improved accuracy.

If as the Air Force states, deterrence is the purpose of our land based nuclear missile force, then improved accuracy is not necessary.

Minuteman missiles now have an accuracy of approximately one quarter of a mile radius of the target site. If only a fraction of our hundreds of land based ICBM's are successfully launched, then we have a credible deterrent force considering our additional sea and air based launches. So accuracy for deterrence cannot be a justification for the Giant Patriot Program.

However, greater accuracy is needed for a counter force capability, that is, a capability for a pin point accurate first strike destruction of the potential enemies nuclear capacity. In this connection we place in the record, and attach as Appendix B, the U.S. State Department letter dated February 26, 1974 and signed by Assistant Secretary of State, Stanton D. Anderson which says in part, "the advantages of conducting the operational tests series are significant. Both men and equipment will be tested in circumstances that approach, as closely as possible, a war time situation." We would like to emphasize that such tests can only simulate a wartime situation in which the U.S. is about to attack first. This is an option our country has publicly rejected since the beginning of the nuclear age. If the Department of Defense now considers the first strike a viable U.S. option, and Giant Patriot is an integral part of the development of such an option then it is incumbent on the Air Force to discuss such a strategy in the Environmental Impact Statement.

What about alternative number two, which is a consideration of the option of not firing the missile at all? The Western Montana Scientists' Committee for Public Information has consulted with two scientists eminently qualified to discuss its alternatives. They are Dr. Herbert F. York, formerly Director of Defense Research and Engineering of the Department of Defense under President Eisenhower, and the man who was responsible for the installation of the Minuteman Missile System, and Dr. George Rathjens, quoted above. Both of these eminently qualified authorities agree with us that if the Air Force had adequately considered alternative number two, that ism not to fire the missile at all, they would have reached the conclusion that the security of the U.S. and the environmental health of the world would be greatly enhansed by not engaging in a missile race in which each side is trying to upgrade its first-strike capability of its missiles. Rather, we should be engaged in a mutual phase-out of the land based missiles, as a first step toward reducing the threat of nuclear war.

Specifically, land based missiles provide tempting stationary targets for nuclear attack, providing high accuracy can be developed by the other side. This creates extreme instability in the arms race because of the temptation to launch preemptive strikes at a substantial part of the other sides nuclear arsenal. Preemptive strikes are not possible against sea bases or airborne missiles which are highly mobile and therefore, relatively invulnerable. In fact, the reduction of land based missiles is a high priority item in the current SALT talks. Our committee believes that the Giant Patriot Program can only be seen as jeopardizing the success of these talks.

In conclusion then, we find that the U.S. State Department's assertion in the letter referred to above dated February 26, 1974, to Congressman Richard Shoup that it "hopes to improve relations with the USSR and the Peoples Republic of China by negotiations instead of confrontation," is contradictory to its support for the Giant Patriot Program which would, in our committee's opinion, enhance the ins tability of world nuclear balance.

(IV. all; Appendix B. B.

Appendix A

Detailed Analysis of Project Giant Patriot
Dr. George Rathjens

Giant Patriot and New Directions in Strategic Arms Policy

by G. W. Rathjens

During the past ten years the Air Force has launched some 800 Minuteman missiles from Vandenberg Air Force Base in California out over the Pacific. This has been done to determine just how well those missiles can be expected to perform. It now proposes, at a cost of $27 million, to launch four more missiles next winter from Malmstrom Air Force Base near Great Falls and four more the following year.

Proposals for such launches over land have been rejected in the past because of concern about the risks to people in the flight path. Such launches are now being planned because, it is claimed, we need greater confidence in the reliability and accuracy of our missiles, and that these tests will contribute to such confidence.

The questions are a fair subject for debate. Do we need more confidence? Will these tests contribute enough to justify the risks, the inconvenience to the public, and the costs?

* * *

In the light of recent remarks by the Secretary of Defense about changes in strategic arms policy, the first question is of special interest at this time. While many U.S. strategic weapons have in the past been aimed at military targets in the Soviet Union, for a decade U.S. policy has been based on what has come to be called an "assured destruction" doctrine. Under it, the primary role of U.S. strategic forces was to deter Soviet attack by posing the threat of a retaliatory strike that would destroy the Soviet Union. Secretary Schlesinger now argues that we need to be able to use our forces with greater flexibility--that we need, for example, to be able to employ limited number of missiles to destroy military and industrial targets, not just to threaten population.

The Secretary argues that such flexibility is required because a massive retaliatory response is not a credible deterrent to the most likely kinds of attack the Soviet Union might mount against us or our allies. His critics see two problems with his proposal. Once consideration is given to using nuclear weapons against large numbers of industrial and military targets the demands for weapons may be virtually unlimited: thus, there will be almost no hope of stopping the race in strategic arms. Far more serious, they believe that if strategic weapons are used in limited numbers, uncontrollable escalation will probably occur, the result being the destruction of both the United States and the Soviet Union.

Technically the requirements for the two alternative policies differ. If our missiles are primarily for "assured destruction", they need not have pin-point accuracy. Based on tests already made, we can be confident that their accuracy is far better than required to destroy Soviet cities. And those tests also provide us with adequate confidence in their reliability. More impartantly, in the light of the very successful test program from Vandenberg, the Soviet Union could not attack us in the expectation it could escape destruction.

But if we plan to use our missiles in limited numbers against Soviet military targets we will want the highest possible confidence in their reliability and accuracy. This will be especially true if we contemplate striking Soviet underground missile silos.

The case for the Giant Patriot tests depends then, critically on whether U.S. policy is to move in the directions suggested by Mr. Schlesinger--some call it a "nuclear war-fighting" policy, or whether "assured destruction" should continue to be the cornerstone on which our strategic planning is to rest. A difficult choice, but one that the country must face.

* * *

Answering the question of whether the Giant Patriot tests are needed to achieve higher confidence in the Minuteman force is easier. The answer is that the tests will be of limited value, and that if there is a case at all for Giant Patriot, the tests should be made over the ocean from Vandenberg rather than over land from Malmstrom.

None of the three technical arguments the Air Force makes seems persuasive.

First, it is argued that the missile tested from Malmstrom will bear much greater similarity to the operational missiles than those of the kind that have been flown from Vandenberg. The latter have had modifications made in them for range safety and telemetry purposes that have increased the length of the missile by 10 inches and its weight by 300 pounds. The concern is that operational missiles, not modified in these ways, will not perform exactly as have the test missiles. In the missiles to be tested from Malmstrom these changes will not be made. Instead, all of the special components needed for testing will be in a package that simply replaces the nuclear warhead. Thus, the missile will have the same dimensions and weight as the real thing. It is claimed that because of this, tests will be more meaningful in terms of providing confidence in the operational missiles than those that are conducted from Vandenberg. But with the new safety and telemetry package that has been developed, there is no reason why future tests conducted from Vandenberg should not be of the same type of missiles that it is proposed be tested from Malmstrom. Such tests have in fact already been made from Vandenberg and more are planned.

Next, the claim is made that the tests from Malmstrom will permit the launch control officers of a whole squadron of 50 missiles, not just the two who have responsibility for a single flight of ten missiles to participate in the tests. The point here is that there is a complex interlocking command and control process involved in the launch of operational missiles. This is to allow the other crews to prevent the two officers who have responsibility for a single flight launching their missiles with out an authentic launch order. Although the processes are constantly tested in simulations at operational sites, the Air Force claims that additional confidence can be developed by involving 5 launch crews interacting in an actual launch. However, there is no obvious reason why this could not be done ar the Vandenberg with modification of the launch facilities. It could probably be done at a fraction of the cost of Giant Patriot.

Third, there is the question of whether ir is important to test missiles from operational sites in order to determine if their accuracy is being degraded because of errors made in correcting for local variations in the force of gravity, such variations which affect the missile's trajectory. Putting aside the question of whether the realization of extreme accuracy is in the national interest, there are two serious difficulties with this Air Force argument. If it is important that such measurements be made at Malmstrom, then it is presumable also important that they be made with firings from the other five Minuteman bases as well since in each case the variations in gravitational force will be different. The problem here is that the risks of launching missiles over land will be much greater in the other cases. Indeed, Malmstrom was picked for the Giant Patriot tests because the Air Force determined that the risks would be lower than with launches from other bases. The Air Force argument must also be considered against the background of other programs to achieve high accuracy. The most promising of these involve terminal guidance, i.e., guiding the warhead into the target. If these techniques are implemented then variations in gravity in the launch area become totally unimportant.

One more point should be made about the proposed Giant Patriot tests. They all involve Minuteman II missiles. Yet, there is great pressure from the Air Force to have all those missiles replaced by Minuteman III's. If that is done, the 8 proposed tests will be irrelevant; and in any case, there will surely be Minuteman III tests from operational sites later on if the Air Force ;has its way. The program proposed is just the beginning the, both in terms of numbers of tests and their costs, and it may be the beginning of a very large program if tests are to be made from all six bases.

Finally, it has to be noted that no matter whether tests are made from Malmstrom or Vandenberg it must be noted that we can never have absolute confidence in our missiles performing as expected. There will always be the possibility of a failure of the command and control system to function properly, an the most likely source of difficulty is likely to be at high levels--in the President and his advisors deciding what they want to do, and in communicating to the commands to the operational forces. Such failures are especially likely in the most probable war "scenarios"--when there is a gradual escalation or when the Soviet Union strikes first. Any small reduction in uncertainties that could conceivably be resolved by tests from Malmstrom would be dwarfed by those that remain.

* * *

Clearly we need a national debate on Secretary Schlesinger's proposals about changes in strategic policy, but however that debate comes out, the benefirs of Giant Patriot would appear to be small--indeed negligible--and not sufficient to justify the costs and risks involved.

(I.D.; IV; Appendix B.B)

Appendix B

Department of State Letter to Congressman Richard Shoup
Stanton D. Anderson

Washington, D.C. 20520

February 2?, 1974

Honorable Richard Shoup
House of Representatives
Washington, D.C. 20515

Dear Mr. Shoup:

This is in reply to your letter of February 12 in which you asked for comments of the Department of State on the impact the recently proposed operational test of a MINUTEMAN missile would have on SALT, detente, and the arms race.

As you know, periodic testing of our strategic missile forces is not new. The Air Force has conducted test launches from its test center at Vandenberg Air Force Base, California for nearly a decade. The recently proposed operational tests would be in place of, rather than in addition to, an equal number of these tests. The only new element in the operational test program is the location of the launch site: the few planned operational test launches would take place at operational Air Force missile bases.

The advantages of conducting the operational test series are significant. Both men and equipment will be tested in circumstances that approach as closely as possible a war-time situation. The Department of Defense believes that tests under these conditions will greatly enhance the level of confidence we may have in the men and the equipment involved. It is also believed that a demonstration of our ability to launch missiles under these conditions will strengthen their overall deterrent value, which we believe is still a necessity.

By relaxing tensions and improving our relations with the Soviet Union and the People's Republic of China, we hope to demonstrate that negotiation instead of confrontation can serve well the fundamental interests of our respective peoples. However, we are fully aware that serious differences in our outlooks and policies have not been eliminated. The Soviet Union and the People's Republic of China are and will continue to be dedicated competitors of the United States. Under these circumstances, our time-tested policies of vigilance and firmness remain essential to ensure our security and to provide a basis for negotiating further agreements aimed at strengthening world peace. You may assure your constituents that the planned operational tests described above are fully consistent with this policy and will in no way undermine detente.

I hope this information will be helpful to you in replying to your constituents. If I can be of any further service to you, please let me know.

Sincerely,

Stanton D. Anderson

Stanton D. Anderson
Acting Assistant Secretary
for Congressional Relations

Enclosure:

Correspondence returned.

3. Comments Received at the Boise, Idaho Hearing

This section contains a transcript of the public comments received at the Boise, Idaho hearings. Responses to the comments are provided via section and paragraph references as explained above.

PUBLIC HEARING - BOISE, IDAHO

PROJECT GIANT PATRIOT
19 March 1974

MR. DA SILVA: My name is Pete DaSilva. I am a local Boise resident. I just found out about this today, so you will have to excuse me if I don't have a whole lot of research and other such items. I want to try to ask some questions tonight which may be relevant to this proposal or project. To start off with,some questions that you might not think about.

The first question is -- why would this hearing be held at a time that school is out, it's vacation time. Most students that go to school here -- a lot of them -- should be very interested in making comments on this and learning more about it. I'm not so sure that this Giant Patriot program is a really very patriotic kind of program -- sounds a little dangerous to me, since it would waste some of o. resources, financial and otherwise. I don't even know how much this is going to cost, but probably in the millions. I wonder why the money has to be spent this way. I have heard of this program -- this missile type deal is possibly even outmoded by now -- I don't even know. Perhaps it's the way that Air Force plays its kind of war game, I don't even know. The question, you know, perhaps, some of would be considering and didn't find answers to. You talk about credibility, you know, bombers, missiles, that show our credibility in Vietnam. I'm not sure that's the kind of credibility I want.

I question safety here -- I am sure we all do -- at least we are thinking about it. We care about our State. I hear that Governor Andrus might back this if it were a sure thing -- no possibility of failure. We don't know that; therefore, I don't think the Governor of the State should back it up. You hear about the Nez Perces Indian Reservation possibly being a problem to this -- hear about evacuation -- I hope they are being considered in all this. Just seems funny that people, you know, people being moved around -- even over their own land for such a program. Then they talk about Vandenberg Air Force Base in California. I am not so sure where that is -- how close to the ocean it is -- how far in-land -- I don't know how safe this is going to be. This may be a 1200 city flight -- I don't know if that means it's going to be safe here. So, I guess I am puzzled about two major things tonight. One of which is safety -- talk about hydrogen chloride, when I went to school hydrogen chloride was hydrochloric acid (HCl), maybe I am wrong, I don't know. We talk about the local economy benefitting -- sure, the local economy might -- it costs millions of dollars for a destructible item. So, I just say, you know, we have got to really be careful in looking at this. We are in Boise -- in the northern part of Idaho -- I am not sure how impartial the Air Force can be judging this. Thank you. **(Appendix B. B. ; V; III. G. 1; III. B. 4)**

COLONEL JORDAN: Thank you Mr. DaSilva. Mr. Hull, you indicated on your card that you may desire to make a statement. Do you desire to make a statement?

Reporter's Note: No response from Mr. Hull.

COLONEL JORDAN: Mr. Forschler?

MR. FORSCHLER: I would like to reserve my comments for a little bit later.

COLONEL JORDAN: Does anyone else desire to make a statement at this time?

Unidentified Individual: I have a question. Were you planning on answering questions, because I have one.

COLONEL JORDAN: Well, those questions will be a part of this hearing and, as I indicated earlier, the comments that you make will be addressed in the preparation of the final Environmental Impact Statement. As to the timing of this hearing, of course, we did not take into consideration the spring vacation. I found out about it when we arrived here. We had specific deadlines to meet and that was the reason for the scheduling of the hearings at this particular time. We have a hearing in Salem on Thursday of this week and we had one last week in Helena, and all the comments will have to be in Washington by the 8th of April.

If any of you wish to submit written statements, or perhaps after reading the Draft Environmental Impact Statement -- I notice that some of you have come up and taken copies of the Draft Environmental Impact Statement -- if you will do so, we would like to have your comments become a part of this hearing. I would like to receive them not later than the 28th of March at my office at Offutt Air Force Base, Nebraska. That's Headquarters, SAC, Office of the Staff Judge Advocate. You may also, if you wish, submit statements directly to the Special Assistant For Environmental Quality. That's Dr. Welsh, and he is in the Office of the Secretary of the Air Force, Washington, D.C., 20030. Now, those comments should be in Washington by the 8th of April -- not later than the 8th of April.

Unidentified Individual: Colonel Jordan, I'm just wondering -- if -- what kind of communication have you had from the people in the areas projected in the - - -

COLONEL JORDAN: I don't know. We did have public announcements of this hearing and the public announcements indicated that any person could contact me at my office, although I haven't received any correspondence.

Unidentified Individual: Has anyone wirtten to you?

COL JORDAN: I haven't received any requests at all to present statements nor have I received any statements. Of course, if anyone wishes to make one, please tell them to write to me or directly to Washington. We want to get the comments from the public. That's our reason for being here. And, we do hope anyone who has something to say will have an opportunity to speak. And, if not here at this hearing, then, of course, prepare your statements in writing and send them to us as they will be a part of this particular hearing, if we receive them by the 28th of March, or if they are sent to Washington, and they will be considered by the Secretary of the Air Force and the persons who make up the final Environmental Impact Statement.

Unidentified Individual: I would just like to make a statement about the Statement.

COL JORDAN: Would you please come up to the podium and identify yourself and give your address?

(Note for the record. Mr. Bachman did not fill out a card.)

MR. BACHMAN: I'm Dave Bachman, I reside at 2012 North 18th Street, Boise, Idaho. I am not convinced that the project is justified, but besides that, I would like to point out on page 3-50 of this Impact Statement, that the stage of the second situation that creates missile debris, in the destruction of a missile due to a missile failure -- the possibility of having to destroy the missile as it flies over the United States, as well as missile reliability -- if destruct is required, the destruct system will produce relatively small fragments and will have little injury potential. I question the validity of that statement on "small fragments." It states further that these fragments will range in size from 1 to 15 pounds, but there will be larger pieces weighing from 100 to 1,960 pounds. In addition, there will be propellant fragments weighing approximately 50 pounds -- the burning fragments would not survive to impact, if the missile was destroyed after 40 seconds of flight, but presumably they would be burning prior to the 40 seconds of flight. My question is, where would that land, prior to 40 seconds of flight? **(I.C.3; III.D.2)**

CAPT OLSON: In Montana, that's for sure.

MR. BACHMAN: I question that -- is that a fact?

CAPT OLSON: That's a fact.

MR. BACHMAN: But within 8 seconds, it would only go 20 miles?

COLONEL JORDAN: Mr. Benn?

MR. BENN: The majority of the pieces -- you are talking about the burning?

MR. BACHMAN: Yes.

MR. BENN: They would fall in the fire watch corrider, which is 20 miles long by 4 miles either side of the trajectory.

MR. BACHMAN: What about the pieces -- Where would they fall -- say if it was destroyed 37 seconds into flight, we were talking about pieces of shrapnel mostly, from 1 to 15 pounds.

MR. BENN: It's hard to answer without looking it up.

COLONEL JORDAN: Mr. Bachman, as I indicated earlier, these questions will be part of the hearing and your questions and comments will be addressed in the preparation of the final Environmental Impact Statement. We don't have all the facts here, we can't answer all the questions that are being brought up. We are here, really, to receive your comments. There are a few factual questions which we can clarify. Thank you, Mr. Bachman. Is there anyone else who would like to make a statement?

Unidentified Individual: Sir, may I ask you a question rather than make a statement?

COLONEL JORDAN: Would you please step up to the podium and identify yourself and give us your address?

MR. CARLETON: My name is William Carleton. I am from Mountain Home, Idaho. This is not necessarily a statement, but a question of location. Another person brought it up. Will any of these meetings be held in the centers or the communities or in the direct path of this missile? Baker, Oregon, is on the fringe as far as population center, but will the towns of Grangeville, Holsak, Orepenno, and others in the area have a chance to make statements? **(Appendix B. B. 1)**

COLONEL JORDAN: I'm very sorry -- we just definitely cannot have public hearings in all the places. We had to select cities in the three states and it was decided to select the State Capitols of the three states. We, again, as I indicated earlier -- anyone from those areas who desire to make written statements, we would be very happy to receive such statements. And, we did hope that there would be publicity in those areas, and we had reason to believe -- I believe there was indication in the press about the meeting tonight and we were hopeful that anyone desiring to make a statement from those areas would be here. I recognize that a distance is involved, but there are certain restraints and we just can't go through all the various areas that might have an interest in this program.

MR. CARLETON: The notice for this meeting in this area was posted in the Idaho Daily, I believe today, but for the communities north of us -- hours away -- to travel a state which is rather divided geographically -- were they posted today, or have they had prior notice of this meeting?

COLONEL JORDAN: It is my understanding that prior notice was given about this meeting tonight. We had a press release -- the date of the press release was 4 March, in which we did give notice about the hearings, also in the Federal Register. So, I recognize the problem, I really do, and I do hope that anyone having an interest in this project would please write their statements and send them to me and I will see that such statements become a part of the record of these proceedings. And, comments will be addressed in the preparation of the final Environmental Impact Statement. When you go back, would you please tell people about that, Sir? Thank you very much.

CAPTAIN OLSON: I would like to add that apparently the statement was made that we would have to evacuate Grangeville and Whitebird. This was erroneous and by no means do we intend to cause the evacuation of any population center. We've been laying some rules upon ourself in selecting sites and impact areas, the wilderness areas, for instance. In preparing this Environmental Impact Statement, we find that the laws controlling the wilderness areas indicate that we better not land there. The areas that we are looking at to land pieces on are quite low in population. The first stage ellipse is 26 miles by 12 miles and yet in a few of these we find zero population. That's a lot of space with nobody there. We're finding very low numbers. The way we're doing this is through photo interpretation. As to your question, we have also written the Nez Perces Indians; I don't think they have written back yet. We really haven't heard from anybody in northern Idaho about it.

Unidentified Individual: I have a question.

COLONEL JORDAN: Would you like to come to the podium, please?

Unidentified Individual: No, I just have one question. Perhaps I missed something -- I did come in late -- but I would like to hear it justified, why are we doing this?

COLONEL JORDAN: Well, again, I tried to indicate in my prefatory comments that we are here to receive comments on the Environmental Impact Statement and not the rationale for the OBL. That is not the purpose for this hearing, we are here to consider public comments with regard to environmental aspects of the OBL and the adequacy of this environment al draft, or the Environmental Impact Statement. We are not here to discuss the rationale for the OBL.

Unidentified Individual: I can see that it is rather presumptuous that you don't give a justification first and then go into the environmental questions.

CAPTAIN OLSON: But you did -- you did get a justification during the first slide presentation.

COLONEL KELLY: What I would be happy to do, Sir, if anyone wants the press releases which gave justification, I can send them from Washington, and a summary of the briefing, just fill out one of these cards or just tell me and I will be more than happy to get the briefing and justification to you.

COLONEL JORDAN: You did not hear the briefing?

Unidentified Individual: No, I didn't. I would still like to hear the answer to that, because of an indication that the Soviet Union is building up certain kind of missiles and we are at a disadvantage over here -- so I think there is definitely a kind of rationale there. **(I. A. 1; Appendix B. B.**

COLONEL JORDAN: That was simply to lay a predicate for the meeting and it was a description of the program which was a part of the Draft Environmental Impact Statement. But, the briefing by Captain Olson was more general and went beyond merely a description of the project. That was simply the preparatory briefing. The purpose again, for this meeting, is the Draft Environmental Impact Statement -- we are here to receive public comments on that statement.

Unidentified Individual: I have a question --

COLONEL JORDAN: For the purposes of record, I would really appreciate it if you wish to make statements, please come to the podium and identify yourselves so that we can have it recorded. Our recorder has great difficulty in hearing statements from the back of the room.

MS. JAMISON: I am Heidi Jamison and I am also a local resident of Boise, and I would like to know -- I didn't hear about this meeting until uh -- this evening -- I didn't read the newspaper -- I came home from work and I would like to know how they expect people to make reasonable statements on the environmental issue involved when they don't find out about it, they don't have time to read this Statement, and you expect them to make some sort of statement about it. If we are going to have a debate about it -- uh -- we could come prepared. (Appendix B.B.1)

COLONEL JORDAN: I would be very happy to provide you with a copy of the Environmental Impact Statement and if you have some comments concerning the adequacy of it, please send them to me.

MS. JAMISON: Well, by that time, will the decision already have been made? And, maybe whatever I have to say will appear in the final Environmental Impact Statement, but by that time, is the decision made already -- so that my statement would have nothing to do with it?

COLONEL JORDAN: No, this decision has not been made. As I said -- the comments on the Draft Environmental Impact Statement should reach Washington not later than 8 April, and then at that time all the comments to the various agencies to whom the Draft Environmental Impact Statement have been given will be collected, assessed, considered in the preparation of the Final Environmental Impact Statement.

MS. JAMISON: And then the decision will be made?

CAPT NEEDHAM: This is an input to the decision.

MS. JAMISON: Who is making the decision?

(Applause from the audience.)

CAPT OLSON: Well, I think it is in the hands of Congress at this time.

COL KELLY: You are quite correct. It is a Congressional decision. It is a monetary decision, Congress votes the money, they have told the Department of Defense that they want this done, so the answer is honest.

Unidentified Individual: If Congress is going to decide the case on the Environmental Impact Statement, who is gonna look at this?

CAPT NEEDHAM: This is just one consideration.

MS. JAMISON: Will all the Congressmen and Senators read mine?

CAPT OLSON: Not all.

MS. JAMISON: Why not all, or am I not all that important?

CAPT OLSON: Well, they work in committees and right now the House Appropriations Committee, for one, has this particular program in their hands -- not all Senators are working in this.

COL JORDAN: MS. Jamison, the Federal Register had it on the 22nd of February, the fact that the Draft Environmental Impact Statement had been prepared. Now, distribution has been made to various agencies. Captain Needham has a list of the places in Idaho where copies of the Environmental Impact Statement have been sent and are available. And, for the group, and we do have a few copies here, and I will give you a copy right now if you would like to take one. Would you give her a copy, please, Captain Needham?

(Ms. Jamison returned to her seat in the audience.)

COL JORDAN: Thank you very much.

CAPT NEEDHAM: These were made available, as we pointed out, by the State Clearing House in Boise, to the Boise Public Library, Boise State University Library, Public Libraries in Grangeville, Lewiston, Coeur D'alene, and Moscow. And, comments were also requested and Draft Statements provided to some 26 other agencies, and these are listed in the front of the Environmental Impact Statement.

BETTY BACHMAN: My name is Betty Bachman, and I live here in Boise, too. One of the statements made up here was the socio-economic us - uh --

CAPT OLSON: Factors?

MS. BACHMAN: Factors involved in this were being considered. Well, if they are being considered, then why are we not discussing whether or not we want this; if it's happened and why it's happening? You know, I feel like this is social factor involved, and I think we should be discussing it. And, also, I feel that on the point of -- Mr. DaSilva said that uh - part of - uh - uh - the Nez Perces Indian Reservation, part of the people on that Reservation, would have to be evacuated and I feel like that if a small town -- if it would have to be evacuated, or part of a small town would have to be evacuated, with such a program -- it would be (inaudible words) --- but there isn't, because they are Indians, they don't know, they don't have anything too much to say, and I feel that should be a very important thing. (I.C.2 & 3)

(applause from audience.)

CAPT OLSON: We are not going to evacuate them.

MR. DA SILVA: You are not going to do what, now?

CAPT OLSON: We are not going to have any evacuation of the Nez Perces.

MR. DA SILVA: I thought you said part of the flight pattern was over that area.

CAPT NEEDHAM: I pointed out, in my part of the briefing, that this was part of the gross area -- it's in the first stage of impact area -- but it's definitely not -- we are not going to be impacting in that reservation, but it is part of the gross area. That was pointed out on the slides.

MR. DA SILVA: Do you think any evacuation will be necessary? (I.C.2 & 3)

CAPT OLSON: There may be some minimal evacuation, but that's not part of the evacuation we are talking about.

COL JORDAN: Well, again, on this question, I indicated earlier, Mr. DaSilva, that we cannot go to all the various places where there might be an interest. We selected the State Capitols for these public hearings.

COL JORDAN: Yes, would you please come to the podium?

MRS. PARSELL: I am Sharlene Parsell from Moscow. And, you were talking about the sites you selected that you hadn't had a chance to survey. Are they the same ones that are on the Environmental Impact Statement, or can you sort of generalize as to what the areas are? Do you understand that? **(I. B. 3 & 6; I. C. 2)**

COL JORDAN: You are asking for clarification on the part of Captain Olson's preview?

MRS. PARSELL: Yes.

COL JORDAN: Captain Olson, are we able to clarify that portion of your briefing?

CAPT OLSON: Well, in specifics, well, as I said before, I wish we could be more specific, but we don't have a hard decision yet - what we might confront and what we might cross. We don't have the money to go. By the way, that is a point I wanted to answer. One girl asked "Why is it happening?" I think the point right now is that it isn't happening. We don't have money, we don't have -- the thing is still almost a year away and we are already talking about it, we have been talking to the public since last December, which isn't too bad. Some agencies don't tell the people anything.

Unidentified Individual: How do you -- how do you avoid the populated areas and Federal lands? You know, that strip that's in the Statement -- you know -- there's an awful lot of Federal land in that area, not counting the wilderness area, and also several small towns. Isn't that pretty precise kind of thing? **(I. B. 5; I. D)**

CAPT OLSON: It's very precise. When we go from a site that we are interested -- as far as looking at where we are launching that site -- you can't cross -- you have to be very precise, you have to have decent maps to find out exactly what we could be endangering. We do a complete photo interpretation to find out what is there. And, we get down to very precise analogy of what our evacuation policy should be should we have to evacuate. We are not getting close to these towns you mentioned and we have not made the decision as to where we are going, and we aren't making the decision until we get a go-ahead from Congress. We are just in the position of going up there and looking and so, really the decision, as we pointed out, is still in the hands of your own representatives, but you do have control.

Unidentified Individual: If it's in the hands of our representatives, I don't want to be told "write your Congressman," if I barely knew about this today. How are we gonna get the public to know about this so they can write their Congressman and let them know that. Is this going to be advertised, is the public going to hear about it? **(Appendix B.B.1)**

COL JORDAN: As I indicated earlier, we did publicize this hearing. And, again, I would like to stress the purpose of this hearing is on the Draft Environmental Impact Statement and we did try to publicize it. If sufficient publicity wasn't given, I am very sorry about that. But, we did have press releases and we asked our information officer to -- yesterday in fact -- to go and see if they could again publicize this meeting. Again, Congress is considering the OBL program.

Unidentified Individual: But, we have to write to our Congressman, right? Is that how you make things change, write your Congressmen?

COL JORDAN: Again, I would suggest that you get a copy of the Draft Environmental Impact Statement.

Unidentified Individual: I can get a copy, but how does the public get a copy?

COL JORDAN: Well, Captain Needham gave a list of all the places that copies are available.

Unidentified Individual: But, most people don't even bother to write their Congressmen much less go through the library to look it up. How are they going to hear about it if it wasn't in the paper?

COL JORDAN: Our Information Officer might address that question.

COL KELLY: First of all, we made an initial release on the 28th of December. At the same time, we briefed the Congressman involved in the four states, the Appropriations Committee, and the House Armed Services Committee. And, then, we briefed other Congressmen who were known environmentalists, and then we expanded that briefing to other Congressmen who wanted a briefing, and offered to the entire Congress that anyone who wanted a briefing would get a personal briefing. We briefed the five Governors involved, Washington, Idaho, Oregon, Montana and California. We briefed Legislatures in Montana at their request, and in Oregon at their request. In other words, we have made the briefings to any available legislature that wanted them. We have made detailed press releases to the media. Those were made again in January and February,and then on 4 March we sent another press release, and I personally went to all media in the area to insure that they had publicity concerning these hearings. I don't want to bore you by reading that, but it tells you what the Environmental Impact Statement is about. And that was put in the hands of the media. And,we also gave a briefing to the State Governor -- a copy of the briefings. You are asking why it hasn't appeared in the newspaper, I can't answer that question. All I can tell you is that the media has been told; the legislatures have been told, and every avenue at our disposal has been used to tell the people, and this is the final avenue that we have now. You are asking about the second stage on down -- we promised each of the Governors -- each of them having indicated that they would not interpose objections at this time, but would wait for further developments. Your Governor among them. Each of them would tell us that we would be back as soon as Congress had given us the money for the site surveys, for development of specifics. And, again, we would give them the specifics, give the media the specifics and in fact give them the specifics in the presence of the media. This has been a public relations program, in the public affairs realm, in that we have from the outset, put the case to the people so that -- we know that in doing that we were going to get objections. But, we wanted objections. We want no one to be able to say when we get downstreem that the public hasn't known about this. I apologize that you haven't known about it, but we really have exhausted every means at our disposal.

COL JORDAN: Colonel Kelly, did you mention the TV program this afternoon?

COL KELLY: Yes, each one of the channels has carried it. There was a statement on the piece on the back page this morning. Channel 2 had it on this evening on the news; Channel 7 carried it on both the evening and the late news last night.

COL JORDAN: We hope the public will hear about the Draft Environmental Impact Statement. Yes?

Unidentified Individual: This is a little city and if people organized like you say and got together and to try to have their voices heard, then their side would come out as well as your side. Right now, we are not supposed to be discussing or debating and fighting in here, but just, say, get this group together -- that would be newsworthy and I think all the issues could come out -- but tonight isn't the night to do it.

COL JORDAN: Thank you. Are there any more statements relating to the Draft Environmental Impact Statement?

MS. WALKER: My name is Carol Walker and I am from Boise. If I understood it correctly, our statements will go on the Environmental Impact Statement, which will go to our Legislatures and Congress. I would just like to say that, as a taxpayer, I don't want my tax dollars going to something in the defense budget that is, I feel, in the first place that the defense has enough money; and secondly, I don't want my money going into something that, logically -- I mean -- speaking, you know, it's liable to come to destruction, and I don't want my tax dollars going to anything to necessitate destruction in the area. (Appendix B.B.)

COL JORDAN: Thank you, Miss Walker.

COL JORDAN: Mr. DaSilva?

MR. DA SILVA: When I was talking first off, I missed a couple of questions I had. Questions I thought might be answerable or answered tonight. I don't think I really pointed too closely to what I considered to be fraud in this avenue. And, I think fraud was perpetrated tonight -- if only on one small point which I thought I would bring up. When I mentioned what is hydrogen chloride in the missile exhaust and I questioned that it was hydrochloric acid (HCl), and when it is presented as hydrogen chloride, it's something like an acid, which is one of the most hideous ones available. I question the Environmental Impact of the so-called hydrogen chloride. I would question its being used as having hydrochloric acid.

COL JORDAN: Is that a question? Perhaps Captain Olson --

CAPT OLSON: We have perhaps 15 pages on the subject, we have had more than 300 launchings in Vandenberg, and if we really had a problem with hydrogen chloride, we'd certainly know about it.

MR. DA SILVA: Why wasn't it reported?

CAPT NEEDHAM: It's a gas, hydrogen chloride gas, but it's -- it's mixed with water. But, as an exhaust product, it's hydrogen chloride.

MR. DA SILVA: Isn't that part of OPH?

CAPT NEEDHAM: That's right.

MR. DA SILVA: Isn't it capable of a lot of destruction?

CAPT OLSON: In concentrations.

MR. DA SILVA: I think That's a good issue. I don't know what the concentrations -- I'm sorry, I haven't had a chance to read it carefully. **(III. B. 7)**

COL JORDAN: Mr. DiSilva, you said you hadn't had a chance to read it carefully. I would suggest that you do so and then submitt your statement in writing to me or Dr. Welsh. As indicated, this particular question was discussed in the Draft Environmental Impact Statement. I presume you are questioning the adequacy of that paper and, of course, your comments will be considered in the preparation of the final Environmental Impact Statement. Perhaps it was not fully treated, but if you would reduce your comments in writing and submit this statement, it will be addressed.

MR. DA SILVA: All right, so what we say may not necessarily be addressed. But, if you write, it will be addressed?

COL JORDAN: No, what you say will be a part of the record, but you indicated earlier that you have not completely read the statement.

MR. DA SILVA: Okay. I would also question, as Mr. Bachman brought up about the chunks of debris, what is the size and what isn't the sizc, you know. I think the report in some ways -- this is only part that I have read -- ambiguous in parts, almost fraudulent, because there is an indication that things could be okay. Most likely they are going to be okay. I am just not so sure about that. I also question -- you say the money is being held up. Why would that be? As far as I am concerned it should be held up indefinitely. I feel the same way Miss Walker does, I don't want my money being used for that. I never did get an answer for the reason the money is being held up. (II.D)

COL JORDAN: I don't know. I don't believe anyone here does now, but your comments will be put into the record, Mr. DaSilva, and you will receive a copy of this proceeding and the final Environmental Impact Statement. I don't believe there are any more statements. Again, thank you for coming, ladies and gentlemen. I appreciate your comments and our meeting is now adjourned.

//////////////////////////////BOISE//////////////////////////////

The attached letter was received from Mrs. E. F. Bentz, White Bird, Idaho, 83554, to be added to the hearing.

Colonel Jordan

SAC / JAC
Offut AFB

Nebraska 68113

You force a decision on us - we have to decide whether we would rather be hit by somthing you men in America aim at us or something aimed at us ~~or something~~ by other men - what in hell is the difference ?

You men in government say to us - give us your sons we are going to fight a war .

Then you say give us your land we want to use it for a National park .

Now you say move out - we have got to test our missiles You look like the enemy to me

You men are stupid - the enemy is not without its within its man , the male of the species, he is the problem he has always been the problem, a problem because his reasoning powers are so completely overpowered by his SELF preservation drive , his brain does nothing but aid his drive it makes of him all too often an all too reasonable facsimile of the devil himself he is such a mastercraftsman at creating hell on earth - its all their in his history books , the world is full of such devils

We could use exorcism on man if we had free speech and press but we are no more at liberty to criticize male leaders in the field of mans religions than Soltzhenitsyn is to criticize leaders in Russia .

You cant save America with missiles - it will decline and fall just the way great nations in the past have because and nothing is being done about him -

man is the problem, he has always been the problem -
because his reasoning power is overpowered by his SELF preservation drive , that is why we have laws and governments , that is why the Bible was written - its laws would inhibit the drive in man, and give his reasoning powers a chance to become fully developed thru USE -
if those male leaders understood what the Bible is really all about - it is evident , they do not !

If men had accepted that do-it- yourself GOVERNING kit that Moses tried to hand man in just Ten laws it would have made other forms of government obsolete a long time ago - men could forget missiles, and defense departments -

Go ahead a fire your missiles, yours is the power and its GORY .

But I thought you ought to know - you are exposing your IGNORANCE -
If this nation is going to fight wars, if it is going to use bombs , missiles,then it must do what Russia did , kick God out because the law of God is "thou shalt not kill ," Christ obeyed that law, so it's evident the killing way of solving social problems is not this Gods way , it's not Christs way - it's MANS way, and having this nation,and its people associate themselves with this God is misleading because this nation believes in " other gods,"
its people are bearing false witness , the names of this God and Christ are being used in " vain , " they always have been -
Make this nation honest , make it stop putting "in God we trust" on its money , make people stop saying " one nation under God "
maybe that depends on what people mean when they use the word God, they could mean " other gods , "

Russia fights wars but it does not associate itself with the Bibles God and Christ when it does it - America offends where Russia does not and it is a serioud offense .

(Mrs) E. F. Bentz
White Bird
Idaho 83554

Response to Mrs. E. F. Bentz

(Religious and moral issues are not within the scope of an environmental statement.)

4. Comments Received at the Salem, Oregon Hearing

This section contains a transcript of the public comments received at the Salem, Oregon hearing. Responses to the comments are provided via section and paragraph references as explained above.

PUBLIC HEARINGS – SALEM, OREGON
PROJECT GIANT PATRIOT
(21 March 1974)

REVEREND ROBINSON: Thank you, Colonel Jordan. Well, as I have been having the message explained to me and as I read it in the library in Portland, I couldn't help feeling that the whole thing is unnecessary and expensive and -- uh -- somewhat infantile, if I may say so, Sir, with all due respect. I can easily see why people want to do this particular experiment, we have seen some marvelous electronic gadgets explained to us, seen them on the screen, and they are really quite interesting, indeed very fascinating, very clever -- tremendous thought behind it, but one can better understand then why people want to fire them off, because this may be the only opportunity they have. Pray God that that will be so. I am sure you will agree with me on that. But, meanwhile, we are just wasting the taxpayer's money and suddenly, I think, demean ourselves. I can't help feeling that we degrade ourselves, in considering such things that we are considering here tonight. I know that does not carry weight with everybody, but there are many thousands of people here in Oregon and other parts of the country, and indeed, across the world, who would feel that. Modern warfare -- there's nothing like modern warfare -- fueling inflation, which is one of the main problems in our present economy.

Another thing that it seems to me is that we ar acting as if we were members of tribes. Seems to me that we out of place in all of this. We are sort of antidiluvian - I could see, and I really did see in my imagination as I watched the screen just now, because the old extinct monsters that used to be on this earth, which are no longer here. Seems to me that we are somehow being prepared for that -- in carrying on in this particular way. And, I want to suggest that this is, that we have passed the end of the age of some tribalism as this. We are having our President on friendly terms with the leaders of Russia and China, and attempt to be friendly with all the peoples in the world, and, yet, here we are in this small group tonight, thinking about potential adversaries and trying to convince ourselves and our friends that our gadgets work, and talking about safety being the main objective as Mr. Needham did just now. There is nothing less safe and there is nothing less of the safety purpose in a rocket, or a missile. And, then, also we had a mention of endangered species not being much affected by this experiment. Well, it seems to me that this very experiment and all that goes along with it in our modern weapons systems, makes us all an endangered species. Here we are, we are the endangered species, that's what we are talking about, really. And then, I couldn't help thinking that before we came, the Indians were here and they were gentle people compared to us. I happen to have sent to me in the mail today, an Indian prayer. I am going to read it to you, if I have time, it's all about the very subject of the report.

"O great spirit, whose voice I hear in the winds;
Whose breath gives live to all the world,
Hear me, I am small and weak, I need your strength and wisdom.
Let me walk in beauty and make my eye ever behold the red and purple sunset.
Make my hands respect things you have made and my ears sharp to hear your voice.
Make me wise so that I may understand the things you have taught my people.

Let me learn the lessons you have hidden in every leaf
and rock.
I seek strength, not to be braver than my brother, but to
fight my greatest enemy -- myself.
Make me always able to come to you with clean hands and
straight eyes, so when my fate is prevading sunset,
my spirit may come to you without shame."

I have prepared a statement, Sir, and I will read it, it is very brief. Having reviewed the Draft Environmental Impact Statement at the Portland Public Library, I am discouraged that we Americans should be making such experiments as the proposed rocket firings. Some people will have to be removed from their homes during the firings, there is the possibility of 4,800 pounds falling on someone's home, or worse, on human beings. Fire may result, but the worst pollution is spiritual and psychological. It is well established that no nation can now defend itself adequately. Modern technology can be creative, constructive, to such an extent that it can bring new hope to mankind in the fields of education, medicine, food supply, and an all-round better life for everyone on the earth. Or it can be completely destructive, eliminating life from the globe, creating despair and using resources that we cannot afford. In Deuteronomy 30, Verse 19, we read: "I have set before you this day, life and death, blessing and curse; therefore, choose life that you and your descendants may live." Twenty-three civilizations are known to have passed before this one. Ours will go the same way unless we heed the basic truths which underlie the creation and maintenance of life. If making large numbers of people extinct, which would be the ultimate effect of the weaponry proposed if used, if it proves anything, it is an argument for atheism. God is never mocked, however justified we, the mockers, may feel.

I am here as a churchman and a representative of The Fellowship of Reconciliation, a religious peace group in 29 nations throughout the world. We long to work for a world where men stop defending themselves by making others fear them and their horrific weapons. We believe that the only possible defense today is of a non-violent kind which appeals to the other side's better nature. We believe also, incidently, in the use of such international organizations as the United Nations. Further, we believe that we have no right to use the resources of the earth, given to us in trust by our Creator, for selfish, privalistic, nationalistic purposes, but for the good of the human family. We have wasted oil, and it will soon be exhausted, coal, iron and other precious gifts and are now seeing clearly, the writing on the wall that this must stop. Sir, Colonel Jordan, I appreciate the opportunity to come and meet you and your staff. But, Sir, our priorities are wrong. We must change them or suffer the consequences, as have previous civilizations. I leave you with this last thought: "Choose life, forget ICBM's, do unto others as you would they should do unto you, and live. (Appendix B. B. '; III. G. 3; I. C.; I. D)

COL JORDAN: Mr. Rivera?

MR. RIVERA: My name is Carlos Rivera, I am from Portland and also a Democratic candidate for the Congress of the United States from the Third District of Oregon. I'm very concerned about the problems of missile firings over our State. And, not only what they might do to our State environmentally, but what they do to our countries in the total concept of military detente. First of all, when this group first came to Oregon to meet with the Governor and our legislative committees in the House, a great deal of public relations work was done, bringing this group out here. A lot of media coverage, a lot of newspaper coverage, b ut now when the time comes for an Environmental Impact Statement, to make a determination and a recommendation, for approval of this project, the Air Force goes to the trouble of obtaining a legal opinion, indicating that there is no need for written notice. Now, what kind of affirmative action on the part of the military is that? To try to bring across to the people of this country, a notice of what's going on. This lack of truth in Government -- this is an extension of what's going on in Washington today. I think that, also, that there is a distortion in the facts that are being presented tonight on the part of the Department of Defense and the Air Force.

Earlier tonight, we heard that a number of short flight tests by the Minuteman were held in the mid 60's. But, they didn't tell us that three of the four test missiles failed to perform completely all of the launch requirements. But, yet they can say to us that they can continue on with their safety factor program. I think that this kind of lack of credibility is part of the problems that we have today in Government. In talking about the problem of missile debris being unavoidable, I think it is avoidable -- by not firing the missiles. I think that we are talking about an environmental impact statement that talks about short-term socio-economic impact being negligible, I think that is the word, I can't recall exactly what it was. I think that we are talking about the impact of not only 6 million dollars that is going to be used or is being requested, but the total of 29 million dollars that's going to be spent on this program. And, I think that we have to talk about our priorities -- redistribution of this money, you know, when the time in our nation's history, when people are paying exorbitant prices in grocery stores, or standing in gás lines because of the lack of fuel, and the President can spend 17 million dollars beautifying his estate and pay less taxes than the gardeners of the White House -- I think it's -- in talking of terms of 6 million dollars this year and a total of 29 million dollars, that the hard-working taxpayers not only of our state, but the rest of the states, it's time that we took a very strong opinion. And, as I indicated, as a candidate for Congress, I would definitely be opposed to such a program. Thank you.

(Appendix B. B.

COL JORDAN: Thank you, Mr. Rivera. Mr. Nokes?

(No response from Mr. Nokes.)

COL JORDAN: Mr. Richmond?

MR. RICHMOND: My name is Benjamin Richmond. I work for the American Friends Service Committee, 4312 Southeast Star, Portland, 97215. I really must just have three questions to ask you, as the result of hearing the presentation tonight. Unfortunately, I wasn't able to read the Environmental Impact Statement, which is the result of not having really found out about this hearing through normal press releases or whatever -- just by word of mouth. And then I called Senator Birkowitz's office to find out about it and where it was being held. First, I called the Governor's office to find out where I could get hold of some information about the hearing, and they referred me -- they didn't know -- they referred me to the State Military Department -- I hadn't heard of it before. I called them and some Major there told me a little bit about it. He said that there was going to be a hearing and where it was, and it would be tonight and then said he didn't know anything more about it. So, I called Senator Birkowitz and they hadn't received the Environmental Impact Statement, but they understood that it could be found in some state library. And, it was then that I was informed that the hearing tonight was particularly on the environmental problems to the launching. So, unfortunately, due to these problems -- I guess other people may have encountered them also -- I haven't been able to do my homework very well. But, I do have three questions.

One of them, I believe you mentioned that the course of the launch was going to go over the Nez Perces Reservation? Or, one of the launch routes could do that?

CAPT OLSON: It could.

MR. RICHMOND: Could you expand a little bit then on the socio-economic impact of -- uh -- the launching over the Nez Perces and if that Reservation is close enough -- I am not familiar enough with the geography. And, the other thing was about whether the Nez Perces have been involved in hearings on this subject.

COL JORDAN: We will deviate from the normal procedure. Normally, we receive statements first, but, Captain Needham, would you like to address yourself to this particular question?

MR. RICHMOND: I am sorry we have to deviate, but I haven't had a chance to do my homework, or I wouldn't be asking questions and I would be delighted to make a statement. Water pollution, you said wasn't a factor. Does that include re-entry of the missile or the missile burn-up in the atmosphere when it re-enters, or what happens -- doesn't it ever hit the water?

CAPT NEEDHAM: The third stage of the missile and the re-entry vehicle will impact in the area of the Canton Islands. It will impact in the lagoon of the Canton Islands. This is the only place that the hardware will come in contact with the water. At this point, it will be -- the fuel will be completely expended so that really the only water pollution problem there would be corroding of the material, and we can't classify that as a water pollution problem.

MR. RICHMOND: And there won't be any sonic boom effect at re-entry?

CAPT OLSON: Very slight.

MR. RICHMOND: It must be very slight. Okay, I just hope that this has received fuller attention in terms of what it could do to the sea environment of that area.

The third question I have -- maybe this is more in the way of a statement, since you may not be able to answer it. But -- uh -- I am curious -- you say in the goals of the test, you want to really improve the credibility of the triad, nuclear deterrent system, so that our friends and potential enemies will be alerted to our defense posture or something. I wonder if there isn't also a domestic impact of this program as well, that there is a feeling on the part of the Air Force that we need to increase credibility among our own domestic population as to the necessity of a triad defense system. That includes, as well as missiles, such systems as the proposed B-1 bombers. In other words, what I am trying to get at is whether one of the side benefits of such a launching wouldn't be public willingness or acceptance of the triad series and the further expenditure of more significant sums of money on other aspects of the system such as the B-1 bomber, which would cost a potential 50 billion dollars in the next few years. Thank you. (I. B. 5; III. G. 1 & 2; III. J)

COL JORDAN: Thank you very much. I have a copy here for you of the Draft Environmental Impact Statement.

MR. RICHMOND: Thank you.

COL JORDAN: As I indicated earlier, you may wish to make written comments and send them to me or, if you wish, to send them to Washington. This is for all members of the audience, the address is: Special Assistant for Environmental Quality, Secretary of the Air Force, Washington, D.C. Dr. Welsh, would like to receive the statements not later than 8 April. If you wish to have your statements included as a part of this hearing, then send them to me. I would like to have them not later than 28 March. The next person that desired to make a statement is Mr. Nettleton.

MR. NETTLETON: I am Marvin Nettleton and I live in Salem. I am a member of the Fellowship of Reconciliation. As I sat here and looked up at the flags of the United Nations, I wondered really what was going on. I wondered if we really know what we are doing. We read about tensions in the world, we hear how they are being eased, and yet we sit here tonight discussing how we are going to impress our enemies.

According to all the information I am able to get, we have already -- already have overkill capabilities -- 8 or 10 times. Russia has 7 or 8. Why do we need more overkill? We have been reading about the energy crisis, why don't we spend these missions on developing other means of fuel, as possible fuels. It has been said that there will be no material used and these Minuteman aren't being constructed for this particular project. Big deal! The material is still gong to be wasted, and the fuel will be wasted that will be used. And, really, all that will be wasted, but we don't need it. We already have overkill. We believe in armaments -- we think that's our security. What do we need with more overkill? Oxygen is not unlimited, there will be an environmental impact on the area, gravel roads are going to be constructed, there will be erosion. There is bound to be. We are going to release all of these hugh sums of material into the air and some of it will fall on the ground, a lot of it will be taken into the air and distributed over the world. Just adds that much more pollution. I have heard it said that there's no place in the world that the air is really free of pollution. So, it must already be saturated. I don't think we need to saturate it any more.

Now, I understand that this will fly over the land -- I think the figure was 102 minutes. That's nearly an hour and three quarters. A lot can happen in that length of time. So I don't feel that sufficient studies have been made of the impact on our environment, I don't think that we need it from a military standpoint, and I think that there are better ways to use our money and our energy. Thank you. (Appendix B.B. ; III.4.1; III.B.6 & 7; I.B)

COL JORDAN: Thank you, Mr. Nettleton. I believe you said "102 minutes." It is 102 seconds.

REVEREND ROBINSON: Would somebody like to say that into the mike, it would be helpful to people recording it.

COL JORDAN: Mr. Benn will do that. He will clarify the portion of the briefing that indicated the minutes or seconds.

MR. BENN: The missile will burn 102 seconds at which time all debris will have impacted into the Pacific Ocean. The actual present position of this missile as it traverses the Continental United States will take four minutes, but we will have reached a condition at the end of 102 seconds where it will go ballistically into the Pacific Ocean.

COL JORDAN: Is Mr. Nokes here? I have a card here that indicates he desires to make a statement.

(No reply from the audience.

COL JORDAN: Is there anyone else in the audience that would like to make a statement this evening?

(No response from the audience.)

COL JORDAN: Well, thank you very much, ladies and gentlemen, I appreciate your comments very much. As I indicated earlier. they will be addressed in the preparation of the final Environmental Impact Statement. Thank you and good evening.

/////////////////////////////// SALEM ///////////////////////////////

The attached letters were received from Mrs. Dennis Patch, Salem, Oregon; Charlotte Holms, Salem, Oregon; Ruth Haskins, Salem, Oregon; and a statement from Reverend Eric L. Robinson, Portland, Oregon.

1070 15th N.E.
Salem, Oregon
March 27,1974

Col. Vincent A. Jordan
Strategic Air Command
Offut AFB,Nebraska

Dear Col. Jordan:

I have just returned today from being out of town, and have read the report in the press of the Great Patriot Missile hearing held here in Salem on March 21st.

I should like to express the concern of a number of persons who had not known of the meeting, and of another group who had standing commitments for the evening. Included in this latter group are members of a coalition international relations study group. This group represents such organizations as: League of Women Voters, AAUW, YWCA, Business and Professional Women, Federated Women's Club, Zonta, Church Women United etc. Members meet and study together those issues which involve the reality of national inter-relatedness, and hence the importance of peace.

I would like to suggest that an opinion poll from members of such groups as the above, who seek to keep themselves informed on issues, would be a better way to assess public opinion than a poorly spaced press release; or to have had alternate hearing dates.

I strongly object to the firing of the missiles over any state :

(1) The escalation of defense mechanisms increases rather than decreases international tensions.
(2) There is as was stated by one member present, at hearing already a high level of overkill potential. I trust that you have read the articles and books by Scientist Ralph Lapp on this subject! ?
(3) In an age of resource shortages such as exist today, it is "a crime against society" to use earth's scarcity for purposes of destruction.
(4) It is equally an act of violence for the defense dep't. to contribute to the economic factors of inflation.

Because I firmly believe that wars as a means of settling international disputes can no longer be countenanced because of economic and ecological factors, I would suggest that we invest the monies of the defense to the cooperative attempts at survival by increasing the strength and capabilities of the United Nations.

Sincerely Yours,
Mrs. Dennis Patch
Mrs. Dennis Patch
V. Pres. oregon United Nations Assoc.

(Appendix B. B. 1, 4, 5, & 6; VI; VII; III. 6. 3)

March 28, 1974

Dear Col. Jordan,

I believe we should not fire Giant Patriot missiles through NW skies

I believe it will endanger our relations with other countries, it is dangerous to people in the NW and it is wasting money.

Charlotte Holmes
3088 Livingston NE
Salem, OR 97303

(Appendix B. B. I. D)

4940 Sunnyside Rd. S.E. C-7
Salem, Or. 97302
April 2, 1974

Col. Vincent Jordan
Offutt A. F. B., Nebraska

Dear Col. Jordan:

I am writing to ~~protest~~ the missiles being fired over the state of Oregon.

May I suggest when hearings are being held that they be more widely publicized and alternative times be arranged to accommodate employed persons?

Yours truly,
Ruth Haskins

(Appendix B. B. 1)

REV. ERIC L. ROBINSON,
FELLOWSHIP OF RECONCILIATION,
2645 N. E. 30th Avenue,
Portland, Oregon, 97212.

March 21, 1974

S.A.C. Testimony before hearing in Salem: presided over by Col. Vincent Jordan.

Having reviewed the draft Environmental Impact Statement at the Portland public library, I am discouraged that we Americans should be making such experiments as the proposed rocket firings. Some people will have to be removed from their homes during the firings, there is the possibility of 4,800 lbs. falling on to someone's house - or worse, on to human beings; fire might result, but the worse pollution is spiritual or psychological.

It is well established that no nation can now defend itself adequately. Modern technology can be creative - constructive - to such an extent that it can bring new hope to mankind in the fields of education, healing, food supply and an all round better life for everybody. Or it can be completely destructive, eliminating life from the globe, creating despair and using resources that we can not afford.

In Deuteronomy 30 v. 19 we read: "I have set before you life and death, blessing and curse; therefore, choose life that you and your descendants may live".

23 civilizations are known to have passed. Ours will go the same way unless we heed the basic truths which underlie the maintenance of life.

If making large numbers of people extinct - which would be the ultimate effect of the weaponry proposed if used - proves anything, it is an argument for atheism. God is never mocked, however justified the mockers may feel.

I am here as a Churchman and as a representative of The Fellowship of Reconciliation, a religious pacifist group in 29 nations throughout the world. We long for a world where men stop defending themselves by making others fear them and their horrific weapons. We believe that the only possible defense today is of a non-violent kind which appeals to the other side's better nature.

Further, we believe that we have no right to use the resources of the earth - given to us in trust by our Creator - for selfish, nationalistic purposes, but for the good of the human family. We have wasted oil, coal, iron and other precious gifts and are now seeing clear writing on the wall that this must stop.

Sir, our priorities are wrong. We must change them or suffer the consequences as have previous civilizations. "Choose life; Forget IBCMs; do unto others as you would they should do unto you - and LIVE".

Eric L. Robinson

(I.C; I.D; VI)

5. Transcript of the Lewiston, Idaho Hearing

This section contains a transcript of the Lewiston, Idaho public hearing. Responses to the comments are provided via section and paragraph references as explained above.

PUBLIC HEARINGS - MINUTEMAN II
PROJECT GIANT PATRIOT

Lewiston, Idaho - 9 April 1974

COL JORDAN: Good evening, Ladies and Gentlemen, it is indeed a pleasure to be again, in Idaho. It is my second visit here; we had a public hearing in Boise recently, and I said at that time that I hoped I would have the opportunity to visit Idaho again, and I didn't realize that I would be able to be here so soon after that visit. It is, indeed, a beautiful State. This is my first visit to Lewiston.

We are here tonight to receive public comments on the Draft Environmental Statement, relating to the Strategic Air Command Operational Base Launch Program, which is known as GIANT PATRIOT. We are from SAC Headquarters, Colonel O'Connor, Captain Needham, and Major Verdery are our panel of experts.

I am here in the role of an impartial Judge Advocate officer. I am not a hearing examiner; I make no recommendations. I did not participate in the development of the program, and I will not be asked to make any decision relating to whether the program will proceed, be modified, or be abandoned. I am here to assure that you, the public, have an opportunity to make any statements that you wish to make on the Draft Environmental Impact Statement. Because, indeed, it is the draft statement. And, after we receive the public comments, they will be addressed in the preparation of the final Environmental Impact Statement. So, our purpose here tonight is to receive public comments; one, on the environmental effects of the OBL, Operational Base Launch, or Operation GIANT PATRIOT; and secondly, the adequacy with which those environmental effects have been dealt with in the Draft Environmental Statement.

Now, to set off the meeting, we thought it would be appropriate to first give you a briefing to describe the program. Major Verdery will do that; he will give you a briefing describing the program. Now, that really is the first part of the Draft Environmental Impact Statement, what it's all about. The second part of our briefing will go into the matter of environmental effects, the second portion of our Draft Environmental Statement. Actually, there are more than two portions, but the first part is a description which Major Verdery will give; the second part will be a synopsis of the Draft Environmental Impact Statement.

We don't want to take too much of your time on these aspects of the program, because we want to get your comments, we want to receive the public's views on the Draft Environmental Impact Statement. We will record all this -- Mrs. Morgan is our reporter and will make a transcript. The transcript will be available to all persons who have indicated a desire to receive the transcript.

I would appreciate, for the purposes of the record, if persons making a statement would identify themselves, give their address, and, if they wish, their affiliation with any group they represent, if they wish to do so, so that we can have it on the record and we will be able then to mail a transcript to the proper person. Without any further ado, we will now hear from Major Verdery.

MAJ VERDERY: As Colonel Jordan said, my purpose here is to brief you on the operation aspects of this program, to give you technical description of the overall conduct of the Operational Base Launch Program, nicknamed "GIANT PATRIOT." Now, this briefing is outlined here in a brief review of the reasons and background behind the conduct of the Operational Base Launch. Included in this will be a description of the current Minuteman testing concept as we test missiles from Vandenberg Air Force Base today, for purposes of your contrasting this current testing concept with the concept under which we will conduct the GIANT PATRIOT launches. I will give you a brief description of previous Operational Base Launch activity and discuss, somewhat rigorously, the safety aspects of the location and launch time selection.

Now, obviously, the Minuteman weapons system affords us the greatest portion of our deterrent, strategic forces. It's the largest portion of our triad, the triad being made up of the land-based ICBM's, the Minuteman, of which we have one thousand in number, postured on alert in the the Continental United States. The other two portions of the triad being the manned bombers of the Strategic Air Command, and the sea-launch ballistic missiles of the Navy. Now, undeniably, there is a certain demonstrative nature to these tests. Any deterrent force, in order to be effective, must be demonstrated, must be believed, by the nation being deterred.

I won't dwell at any great length on the deterrent, demonstrative nature of these tests, because in addition to these, we at Strategic Air Command Headquarters believe there are several technical test objectives to be satisfied by these tests. The first of which is the demonstration of the complete end-to-end test of the Minuteman weapons system, which has never been done before. That is, from the Command Communications from SAC Headquarters down to the Minuteman Wing, from there out to the Minuteman Missile Combat Crew and their capsule, the turning of the launch keys, the electrical transmission of the Launch Command out to the Missile Launch Facility, the lift-off of the missile from its operational silo and its flight, as it were, to a target in the Pacific Ocean. Now, that's one test objective--the end-to-end test of the weapon system that has never been completely demonstrated before.

The second technical objective is that of verifying the gravitational and geodetic effects of flight over land. Now, as we test missiles today from Vandenberg, we fly over the water to homogenous area of the Pacific Ocean, thus we have had to extrapolate the effects of the gravitational and geodetic nuances of flying over the continental land mass. So, for the first time, we will be able to validate the extrapolation of those gravitational and geodetic effects. And, finally, we will demonstrate the reliability of the Minuteman ground system as it sits in its silo on day-to-day alert for a sustained period of time. So, those are the three technical objectives, in addition to the deterrent demonstration which we hope to achieve in these tests.

Now, the Minuteman Weapons System is deployed at these six bases. The Minuteman II weapons system, in particular, which GIANT PATRIOT is a test of, is deployed at Malmstrom Air Force Base, just outside of Great Falls, Montana; Ellsworth Air Force Base, near Rapid City, South Dakota; and Whiteman Air Force Base, near Knob Knoster, Missouri. There has been some comments as to the Minuteman II Weapons System being an outmoded, outdated system. This is not the case. The Minuteman II missile just completed its final deployment phase at Ellsworth Air Force Base last year. So we just completed deploying 450 Minuteman II missiles; the remainder of the 1,000 Minuteman missiles will be Minuteman III missiles located at Grand Forks, Minot, and Francis E. Warren. So, for the foreseeable future, the Minuteman II will remain at the 450 missile level.

Now, this is simply a description of the Minuteman Missile System. The Minuteman missile is a solid fuel, intercontinental

3

ballistic missile, approximately 55 feet long with three stages, a first, second, and third stage, and a re-entry vehicle housing the nuclear warhead. The missile is postured in a flight, a flight being made up of one launch control facility shown here with a building above ground housing the support facilities, and an underground capsule in which resides the missile combat crew on 24-hour alert for seven days a week. Now, each launch control facility has surrounding it, ten launch facilities which house the Minuteman missile. Here, you see the make-up of a Minuteman squadron. It is made up of five flights shown here in the different colors. A flight of missiles is one launch control facility shown here in the center of the flight surrounded by ten missile launch facilities. Five of these flights of ten missiles are grouped together in a squadron. Any one launch control facility and combat crew can monitor and control all fifty missiles in the squadron.

Now, the current Minuteman testing concept calls for us to select, at random, missiles from the operational bases and ship them out to Vandenberg Air Force Base; shown here is an example of a missile being selected from Malmstrom and shipped to Vandenberg. At the same time the missile is removed for shipment to Vandenberg, a task force of operational, maintenance, and missile combat crews is detached from their home units and sent to Vandenberg. When the missile and the task force arrive at Vandenberg, that missile is processed to remove the nuclear warhead and add a safety destruct and tracking system. It's postured to alert in a test launch facility, very closely similar to the ones at the operational unit, and there the missile combat crew monitors it day-to-day until the message is received from Strategic Air Command Headquarters, upon which the missile combat crew will turn their launch keys and launch the missile down the Western Test Range to a terminal area. When the missile is launched we monitor its progress closely in flight by sensors. By sensors I mean radar, telemetry, and optical devices which track it during its flight. The sensors are in the up-range, mid-course, and terminal areas. The purpose of these sensors is twofold. First, to monitor the progress of the missile for range safety purposes; that is, the range safety officers must know the exact flight of the missile to determine its safe trajectory. The second purpose is for post-flight data analysis to determine the performance of the missile as it flew. Now, this is contrasted to the operational base testing concept here.

In the operational base concept, the missile will remain in its silo as it has been there for several years, on alert, ready to be fired, if ever need be. Its physical and electrical environment will remain undisturbed, and this is a key point. We will not do anything to disturb its environment as it sits there; we will simply remove its nuclear warhead and replace that nuclear warhead with a range-safety tracking and destruct mechanism. Then, after bringing back to alert, the missile combat crews will react to a message from Strategic Air Command Headquarters and 1 unch the missile over the Continental United States to a target in the Pacific Ocean.

There has been a great deal of previous activity; this is not something that we, all of a sudden, decided to do, as some people have said. The initial operational base launch activity began as far back as 1963 when we first began testing the Minuteman missile. It has always been the desire to test missiles in the most operational and real environment that it sits in every day, and not have to remove them and fire them from test facilities on the western test range. From the 1963 to the 1970 time period, we did conduct some limited range tests called Long Life and Giant Boost, using specially modified missiles with less than seven seconds of propellant capable of only one mile of flight. These tests gave us valuable data and did, indeed, prove that we could conduct Operational Base Launch activity in a safe manner. The principal reason why we did not conduct full range tests during those early years, was that the technical state of the art did not exist to allow us to design a safety system to let us conduct such launches with maximum safety.

In 1970, an Operational Base Launch proposal was sent to Congress, to ask for funds to conduct such tests. The funds were approved to develop the range safety system, both the airborne and the ground tracking systems, but Congress withheld the funds for the actual conduct of the launch with the words read into the Congressional Record by the Joint Session of the House and Senate Appropriations Committee, such that they said that the funds are approved for the development of these systems and, if in a future year, such systems are developed and the firing of missiles from an operational base is required, come back to Congress in a future fiscal year and they would consider our budget request. Such a decision was made in 1973 and a request was made to Congress.

GIANT PATRIOT calls for a total of eight launch programs; to conduct four in the winter of 1974-75 from Malmstrom Air Force Base, followed by four more in the winter of 1975-76. The initial four launch test segments calls for two different squadrons at Malmstrom to be tested. We will posture the first squadron with the Operational Base Launch missile and launch two. We will then recover that squadron and put it back in its normal alert ready posture and move over to the second squadron and posture two more GIANT PATRIOT missiles and launch them down the western test range. This is simply for the sake of comparison of the missiles as we fly them from Vandenberg versus how we will fly them from an operational base. As you recall, when I talked about the missiles being removed from their operational base and shipped to Vandenberg, where they add a telementry and destruct system, this is the operational missile depicted here. When it arrives at Vandenberg, the maintenance technicians at Vandenberg remove the raceway cover, which is a cover for the operational control systems leading down from the guidance system to each stage, which controls the missile in flight. They remove that cover and underneath it place a destruct device, called a linear shaped charge, which, if initiated, would blow the missile up in flight and render it nonpropulsive. They also add to it an instrumentation cable that runs the length of the missile to carry to this telementry system, the performance perimeters of the booster in flight, so that while it's flying it can telemeter to ground stations how it is performing. This range safety wafer is added along with the telemetry system for purposes of tracking command destruct.

All of these things considered, the operational characteristics, it is no longer an operational missile when we add these things to it and fly it from Vandenberg. So, the Operational Base Launch had to wait for the development and the capability to take all of this outlined in red here, to be combined within the confines of the operational missile. What we did was take an operational re-entry vehicle, shown from here forward, and in place of the nuclear device, which normally is contained here -- place a tracking and command system and two linear shaped charges here. And, if in flight, the missile should err from its path, a destruct signal will be initiated where the shaped charges will fire down into the third stage of the missile causing it to detonate much like dynamite, as opposed to simply "cutting the tape" like the Vandenberg destruct system, and the missile is completely obliterated in flight. It is specifically designed, this system, to be such that all burning propellant would be consumed before it reaches the ground.

As you recall, from the Vandenberg tests, we monitored the missile on the Vandenberg flights, the up-range, midcourse and terminal area, and no operational base has these sensors, these radar, optical devices, so such a system had to be designed. What was built was called the mobile range safety system. This system has been designed and developed specifically for these Operational Base Launches. It affords us the ability to do optical, radar and telemetry tracking of the missile the same way we do at Vandenberg. It simply combined, condensed and made mobile those same kinds of systems. It consists of a sky-screen device which monitors the missile's progress closely, visually in the up-range area, which I will talk about a little later, the monitoring control and long range radars which will control the missile and monitor its flight from the time that the visual operation sensors until the missile reaches the coastal area, and it is out well over the ocean.

Now, this is probably the most critical part of the briefing; this is how we are selecting the location and the launch time. The safety considerations were paramount in our selection of the launch site; that is, Malmstrom Air Force Base. We wanted to have the minimum population in the over-flight area of the trajectory, with the minimum distance from the launch point to the Continental United States exit point. We wanted to derive maximum benefit from the tests at the same time, to test both Minuteman ground systems, which happen to be found at Malmstrom, and to have tracking data available for post-flight analysis. All of these criteria lead us to Malmstrom as the location for the test conduct. Of the three Minuteman II bases, Malmstrom AFB, Montana, is the closest to the Continental United States exit point, and affords us an overflight area where generally the population density is zero to two persons per square mile. It affords us access, as well, to the Canton Island terminal area which already has radar in place, which we use to track missiles from Vandenberg today.

Now, this slide is necessary for understanding of this minimum risk concept that we use in selecting the specific launch facility sites at Malmstrom. When a Minuteman missile flies on its trajectory at a point of about 25 miles high, the first stage burns out. At that point, the first stage of the empty metal cylinder (about 50 inches in diameter and 28 feet long, weighing 4,000 pounds), it falls away from the missile and follows a ballistic trajectory and impacts the face of the earth about 200 miles from the launch point. This is in an area of the Selway-Bitterroot wilderness.

Shortly after the first stage falls away, four inter-stage panels are ejected. These are simply structural devices that hook the first and second stage together. These four inter-stage panels weigh about 60 pounds each and are about three by three and one-half feet. They are thin metal devices about a quarter of an inch thick. These four devices, inter-stage panels, follow a ballistic trajectory and impact the face of the earth at about 250 miles from the launch point.

Shortly after the point occurs called the Conus-Clear point. That's 102 seconds in flight, when the missile is still well within Montana. This Conus-Clear point means that the missile has received sufficient velocity from its second stage thrust, such that regardless of subsequent events, even if it had to be destroyed, at this point all the debris would impact in the Pacific Ocean.

Right after the Conus-Clear point, the second stage burns out and it falls away, but it has enough velocity to carry it out about 600 miles into the Pacific. Then the third stage ignites, it burns out here in the third stage of the re-entry vehicle, with the destruct system, exists the Continental United States at a height of well over 400 miles, that's well into space. Now, let me point out here that Idaho is about here under the trajectory; at that time the missile in its flight is well above the atmosphere, higher than most satellites that whiz over your heads every day. It's over a hundred miles in the air, or above the atmosphere, if you will.

Now what we do, the way we are selecting today, this week and next week up at Malmstrom Air Force Base, the way we are selecting the specific launch sites, is this: There are two objects, or actually five objects; first, the first stage itself, and then those four panels all fall in a group which impact the face of the earth. In order to compensate for the various things that might effect a body falling through the atmosphere, we built what we call a three sigma ellipse. This ellipse takes into account all the worst possible conditions of winds; for example, the worst south wind, the worst northerly winds, the worst easterly, westerly, the worst atmospheric densities, etc., that could possibly effect something falling through the atmosphere. This builds us an ellipse for the first stage that we know with all certainty that all possible cases of first stages will impact in. That ellipse is 26 miles long by 12 miles wide, shown here. Now, the same kind of ellipse for those four small panels, is 19 miles long by 8 miles wide. Now, say we go about selecting in this minimum risk process, the specific launch facility. We first lay a little map, a detailed map, using photo-reconnaissance (aerial photographs) taken of this entire launch trajectory; we lay out on a map these two ellipses and we simple move these areas around until they no longer fall in a populated area, and from that we work back to a specific launch site that we will launch from. The criteria, I must emphasize this, the criteria used in selection of these launch sites calls for us to never impact any of this debris near a populated area sufficient that will require any evacuation. That is our criteria; we will not evacuate any populated areas. Now this is the minimum risk process by which we will select the final launch facilities up there at Malmstrom; such that none of this debris will impact near or in a populated area.

Now, the up-range area, range safety control, is done by these sky-screen devices which I referred to previously. The most critical point of a missile's flight is from lift-off to about eight seconds where it is going through a manuever called "pitch," where the missile rises directly from its silo and pitches over toward the target; and then it recovers from that maneuver and flies straight on down to the target. Now, because of this critical area, the path of the missile is monitored by these sky-screen devices which are simply optical plates of glass on which is prescribed a pre-computed trajectory. A Range Safety Officer, who is the best qualified man in the world for this sort of work, because he has done this at Vandenberg for years and years, for the past 10 years of missile flights, he monitors both from behind the trajectory and from the side of the trajectory, this missile flight during the early periods, critical periods. It is simply considered prudent to evacuate an area immediately around the silo. This is 5.2 nautical miles or six statute miles down-range from the silos and 1.6 or 1.8 statute miles around the silo. It is in this area that missile debris, if the missile were destructed, would be so dense that it would simply be considered prudent to evacuate. This has been proved over a long period of time at Vandenberg Air Force Base, that this missile flight hazard area is the area that should be evacuated. And, it is interesting to note that this is not a new concept, the evacuation of people from missile flight area. These evacuation procedures have been done routinely over the past eight years on more than 300 Pershing and Athena launchings from Green River, Utah, down to White Sands Missile Range in New Mexico. The Army has been doing this for years, so it is not anything new that we are going to evacuate for a short period, possibly 24 hours, some 4 to 5 families that may reside in this area around the launch facility.

Now, once the missile leaves critical area and it reaches a height of about 40,000 feet, the long range tracking radar located about 90 miles away, will pick the missile up in its flight and begin tracking it and track it on out to the Continental United States exit point. While these long-range tracking radars are tracking, they are feeding data to the instantaneous impact predictor, located in these mobile range safety vans, here. Now this instantaneous predictor gives the Range Safety Officer, on a plot board, a picture of where the missile debris would land at any given instant, should he have to destroy the missile.

Now, also depicted on those plot boards are all the populated areas along the missile flight path. This gives him the ability to, what we call, "selective destruct;" that is, he sees that potential debris pattern approaching a populated area and the missile began to err from its path; he would destroy the missile before the debris would land near a populated area. Or, if it were already too close, he would simply let it pass by the populated area and destroy it on the other side. This is what we call "selective destruct."

The requirement has existed for this program since 1963. We have developed the capability in the way of the mobile range safety system, the airborne command destruct system, which rides upon the missile for destruct capability. We have developed safety procedures over ten years of launches of missiles and over 400 launches of such from Vandenberg Air Force Base. We have the most qualified people in the world, and we believe we are now ready to do these tests. I thank you for your attention.

COL JORDAN: Thank you, Major Verdery. Before we proceed to the next and really the main purpose for our hearing, are there any questions that you might have pertaining to the briefing that Major Verdery has just given you -- specific, factual questions? Before asking questions, would you please, for the record, identify yourselves?

* Unidentified Individual: That's not important, my question is quite simple. On that one picture where you showed you had two ellipses, the ellipses that dealt with the camera showed it at the very end of Federal Land designation on your map; what population center is near that sector limit, how far away is it? (I.B; I.C.2)

MAJ VERDERY: That picture was simply for drafting purposes; that is not a specific launch facility. That was not a specific base. What we are doing, in fact, right now, up at Malmstrom Air Force Base is to select the site selection process that is going on now and next week, and as part of that process these detailed maps have all this entire region including the aerial photographs which show all the population centers and even isolated farm houses and ranch houses on these maps. Technicians are laying these ellipses and using these ellipses to place most uninhabited areas possible, these ellipses and then to back up and select the launch facility that will land the panels and also the first stage in unpopulated areas. And, when the final sites are selected, those specifics will be placed in the final Environmental Impact Statement in the final hazard analysis. The specific ellipse, exactly where it lands, people will be shown and told what the hazard is to their farm, their building, their cattle or their person. The specific elipse on the slide does not --- it was not a specific case, it was just one for the purposes of talking or briefing.

REP HAROLD REED: I am Representative Harold Reed of District 8, Craigmont, and the hearing at Boise stated that the fall-out would be in the Grangeville, White Bird area. You also stated that it would be on Indian Reservation lands. But, I am certain that much of that Indian Reservation is sparsely populated. Now, you also state that there would be no evacuation, but then you went on to say that if evacuation was needed, you would pay the entire cost. Therefore, it puts me to wonder of two different statements, that there will be no need for evacuation, but then you would pay the

* Later identified himself in hearing as Mr. Ingram.

entire cost if it was necessary. Now, looking at your pictures here, it also stated that the second fallout would be something in a 19 mile area. Well, in any of that area, there is going to be people living in a 19 mile radius.

MAJ VERDERY: Let me address the 19 mile radius first. That is the worst possible case, that is what we are doing our estimates from, that takes into account the worst southerly winds ever experienced by this area, the worst northerly, the worst atmospheric densities, the worst unknown about anything that could happen to something falling from the atmosphere. As we approach the actual time of the launch, we will take -- have actual data -- what the winds are that day, what the atmospheric density is that day, the specific flight path of the missile, and that ellipse will grow smaller and smaller and smaller, as we know exactly what the conditions are at the time of launch.

The possibility of evacuation has always existed, the possibility. If, for some reason, the hazards are deemed high enough to any individual who might be near there or near one of those impact points, we would -- he would receive remuneration, if he were possibly asked to evacuate. But, it is our full intent to pick these sites such that no evacuation is necessary.

REP REED: Well, the thing that I have been asked by many people in that area, is that they have no desire to have them fly over if evacuation is necessary. And I think that is the point you must prove, that evacuation isn't necessary.

MAJ VERDERY: It is our full intent not to require evacuation of any kind.

REP REED: Okay, thank you. (I.C.2 & 3; III.G.1)

REP BRANSON: I am Representative Dave Branson, from District 8, and for tomorrow night in your Grangeville hearing, would it be possible on your map to pinpoint the area of Grangeville and White Bird as to where that missile is supposed to be going over there, when you showed your map, there?

MAJ VERDERY: Well, as I said, that map is not a specific flight path. That -- that map was built just for the purposes of describing those two ellipses. I could certainly locate about where Grangeville and White Bird are on that map.

REP BRANSON: Well, I think this would be real important tomorrow night in your Grangeville hearing, because this --

there will be quite a few people there and they will be interested in knowing what the flight plan is in relation to Grangeville and White Bird. (I.B.3 & 5)

MAJ VERDERY: Of course, the most important specific we could say is that this selection process rules out any launch site in Montana from Malmstrom Air Force Base, which would impact that ellipse around any populated area like Grangeville or White Bird. Those sites are automatically thrown out in the selection process.

COL JORDAN: Yes sir?

Unidentified Individual: What you are saying, then, is that if the atmospheric conditions, wind prevalence, etc., would indicate it would go over Grangeville, this would then change possible trajectory?

MAJ VERDERY: That's right. In this selection processing we are going through right now, we take the worst possible, largest ellipse and rule out any site which would cause that ellipse to fall anywhere near the populated areas. And, of course, after we made this selection and come to launch date, that ellipse gets smaller, because we know exactly what the conditions will be that day, so we worked from the worst possible test.

MR. CHANEY: I am Bruce Chaney from Lewiston. Is there any heat factor in this -- on the -- especially the first stage, I would think. I am not thinking in terms of panels, but how about the first stage, by the time it reaches the ground? (III.D.1 & 3; III.E.3)

MAJ VERDERY: There should not be any heat factor in the first stage; it falls from a height of possibly 25 miles, it burns out, it burns the fuel to completion; that is, it burns until every bit of it is gone that's in there. Of course, it is hot immediately thereafter, but through its fall through the atmosphere, it should not pose any fire danger at all. And, of course, the inter-stage panels would impact further along and most definitely are not hot at all. They are cold bodies. I might describe it here as approximately 3 by 3 and 1/2 feet; you picture a sheet of roofing metal, possibly; it's as close as I can describe it, with a slight curl in it; of course, they will not fall as a rock or a solid object; they will fall as a leaf would, if you would.

COL JORDAN: If there are no further questions, we will now hear from -- Oh, I am sorry, we have another question.

PETER GERTONSON: Yeah, I elicit a question; a fluttering leaf that weighs 60 pounds disturbs me. The question I elicited on the card was: I have read that these missiles are becoming obsolete; they were going to be replaced, and is firing those from the missile site going to cause extensive damage to the missile site itself? I want to know from the standpoint of national security what the value is for the country from this standpoint, and just offhand, from an economics standpoint?

(Appendix B. B.

MAJ VERDERY: I tried to make that point clear, about the third slide of the briefing where I described where the Minuteman missiles are -- we just -- the Minuteman II missile is, in fact, not an obsolete missile. We just completed by deploying the last one's last summer, so it's that new. We just completed deploying the last ones at Ellsworth Air Force Base in 1973, so it is not outmoded; it is not going to be done away with; we are not firing something just to get rid of it. The defense plans now and for the foreseeable future call for the Minuteman II missiles to remain in the inventory some, as yet, undeterminable length of time. So, the answer to your question is, no, they are not obsolete. And, as far as damage to the silo, a protective system, a device which protects the silo from the hot exhaust gas is installed in the silo, which simply seals off one of the places where the flame might escape and destroy expensive equipment.

COL JORDAN: Captain Needham will now give us a synopsis of the Draft Environmental Impact Statement.

CAPT NEEDHAM: Before proceeding with the summary of the Environmental Impact Statement, I would like to first discuss what Environmental Impact Statement is. To give you a little bit of the background on the National Environmental Policy Act, in 1969, Congress passed, and the first day of January in 1970, the President signed into law, the National Environmental Policy Act. Basically, this law requires that the environment be given appropriate consideration in the decision making process. That is, that all major Federally funded projects that could be controversial regarding environmental policy, or that could have significant impact on the environment, that on these projects, we prepare a Draft Environmental Impact Statement.

After the draft is prepared, as Colonel Jordan pointed out, this is then distributed to all the affected and interested parties, and in this particluar case, we distributed this Impact Statement to some 25 Government agencies, as well as making it available to the public. Through clearing houses, through public libraries in the States that would be affected; that is, in Montana, Idaho, and Oregon. In addition to this, we have held and are holding public hearings to receive public comments on the Environmental Impact Statement. The comments that we receive here tonight will be treated, of course, the same as those we receive in writing from the affected agencies, or from someone that was not able to be here tonight, but chose, rather, to submit the comments in writing.

The Environmental Impact Statement is developed in seven categories or in seven different sections. The first being a description of the proposed action and, of course, Major Verdery has just covered this in quite some detail. So, my purpose is to cover the remaining six parts of it. The second part of the Environmental Impact Statement is to characterize the existing environment. For the purpose of this Statement, we characterize generally, the launch area and the first stage of the panel impact area. The launch area, as Major Verdery pointed out, is near Great Falls, Montana. This primarily agricultural land is very sparsely populated. Also, it is necessary that we consider wild life and, in particular, the endangered species or wild life that are on the endangered species list. We did this and determined that there would be no effect on wild life on the endangered species list or otherwise. And, also, that there will be no effect on historical sites and, of course, the site survey teams will be confirming this as they survey the immediate area of the launch site. The first stage of panel impact areas, as Major Verdery referred to in his slides earlier, the gross area contains the Nez Perce Indian Reservation, the Lolo National Forest, the Nez Perce National Forest, and the Selway-Bitterroot wilderness area. What this means is that this is the area being considered as the first stage of the panel drop area, the impact area. As Major Verdery pointed out, we start from this area and work back to the launch sites.

The third section of the Environmental Impact Statement is what is the probable environmental impact of performing the proposed project, the proposed action. So, this says to go out and look at all the possible ways that this could affect the environment, and this we did. We find that one way the environment will be affected is by the limited construction that will be necessary in the area of the launch site to support the launch. This would be for the placement of radar control vans and what have you that Major Verdery described. There will be road and site preparation; the site preparation would consist of pouring small concrete slabs, and the roads would be mainly gravel access roads, temporary roads. Thesessites will be restored to as much the original condition as possible, or they will be left at the discretion of the landowner. And, there will be some limited construction required for communications which would be the laying of communication lines. But, this will be in Montana near the launch sites.

Another probable effect of the launch is the missile exhaust, and that is the effect that the missile exhaust will have on the environment; the items of primary interest are hydrogen chloride, the hydrogen chloride gas, the carbon monoxide and aluminum oxide dust, the exhaust products from the missile. The amount that is shown here is the amount of the exhaust products that will be generated over the entire flight pattern; it's the entire flight pattern of the missile. So, of course, there is concern as to what effect this will have on someone that would come in contact with it. From the experience that we have gained at Vandenberg and from a computer model that is being built that would characterize the immediate launch area, it has been determined that there will be no hazardous exposure to these toxic materials outside the evacuated hazard area; that is right at the missile launch site, the two mile by six mile area. There will be no toxic exposure outside of this. So, there is no real concern there.

Another probable impact would be that of missile noise. It has been determined there that the noise will be potentially hazardous only within about 900 feet of the launch site and this, again, falls well within the evacuated area. There is no cause for concern here. And, there is also the sonic boom to be considered. Our experience has been that there will be sonic boom as the missile exits and as the missile goes supersonic, and as it comes back subsonic. This will be such that the sonic boom will not reach the ground, so they will not be received on the ground. And, the probable impact or the environmental impact of missile debris. I think Major Verdery and the questions have covered this in detail and it is not necessary to go into it any furhher here.

Another possible impact, and I think the question was raised also, is that of fire probability. The missile -- the only fire possibility that would exist would be in the immediate area of the launch. That is, after the missile flies for about 40 seconds, if the missile is destroyed within that 40 seconds, there is a possibility that pieces of burning propellant may reach the ground. To compensate for this, there is a fire watch corridor that has been established in the immediate area of the launch; this is in Montana. The Forest Service is making available a modular airborne fire-fighting system, which is an airplane which is capable of carrying fire retardant material and putting it on a fire,if it were to occur; and then the intention to launch the missile when there is a snow cover. I would like to point out that this fire probability exists only in the unlikely event that the missile has to be destroyed during the first 40 seconds of flight. Now, if the missile were destroyed after the first 40 seconds of flight, the burning propellant would consume itself before it reaches the ground. So, there would be no possibility of fire.

We also considered water pollution, and determined that this project would not have a probable water pollution effect. We are also required to look into the socio-economic impact and we determined there that the local community, that is, in the area of the launch, there would be some TDY people and that this would have really a beneficial effect, so to speak, on the local economy. They would be there eating, perhaps using some of the motels, but this would not require the building of any facilities for this; so it would have no long term effect on it.

The fourth part of the Environmental Impact Statement are the alternatives. The alternatives that were considered were: To fire from different wings, and as Major Verdery pointed out, Malmstrom is located nearest the ocean and would present the least hazard; to fire from Vandenberg with the operational base launch configuration; and the third alternative is to not conduct the launch at all. And the Environmental Impact Statement addresses why the Department of Defense does not consider these as the acceptable alternatives.

The fifth section of the Environmental Impact Statement is the adverse effects which cannot be avoided. So, what this is, is that after all the probable effects are looked at, after all the alternatives are considered and after everything has been done to minimize the probable effects, what's left? What cannot be avoided? We find that this project will have a minimal effect on the environment. There will be some local short-term air pollution, some local short-term noise and, of course, the short-term effects of construction. The possible adverse impact that could occur, should the missile fail, would be the impact of debris from the failure and possibly of fire from failure in the first 40 seconds of flight.

The sixth section that we were required to consider is the local short-term use versus long-term productivity, and we find that short-term use of the environment in this way will have no effect on the long-term productivity.

The final section that we were required to consider are the irreversible and irretrievable commitments of resource. The only commitment of resources here would be that of materials used, specifically missiles. These are missiles that are taken from the normal test, normal ones to be tested at Vandenberg. So, there are being no missiles built for this so this specific program would not require the expenditure of additional materials. This concludes the summary of the Environmental Impact Statement.

COL JORDAN: Thank you, Captain Needham. Now we come to our most important part of the meeting; that is, to hear from the public. Mr. Wetherell has indicated a desire to make a statement. Would you please come to the podium and make your statement?

MR. WETHERELL: Thank you, Colonel. My name is Mike Wetherell and I am from Moscow, Idaho, and I reside at 1443 Sunnyside Avenue in Moscow. And, I am Senator Frank Church's representative. I am reading this statement on behalf of Senator Church.

> "After studying the Nixon Administration's plan to fire four intercontinental ballistic missiles across Northern Idaho next winter, I am convinced that the tests are a complete waste of the taxpayer's money. I have been briefed by Air Force officials. I have pressed my formal objections to the Secretary of Defense, along with Western Senators Mansfield, Metcalf and Hatfield, regarding the planned test of the Minuteman II missiles. When the issue comes before the Senate, I will vote in

opposition to the requested 27 million dollars for this project. My opposition is based on several major factors:

"First, the project is an extravagance. The Pentagon might consider the 27 million to be 'pocket change' in light of its gigantic budget, but it is nevertheless a large expenditure.

"Second, there is the possible hazard of human beings, animal life, natural resources, and historical sites which inevitably result when tons of missile debris are dropped on Idaho, despite the best efforts of the Air Force to minimize that danger.

"Third, there have been reports that people may be forced to evacuate their homes, farms, and businesses during the test firings. Numerous messages to me indicate the distress that the overflight and any such evacuation would cause the area's inhabitants. For instance, the Administrator of Parkhill Manor, a medical facility in Grangeville, has written me expressing deep concern that such evacuation would bring on 'despair, insecurity, and in some cases, the death of our patients we protect and care for.' The letter goes on: 'To evacuate a hospital or nursing home for a 24 hour period is not as simple as the government states. We are located 75 miles from the closest large community, Lewiston, Idaho. Preplanning an evacuation of our patients would take at least two months. Actual evacuation, at least 80 percent would be by ambulance, would have to take place over a seven to ten day period. Necessary medical records, medications, and clothing must also be transferred. Many of our patients are old, infirm, and senile. Resultant moves could create heart attacks, strokes and death. The same seven to ten day procedure would be necessary to bring our patients back. The government has offered reimbursement. How can one reimburse for the permanency of death? How much, in dollars and cents, is death worth? Most of our patients depend upon the Department of Environmental and Community Services for support. The ambulance services are not a covered service. Who will reimburse? Revenues will be lost, who will reimburse? Employees will lose wages, is the government going to reimburse their losses? Suppose my heating system fails while the town is desolate and all the pipes freeze, or suppose debris hitting my facility cause fire, who will put it out? What is to prevent anyone from breaking into any medical facility, business or private home? We are only 6,000 people affected by Washington, D.C., and shortsighted 'Leaders' who have not seen how their decisions affect the human element.'

"Fourth is the question of need. According to Pentagon statistics supplied to me, the United States has conducted a series of Minuteman missile tests hundreds of times from Vandenberg Air Force Base, in California, over the Pacific Ocean. The Air Force has publicly said that these missile firings were 'highly successful,' the missiles performing reliably 96 percent of the time. The added data that over-land firings would provide is minimal. Both the Pentagon and the Russians already know that the Minuteman II missile works.

"Fifth, Minuteman III, the next generation of inter-continental ballistic missiles, key to the country's strategic nuclear deterrent, is now in the process of deployment. Also, it is a fact that Minuteman IV is already in the planning stage. Many billions of dollars are being spent on these two nuclear weapons systems, and any data received from these tests of Minuteman II would quickly be obsolete.

"Finally, the people of Northern Idaho are opposed to the missile firings. In various ways these good citizens have expressed their view to their national, state, and local representatives and within their communities. In February, the City of Grangeville passed a resolution opposing any test firing and evacuation. I believe the people of Idaho are correct in opposing this test.

"I would like to add one more point here. Throughout this debate, whether a test or not, there is a subtle, but noticeable arrogance of attitude on the part of the Pentagon that areas of Montana, Idaho, and Oregon, over which these missiles would be fired, are not considered important because of low population, and that, therefore, the Air Force can experiment, drop debris, and even chance a misfiring. This kind of thinking is narrow-minded and unrealistic. Northern Idaho, as well as other affected areas, is just as important as any other part of the country. I see no justifiable reason why this test should take place anywhere within the continental

United States, period. I can find, then, no reason to support the Air Force's Operational Base Launch Program, and will vote against it in the Senate." (I.C.1, 2, & 3; III.G.1; IV; VI; VII; Appendix B.B.)

COL JORDAN: Thank you.

(Applause.)

COL JORDAN: Mr. Bruce Walker?

MR. WALKER: I will pass this time.

COL JORDAN: Mr. Ferguson?

MR. FERGUSON: I will decline. The answers have already been made.

COL JORDAN: Mr. Tacke?

MR. TACKE: I am Jack Tacke from Cottonwood, and it is apparent to me that if the same thing can be accomplished from bases like Vandenberg, that this just isn't the thing to do. I mean, there certainly is some risk, as I see it, from the illustrations you gave here and I, for that reason, would be opposed, if these things could be accomplished, if the tests could be made from bases like Vandenberg. As I understand this, it would be the first "over land" test of this kind, is that correct? (IV.A; IV.C)

COL JORDAN: That is correct.

TOM CAMPBELL: I have a question I would like to direct to the Major. I am Tom Campbell, Lewiston Morning Tribune. Where did this report about evacuating civilized communities come from, is that ever a part of your -- previous hearings, where did it come from?

MAJ VERDERY: I haven't the faintest idea, nor has anybody stated, to my knowledge, that any community of any size would be evacuated in this program. It has always been our intent to let the unpopulated nature of the impact zone drive the selection of the launch sites. If there was such public statement, it was either a misquote or a misunderstanding, of one or more spoksman, what they have said --

MR. CAMPBELL: In other words, that evacuation is confined, in which you had that 5.2 -- (I.B.3; I.C.2 & 3)

MAJ VERDERY: That's true.

COL JORDAN: Mr. Kurze?

MR. GERTONSON: Yes, I asked a question before about the Minuteman II.

COL JORDAN: Did you desire to make a statement?

MR. GERTONSON: Well, I might ask, the question I got concerning the Minuteman II missile. I asked if it was being phased out; the answer was, No, it was being phased in. If Senator Church is correct, in his understanding of the Minuteman III and Minuteman IV -- Minuteman III being put out and Minuteman IV on the planning board, is he incorrect? (Appendix B.B.

MAJ VERDERY: Minuteman III is currently completing its deployment phase at Francis E. Warren Air Force Base in Wyoming. I believe that is to be complete early this summer, and then the entire mix of missiles, the one thousand Minuteman Missiles will be 450 Minuteman II, and 550 Minuteman III weapons, and that mix, that structure of one thousand Minuteman missiles is programmed currently through many, many years in the defense budget.

MR. REED: I am Harold Reed again, and I would just like to read one paragraph in the local Tribune. It says: "One of the two drop areas is near the communities of Grangeville and White Bird. A Pentagon spokesman, last January told the Lewiston Morning Tribune, there is a possibility the two communities would be evacuated during the testing."

COL JORDAN: Major Verdery.

MAJ VERDERY: That is a definite misquote, or a misunderstanding on what the Pentagon spokesman said. There will be no evacuation of any community and never has been planned.

Unidentified Individual: I would like to ask a question.

COL JORDAN: Certainly.

Unidentified Individual: What comparison, you made a comparison of test firing, I don't recall where, but they landed at White

Sands, which were entirely over the Continental United States.

MAJ VERDERY: That's true.

Unidentified Individual: What comparison and size of missile, if you can give that, what comparison have you made to that type of testing as opposed to what you are proposing here?

MAJ VERDERY: It is a fairly close comparison. The Pershing is an Army missile. I can't state the exact size of it, but it is a sizeable, I believe it is termed intermediate range ballistic missile, under the Army's control, and they are fired from Blanding and Green River, Utah, across populated areas and they impact in the White Sands Missile Range. Personnel under the immediate path of these missiles, flying in space, if you will, are routinely paid per diem to evacuate for short period of time. And, as a matter of fact, I might point out that as routinely as they are paid, they also refuse to leave believing, and probably rightfully so, that they are taking a greater chance in driving on the highway in evacuating than they are taking in remaining in the flight path.

Unidentified Individual: One other question. Are these stage type rockets? (III.G.1)

MAJ VERDERY: Yes they are.

COL JORDAN: Do we have any other statements?

MR. WALKER: Bruce Walker from Grangeville. I have a question. Getting back to these ellipses, am I correct in assuming they are still on the drawing board, like you said?

MAJ VERDERY: Yes. That process is on-going right now, selecting of the specific launch sites.

MR. WALKER: My question is, how long will it be before these ellipses are definitely placed?

MAJ VERDERY: We hope by the end of next week.

MR. WALKER: And, is there any possibility that these would be published in any kind of --- (I.C.2; I.D.2)

MAJ VERDERY: Yes, they will be published; they will be part of the Final Environmental Statement as well as the final hazard analysis, which analyzes in detail, foot by foot, the hazards of all personnel, animals, structures along the flight path.

COL JORDAN: Yes sir?

MR. MITCHELL: I am Mike Mitchell from District 6. What prompted the Pentagon to determine that what had been going on at Vandenberg was not conclusive enough evidence of the success of the program that was going on to force them to in-land, and do the same kind of test firing that they had, either were not satisfied with or were satisfied with at Vandenberg?

MAJ VERDERY: Sir, I am not at liberty to comment on the Pentagon's viewpoint on the test. The Strategic Air Command has desired this sort of valid operational test of the weapons system since its inception, in 1963. Probably the statement I would best like to quote at this point would be the one made by our Chief of Staff of the Air Force, General Brown, when I believe it was in Oregon, he made this statement. He said that if he were a member of the standing public and he realized that there were some 8 billion dollars having been spent and invested in a weapons system, he would be standing up and demanding that it be tested, at this time.

MR. MITCHELL: I would just ask further then, one question still exists. Now you say it has been since the beginning that they felt that there should be a need for testing other than just at Vandenberg. One question has been brought up now; what hasn't been conclusively proven as successful that would want you to take it inland?

MAJ VERDERY: Well, simply the fact that we have never launched from an operational site, where these missiles are postured, some thousand of them, on a day-to-day alert, ready to be fired, if necessary. Those flights have never been tested.

MR. MITCHELL: Then, last but not least, does it mean that you feel, or that the Strategic Air Command feels, that each of the missile sites located throughout the United States, in order to be assured they are effective, must be test fired?

MAJ VERDERY: No, that is not the case. The configuration control is such that a valid sample taken from a site such as Malmstrom would be,a valid sample statistically, will prove out all of the Minuteman II launch facilities.

MR. MITCHELL: But Vandenberg would not? (IV)

MAJ VERDERY: That's right. Those facilities at Vandenberg are not operational facilities; they are configured strictly for testing.

Unidentified Individual: If the flight path has not yet been chosen, how can you state unequivocally that the missile will not go over White Bird and Grangeville areas?

MAJ VERDERY: I didn't make the statement that they would not go over; I said the sites would be selected such that those impact areas, the drop stage of the panels would not encompass any populated areas. But the missile may very well fly over an area, but as I pointed out, it would be well into space. Higher than the satellites, at the time it would go over your area.

Unidentified Individual: That has not been determined yet?

MAJ VERDERY: That is the case, but we are in the process of making those selections right now.

Unidentified Individual: One last question, if I may.

COL JORDAN: Certainly.

Unidentified Individual: What would be the cost; you said that the sites, the missile testing facilities at Vandenberg were for testing only and they were not, in truth, like the ones at Malmstrom and Ellsworth. What would be the estimated cost to the Federal Government to install a facility that would equal the one at Malmstrom?

MAJ VERDERY: I wouldn't even care to estimate the cost of building an operational Minuteman Wing of some 150 facilities, and all the associated electronic and communication equipment at Vandenberg. It would be astronomical.

Unidentified Individual: Has that possibility been explored at all, to your knowledge?

MAJ VERDERY: To my knowledge? I couldn't even guess on it.

Unidentified Individual: Thank you. (I. B. 5; IV. D)

COL JORDAN: Perhaps Colonel O'Connor could --

COL O'CONNOR: We are not allowed to build any more operational silos, according to SALT agreement. It prevents us from building any more operational silos.

Unidentified Individual: What is the difference between the missile base at Vandenberg and the one you are trying to fire from now?

MAJ VERDERY: Vandenberg is not a "missile base;" it is a test site and always has been such.

Unidentified Individual: But what is the difference between a test site and the real thing?

MAJ VERDERY: A test site does not have missiles postured in it to be fired; it can never be configured as such.

Unidentified Individual: But you couldn't put a missile in it?

MAJ VERDERY: The facilities differ with those of the operational base, simply because they must be used over and over again to test fire missiles.

Unidentified Individual: Are there safety factors involved at Vandenberg, that are not involved at Malmstrom? **(IV. A;IV. C; I. C)**

MAJ VERDERY: In answer to that, I would say that even more safety factors would be used in Malmstrom than we use at Vandenberg. The safety system designed for these operational base launches is much more sophisticated, much more accurate, better tested device than those that are used in the Vandenberg test missile.

COL JORDAN: Mr. Walker?

MR. WALKER: Assuming that the test facility at Vandenberg has all sorts of test equipment to evaluate what you are doing and you pull the trigger on one of these things, what would it cost to just kind of devaluate one of these, just cut a few wires and just reduce it to the state of firing the silo in Montana and use it then and acquire your data? **(IV. A;IV. E)**

MAJ VERDERY: It is not a matter of cutting a few wires; the silos were built from "scratch," if you will, at Vandenberg as test facilities, not as operational facilities.

Unidentified Individual: There seems to be a lot of concern about the difference between the test facility at Vandenberg and the operational launch site at Malmstrom. Now, am I correct in understanding that the difference then, is that when you are testing a missile at Vandenberg, you are not testing the operational launch facilities as such, you are testing the actual performance of a missile?

MAJ VERDERY: That is true.

Unidentified Individual: You are attempting to actually test the launch facility then, not necessarily the performance of the missile? Is that correct? Is that the basic difference?

MAJ VERDERY: That is essentially it. Of course, the principle gain in testing the operational site was the end-to-end complete test, as I stated, from the moment that the command control message is issued from Headquarters SAC all the way down to the Operational Wing at Malmstrom, through the actual total squadron environment of all the 150 missiles. All the electronics contained therein and the final lift-off signal, the turning of the key, the lift-off signal, and compare its flight over a land mass to a target area in the ocean. It is the total test concept that is important, not any one piece thereof.

Unidentified Individual: Could you say an analogy would be to the engine out of my Mercury and put it on a test stand to see how it performs, as opposed to getting into my Mercury and driving down the highway? (I. A. 1,3, & 4; IV)

MAJ VERDERY: That is a fair analysis.

COL JORDAN: Does anybody else desire to make a statement or ask a question?

MR. HONNEY: Jam Honney from Lewiston. Are you drawing different options from firing at Malmstrom, how wide an area are you limited to? (I. B. 3; I. D. 1)

MAJ VERDERY: All the launch facilities are possibly being considered. The area is probably well over 100 miles in width, a total possibilities of flight tests.

COL JORDAN: Mr. Walker?

MR. WALKER: Following this analysis of the Mercury and one thing and another, I would like to understand now, if you have developed cartridge but you don't know if the rifle works?

MAJ VERDERY: That is a fair analogy too, the only thing about analogies is that you wind up defending the analogy.

MR. WALKER: I assume you keep those top secret then?

(Laughter.)

MAJ VERDERY: Those kind of analogies have been used before, like a hunter who hand loads his ammunition but never fires the gun he is going to use when he goes hunting, you can make an analogy like that too. As I said, you generally wind up defending the analogy, rather than the point you are trying to make.

Unidentified Individual: Maybe in the Pentagon, not in Idaho.

COL JORDAN: Sir?

Unidentified Individual: Just gathering from things that have been said, I think the main concern is evacuation and endangering people's lives. We get a firm statement of what a populated area is and at the most, how many people would have to be evacuated from the area. **(I.C; II.A.7; II.B.6)**

MAJ VERDERY: A populated area being any confinable place with a name on it. And, as I said before, it is our intent not to require evacuation of any areas, much less a populated entity such as Grangeville or White Bird, or any small crossroad community which may not even have anything, and it is our intent to lay these impact areas down to such, that no evacuation is required.

Unidentified Individual: So, in other words, anything -- let's say, take a number out of 50 in an area of over 50 would not be evacuated?

MAJ VERDERY: Absolutely not.

COL JORDAN: I believe a gentleman in the back has a question.

Unidentified Individual: Well, considering that there doesn't seem to be anyone from the Pentagon that is sure enough of this system to accept it without further testing, is there anyone that seriously thinks that anyone in the Federal Government would alter their foreign policy on the chance that this system will work?

MAJ VERDERY: We are not at liberty to comment on the effects of this program to foreign policy.

Unidentified Individual: The second part of my question, is that if there would be no effect on a foreign power, or foreign policy, that this small chance that the system might work, is it really making a difference, whether it works or not, if it is never used for its intended purpose? (Appendix B.B.

COL JORDAN: Again, the purpose of these hearings is to receive public comments on the Draft Environmental Impact Statement. And that is really what we should focus our attention on, the environmental effects of the OBL, that is, the operation GIANT PATRIOT program and the adequacy with which the effects have been dealt with in this Environmental Statement. Are there any other questions?

Unidentified Individual: Well, it just seems -- a final comment that it just seems to me that any question has its context and the context of the questions considered seriously is my point.

COL JORDAN: Well, we do try to answer your questions, factual questions. But there are some questions that are beyond the scope of our ken and our authority. Are there any other questions or statements? Mr. Walker?

MR. WALKER: One question occurred to me in watching these slides here, and a comment. Now, granted the slide didn't apply to any place, it was just a kind of theoretical slide on where these things are going to be falling, but there was an environmental statement, I believe, there was something about some roads that were going to be put in and this type of thing, into an area say 90 miles down range where you are going to have some radar units monitoring the flight of this thing, so that instantly people are going to know when it is going to go off course, destroy that dude and get it out of the way; that's a primative area. I am wondering just how you are going to go about building roads in primative areas? (III. A)

MAJ VERDERY: The radar site is, in fact, tentatively being selected at the Helena, Montana, airport, off to the south of the airport. It is 90 miles down-range from Great Falls.

Unidentified Individual: I want to make a statement for the record.

COL JORDAN: Please do.

Unidentified Individual: Can I make it from here?

COL JORDAN: Well, I would prefer if you come to the podium please, it makes it easier on our reporter.

MR. INGRAM: My name is Gary Ingram, Representative from District 2. Before making a statement, I did want to have the panel yield to a few questions to satisfy myself that the position I felt, that is the correct one, and I do want to say this. I think the program, as outlined, indicates that all reasonable and prudent measures have been taken to assure the safety of the people that are going to be in the flight path of this missile. I think it is far more pertinent to ask, when you are talking about evacuations, as to if this missile, or any missile,that is fired from a center or site were not to be successful in this firing and it was under an actual attack situation, that how many people would have to be evacuated from the Malmstrom Air Force Base area and perhaps hundreds of miles around, if an incoming missile were targeted to that site. Perhaps the type of evacuation would be far more significant, we are probably talking about the entire western United States. We are talking about a defense system that our very national survival depends upon. And, it seems to me that the intentions of the Air Force in testing these operational launch facilities is entirely responsible and long over due. I am satisfied from the information I have received from this hearing tonight, that all reasonable and prudent measures are being taken to assure the safety of the people involved, and I would urge the people to get on with it as quickly as you can, don't waste too much of the taxpayer's money, taking a lot of time and frivolous testimony such as we have heard tonight from a previous prepared statement. When we start talking about people's plumbing breaking as part of the testimony, concerning something as vital as this to national security, I think we are really getting off the deep end. So, I want to go on record as urging the full support and my best wishes and encouragement to you people in your efforts. Thank you.

COL JORDAN: I may state that if anyone desires to submit a written statement, just mail it to me at Headquarters SAC, Offutt Air Force Base, Nebraska, 68113. Again, I am Colonel Jordan, Headquarters SAC, Offutt Air Force Base, Nebraska. And, your statements will be included, if received within the week, as Mrs. Morgan will have to take that much time to transcribe the record. And we will include your written statements in the record, if they are received by that time. If there are no other statements, thank you very, very much. It has been a most gratifying evening. The hearing is adjourned.

/////////////////////////LEWISTON, IDAHO////////////////////

Attached is a statement of Senator Frank Church, 9 April 1974.

STATEMENT OF SENATOR FRANK CHURCH

APRIL 9, 1974

LEWISTON, IDAHO

IN OPPOSITION TO "OPERATION GIANT PATRIOT"

After studying the Nixon Administration's plan to fire four intercontinential ballistic missles across Northern Idaho next winter, I am convinced that the tests are a complete waste of the taxpayers' money.

I have been briefed by Air Force officials; I have pressed my formal objections to the Secretary of Defense, along with Western Senators Mansfield, Metcalf, and Hatfield, regarding the planned tests of the Minuteman II missiles. When the issue comes before the Senate, I will vote in opposition to the requested $27 million for this project.

My opposition is based on several major factors:

First, the project is an extravagance. The Pentagon might consider the $27 million to be "pocket change" in light of its gigantic budget, but it is nevertheless a large expenditure.

Second, there is the possible hazard to human beings, animal life, natural resources, and historical sites which inevitably results when tons of missile debris are dropped on Idaho, despite the best efforts of the Air Force to minimize the danger.

Third, there have been reports that people may be forced to evacuate their homes, farms, and businesses during the test firings. Numerous messages to me indicate the distress that the overflight and any such evacuation would cause the area's inhabitants. For instance, the Administrator of Parkhill Manor, a medical facility in Grangeville, has written me expressing deep concern that such evacuation would bring on "despair, insecurity, and in some cases the death of our patients we protect and care for." The letter goes on:

> "To evacuate a hospital or nursing home for a 24-hour period is not as simple as the government states. We are located 75 miles from the closest large community -- Lewiston, Idaho. Preplanning of evacuation of our patients would take at least two months. Actual evacuation (at least 80% of which would be by ambulance) would have to take place over a 7 to 10 day period. Necessary medical records, medications, and clothing must also be transferred. Many of our patients are old, infirm, and senile. Resultant moves could create heart attacks, strokes, and death.
>
> The same 7 to 10 day procedure would be necessary to bring our patients back.
>
> The government has offered 'reimbursement.' How can one reimburse for the permanency of death? How much, in dollars and cents, is death worth? Most of our patients depend upon the Department of Environmental and Community Services for support. The ambulance services are not a covered service. Who will reimburse? Revenues will be lost -- who will reimburse? Employees will lose wages -- is the government going to reimburse their losses?
>
> Suppose my heating system fails while the town is desolate and all the pipes freeze, or suppose debris hitting my facility cause fire -- who will put it out? What is to prevent anyone from breaking into any medical facility, business or private home?
>
> We are only 6,000 people affected by Washington, D.C. and shortsighted "leaders" who have not seen how their decisions affect the human element."

Fourth is the question of need. According to Pentagon statistics supplied to me, the United States has conducted a series of Minuteman missile tests hundreds of times from

Vandenburg Air Force Base in California over the Pacific Ocean. The Air Force has publicly said that these missile firings were "highly successful," the missiles performing reliably 96 percent of the time. The added data that overland firings would provide is minimal. Both the Pentagon and the Russians already know that the Minuteman II missile works!

Fifth, Minuteman III, the next generation of intercontinental ballistic missiles, key to the country's strategic nuclear deterrent, is now in the process of deployment. Also, it is a fact that Minuteman IV is already in the planning stage. Many billions of dollars are being spent on these two nuclear weapons systems, and any data received from these tests of Minuteman II would quickly be obsolete.

Finally, the people of Northern Idaho are opposed to the missle firings. In various ways these good citizens have expressed their view to their national, state, and local representatives and within their communities. In February, the City of Grangeville passed a resolution opposing any test firing and evacuation. I believe the people of Idaho are correct in opposing this test.

I would like to add one more point here. Throughout this debate whether to test or not, there is a subtle, but noticeable, arrogance of attitude on the part of the Pentagon that areas of Montana, Idaho, and Oregon, over which these missles would be fired, are not considered important because of low population, and that, therefore, the Air Force can experiment, drop debris, and even chance a misfiring. This kind of thinking is narrow-minded and unrealistic. Northern Idaho -- as well as other affected areas -- is just as important as any other part of the country. I see no justifiable reason why this test should take place anywhere within the continential United States -- period.

I can find, then, no reason to support the Air Force's operational base launch program, and will vote against it in the Senate.

(I.C. 1, 2, & 3; I.D.; III. G. 1; IV; VI; VII; Appendix B. B.

6. Transcript of the Grangeville, Idaho Hearing

This section contains a transcript of the Grangeville, Idaho public hearing. Response to the comments are provided via section and paragraph references as explained above.

PUBLIC HEARINGS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON GIANT PATRIOT

GRANGEVILLE, IDAHO - 10 April 1974

COL JORDAN: Good evening, Ladies and Gentlemen. It is indeed a pleasure to be here tonight in your beautiful State of Idaho, and I wish to take this opportunity to thank Mayor Bos, members of the City Council, and the citizens of Grangeville for the hospitality extended to us here tonight. This is our fifth public hearing. We have had hearings in Helena, Montana; Boise, Idaho; Salem, Oregon; and last night we had a hearing at Lewiston.

Our purpose in being here is to receive public comments on the Draft Environmental Impact Statement, your comments, your views, your reactions to the Draft Environmental Impact Statement. This is the Draft Environmental Impact Statement that was prepared on Project GIANT PATRIOT. This is the Strategic Air Command's Project for the Operational Base Launch of the missile from Malmstrom Air Force Base. What we plan to do this evening, is to first give you a description of the project. We have a panel of experts here and I will Introduce them to you now. Colonel O'Connor ---

COL O'CONNOR: Good evening.

COL JORDAN: Major Verdery.

MAJ VERDERY: Good evening.

COL JORDAN: Captain Needham.

CAPT NEEDHAM: Good evening.

COL JORDAN: I have already introduced Colonel Day to you, and our reporter is Mrs. Morgan. Major Verdery will, as I indicated, describe the Operational Base Launch Program. This really is the first part of a seven part Environmental Impact Statement. Then, Captain Needham will give you the rest of the statement, the other six parts, a summary of the environmental aspects of Operational Base Launch. So, we are here to receive your comments on the environmental effects of Operational Base Launch, and also the adequacy with which these effects have been dealt with in the Draft Environmental Impact Statement.

We will record your statements as Mrs. Morgan is doing right now. A transcript will be made and then your comments will be addressed in the preparation of the final Environmental Impact Statement.

My role here is that of an impartial Judge Advocate officer. I am here to see that you all have an opportunity to voice your opinions. I am not a hearing examiner, I make no recommendations. I did not particiapte in the development of this program nor will I be asked to make any decisions with respect to whether the program should go on, be modified, or be abandoned.

To assist me in that role, I would like to recommend that you limit your statements to approximately ten minutes, so that all of you will have an opportunity -- all of you who desire to make a statement, will have an opportunity to do so. Now, if you desire to make a longer statement, you may want to do it in writing and then you can send it to me at my office at Offutt Air Force Base, Nebraska. And those statements will then be included as part of this hearing. Without any further ado, I will now turn the next portion of the meeting over to Major Verdery.

MAJ VERDERY: Mayor Bos, members of the City Council, citizens of Grangeville. I would like to express my appreciation and add it to that already expressed by Colonel Jordan for your hospitality that you have shown us, not only here in Grangeville, but people in Lewiston and the folks in the rest of Idaho, where we have held these public hearings prior to this time. The purpose of this portion of the presentation, as Colonel Jordan said, is to describe to you the aspects of the operation called GIANT PATRIOT. Now, in describing this program, in describing the operational aspects of the program, I will cover first the reasons and some of the background behind the conduct of the Operational Base Launch. I will describe the current Minuteman testing concept, that is how we test the Minuteman missiles from Vandenberg Air Force Base today, and the purpose of that description is for you to compare and contrast that testing to that which we will do from the operational base in Montana. I will then describe some of the previous activity in Operational Base Launches, describe the GIANT PATRIOT concept, and finally, in great detail, outline the safety criteria which we are applying to the selection of the launch sites at Malmstrom and the time of day and time of year when we plan to conduct these launches.

Now, obviously there is a demonstrative nature attached to these tests. Besides the desire to conduct the tests for technical reasons, the Minuteman weapons system, the Minuteman missile affords us the largest portion of our strategic deterrent force. It is the largest number of alert weapons making up the triad. The triad is the three-pronged defender of our nation made up of first, the land-based ICBM force, the Minuteman; the strategic bombers of the Strategic Air Command; and the third part of the triad, of course, is the Navy sea launched ballistic missiles, the Polaris and Poseidon. But, Minuteman is the bulk of the deterrent force.

Now the Soviet Union has long recognized that land-based missiles are very important as a strategic deterrent. This is evidenced by their vigorous research and development into land-based missiles. They have, in fact, fired over 100 of their missiles from operational sites within the Soviet Union to targets in the Pacific area, demonstrating without a doubt their capability of their systems.

Now, besides being a valuable demonstration of our strategic deterrent, there are several technical aspects of the program which we in Strategic Air Command hope to satisfy by the conduct of these tests. The first of these technical test objectives is that of, for the first time being able to demonstrate the complete end-to-end test of the Minuteman system. Always before now, we have been forced to take our missiles to a test site at Vandenberg Air Force Base, to fire them, and I will discuss that a little later. But, now we will be afforded an opportunity to conduct a complete end-to-end test. That is from the time the launch message is transmitted by Hq Strategic Air Command over the communications system, the operational system, to the Minuteman Wing at Malmstrom down to the missile combat crew in its launch capsule where they reside on 24-hour alert duty, to the turning of their launch keys, the electrical transmission of their launch message out to the missile; the missile's ignition in the silo, its lift-off from the operational silo, just as it would if we had to fire it in anger someday. The test of that operational facility, with the missile lifting out of it, flying across a continental land mass, and then to the test impact point in the Pacific Ocean.

A second technical test object besides the end-to-end test, is that for the first time, we will be allowed to validate the gravitational and geodetic effects of flying over a continental land mass. Always prior to this time, we have been forced to test missiles over the largely homogenous area of the ocean, the Pacific Ocean. Now, we have had to extrapolate the effects of gravity and geodetic constants caused by flying over land masses and put these into our targeting programs, which target the missiles to their wartime targets. Now, for the first time, we will be able to validate those effects. And, finally, we will be able to gain valuable reliability data on the missile and its environment after it has been sitting on strategic alert, for a number of years without disturbing it.

Now, this slide is simply to show you where the Minuteman missiles are deployed today, and begin to lead into why we chose Malmstrom Air Force Base in Montana as the test base. We are conducting the tests with Minuteman II missiles. Minuteman II missiles are located at Malmstrom Air Force Base, near Great Falls, Montana; Ellsworth Air Force Base, near Rapid City, South Dakota; and Whiteman Air Force Base, near Knob Noster, Missouri. The Minuteman II weapons system is not an outmoded weapons system as some have said or claimed in the media. Now, this has been a common misconception. The Minuteman II missiles were just completed in their deployment last summer 1973, at Ellsworth Air Force Base, and the Minuteman III weapons system has been deployed at Francis E. Warren, Grand Forks, and Minot Air Force Bases. And, for the foreseeable future, the Defense Department plans are to have the Minuteman force of one thousand missiles made of up to 450 Minuteman II missiles located at these three bases, and 550 Minuteman III missiles located at these three bases. Therefore, of the three bases available for firing of Minuteman II missiles, Malmstrom was the base which was chosen. The reason for which I will go into a little later.

Now the purpose of this slide is to give you some feel for what the Minuteman weapons systems is like in its deployed state in the field, at an operational Minuteman Wing. The Minuteman is a solid fuel, intercontinental ballistic missile, approximately 55 feet long, consisting of three stages. The first stage, a second stage, a third stage, a guidance system, and its re-entry vehicle on the very top which contains the nuclear warhead. Now, the way these facilities are deployed at a wing like Malmstrom Air Force Base, is a squadron. A squadron consists, first of all, of launch control facilities which consists of an above-ground building connected by an elevator shaft to an underground capsule. It is in this capsule that the missile combat crew resides on 24-hour alert duty, seven days a week, 365 days a year. These missile combat crews control the missiles from electronics consoles in these capsules underground. Surrounding each one of these launch control facilities, are ten missile launch facilities. This is an underground facility which houses the missile and its support equipment. One control facility is surrounded by ten missile facilities and that comprises a missile flight. One control facility and ten missiles, that is a flight of missiles. Five of these flights, shown here in different colors, are inter-connected together to make a squadron of 50 missiles. Any one of the control facilities with the combat crew in it can control and monitor all of the 50 missiles. In Montana, Great Falls, Malmstrom Air Force Base, four of these squadrons are co-located for a total of 200 Minuteman missiles.

Now, the way we currently test the Minuteman missiles at Vandenberg , and have for approximately the last eleven years, since early 1963, is to take a missile out of its operational environment at its base, like Malmstrom, shown here, we also do this from the other five Minuteman Wings, we will take that missile, it is selected at random by the Commander in Chief of the Strategic Air Command, that missile was taken from its launch facility, the nuclear weapon removed, and the missile is shipped out to Vandenberg Air Force Base. At the same time the missile is shipped out to Vandenberg, a team called a Task Force of people from Malmstrom, in this case, of maintenance technicians and missile combat crews, travels to Vandenberg. Once there, they install that missile in a test launch facility. Facilities built specifically for testing missiles at Vandenberg. Once the missile is brought to alert with a destruct package and a telemetry system installed on it in place of the nuclear warhead, the missile combat crew will then, upon receipt of a message from Headquarters SAC directing them to launch the missile, will launch down the Western Test Range to a target in the Southwestern Pacific.

Now, during the missile's flight, it is monitored closely by sensors. And, when I say sensor, what I mean is a radar or telemetry receiver or optical system like a recording telescope; it is monitored by these sensors in the up-range, in the mid-course by both ships and aircraft with sensors mounted on them, and in the terminal area. The purpose of the monitoring of this missile in flight is twofold. First, it is monitored for range safety purposes. That is, to determine if the missile is indeed traveling along its appointed trajectory and not deviating from it, for range safety controls at all time, the ability to destruct the missile in flight should it err from its appointed trajectory. The second reason for monitoring the missile during flight, is for post-flight data analysis. That is the whole reason for conducting the test, is to determine how the missile performs in flight. So, that is the way we currently conduct tests from Vandenberg. These facilities, Vandenberg Air Force Base, is not an operational Minuteman base, it is a test base built specifically to test missiles by flying them over the ocean.

Now the Operational Base Testing concept calls for the missile to remain in the silo, and this is the most critical of the concepts associated with the Operational Base Launch. The missile, as it sits in its silo today, will remain there with its physical and electrical environment undisturbed. We will not have to pull it out; we will not have to take it off alert and ship it some two thousand miles to California; we will not have to put it in a test silo not resembling exactly its operational environment. We will leave it in its silo at Malmstrom; we will remove the nuclear warhead and replace that warhead with a re-entry vehicle containing a tracking and destruct mechanism, which allows us to track the missile in flight and destroy it if necessary. Then, once that action takes place, again a message will be transmitted from Strategic Air Command Hqs, to the missile combat crew at Malmstrom; they will exercise the exact same keys they would turn if directed to go to war someday if necessary;they would exercise those same keys to launch the missile, using the same electronics and same silos, launch that missile down to the Pacific target area.

There has been a great deal of previous activity in the Operational Base Launch deal; this is not something that we in the Air Force have all of a sudden decided to do in 1974. The history of Operational Base Launches go all the way back to 1963. It has always been our desire to test our weapons, specifically missiles, from the operation environment in which they are postured in readiness for war. That is the ideal way to test any system. That is the ideal way to test an automobile; it is the ideal way to test a gun; it is an ideal way to test anything that you wish to have confidence in, to test it as you would use it. Back in 1963, and early in the mid-sixties, we did not have the technical capability to design a range safety system that would give us the confidence that we could conduct full range tests from a base like Malmstrom, with all due regard for public safety, so we never have attempted it, back in the early days. We did do some limited range flight tests and some ground tests at the Minuteman Wings, and these involved specially modified missiles with just seven seconds of propellant loaded in the first stage, and they were capable of less than one mile of flight. The remaining two stages were simply inert bulk. They were loaded with concrete. These tests proved that we could, indeed, gain valuable data from the firing in operational bases, and also that we could conduct these kinds of tests with a great deal of safety.

In 1970, the state of technical arts had advanced to a point where we could, indeed, design suitable safety systems to do full range launches. At that time, a proposal was sent to Congress for us to conduct such launches and a request for money was made to Congress. In a joint session of the House-Senate Appropriations Committee in 1970, the monies were appropriated, some 22 million dollars, were appropriated to develop the safety system; however, the money to actually conduct the tests was withheld, with a statement read into the Congressional Record by this joint session of the Appropriation Committees, that if, in the future, after the development was completed of the safety system, that the Air Force felt that such firings were still desired and required, that a future fiscal request, a budget request would be considered in a future fiscal year. Now that decision has been made and in 1973, such a proposal was sent back to Congress, and public announcement was made of our intent to conduct such a program back on December 28, 1973. So, that is the history of how this program has come over the last ten years.

The GIANT PATRIOT concept calls for us to launch a total of eight missiles, four in the winter of 1974-75, and four in the following winter. The inital four launch test sequence next winter will call for us to test two squadrons at Malmstrom Air Force Base. We will posture the first squadron with the missiles with their safety devices on them, and we will launch two missiles. Then, we will reload those silos, return them to their normal alert configurations, move over to posture the second squadron, and launch two more missiles. The time between the first sequence of launches and the second sequence of launches will be approximately eight weeks. This is simply for comparison of the missiles that we fly from Vandenberg versus what we will fly from the operational base.

The missile on the left, you see, is the Minuteman II as an operational missile. But when we ship the missile out to Vandenberg for a test firing, we must disturb its operational characteristics. Not only by shipping it to Vandenberg, but also by removing this raceway, the length of the missile has a raceway which covers the control systems leading from the guidance system down to each of the three stages which control it in flight. At Vandenberg, that raceway cover is removed and beneath it is placed a destruct system consisting of a linear shaped charge. Also beneath it is an instrumentation cable which carries performance parameters of each stage to a telemetry device to be telemetered back to the ground stations during flight, so we can monitor the progress and how the missile reacted during flight.

Now for the Operational Base Program. As I said, we had to wait for the capability to develop a true operational safety system, so what we did finally here is develop a safety system which took all of this material here, shown in red, and concentrate it right up here where the nuclear warhead would normally be. And it looks like this, this is the re-entry vehicle on the front of the missile which normally contains the nuclear warhead. Instead of a nuclear warhead, we designed into it a tracking and command system, which allows the missile to be tracked by radars during flight and also receive a command destruct signal if it should err from its appointed path. Now, the command destruct signal causes two charges to fire which, in turn, impinge on the dome of the third stage causing it to literally explode like dynamite. And this completely obliterates the missile in the air, should the necessity arise. That is how the destruct system works. It was intentionally designed to completely blow up the missile in the air and not allow any burning propellant to reach the ground. It is entirely consumed before it reaches the ground.

Now, if you recall in the description of the Vandenberg tests, we had sensors in the up-range and mid-course and the terminal area to monitor the missile's progress for both safety and data analysis. No sensors exist at operational bases so we had to design a system called a Mobile Range Safety System. This system simply combines, condenses, and makes mobile all of those kind of sensors which exist as fixed installations at Vandenberg. It consists of a sky-screen device, which is an optical monitoring device which a range safety officer uses to monitor the early flight of the missile, from the time it lifts out of its silo to about 40,000 feet in altitude. He monitors it and I will talk a little more about that optical sky-screen later in the briefing. Also, a monitoring control system in tracking radars was designed to track the missile after it leaves this area of early launch phase, to track that missile and feed data to a range safety system, and it monitors the missile's progress all the way from its launch point up to the time that it is well over the Pacific Ocean.

This is the mobile range safety system. It will be deployed approximately 50 to 90 miles away from Great Falls, Montana. One of the tentative sites is at Helena, Montana, as a matter of fact. So, this is the mobile range safety system. Now, this is probably the most critical part of the briefing, the one that you will be the most interested in, and this addresses the aspects of safety which we feel are the most rigorous we have ever applied to any test launch program. Safety was paramount in the selection of Malmstrom as a launch site, and continues to be paramount in the selection of the specific launch facility that we will launch from. We consider the minimum population density being a driving consideration, and also having it fly over the minimum amount of land between the time it takes off and the time it exits over the Pacific Ocean.

We also wanted to gain maximum benefits from the test, test both the ground systems up at Malmstrom, that is two different squadrons, and gain tracking data for analysis. This led us to select two squadrons at Malmstrom, the Twelfth Strategic Missile Squadron and the 564th Strategic Missile Squadron at Malmstrom Air Force Base; and here you see the approximate flight path the missile will take to its impact point in Canton Island in the South Pacific. Now, the simple reason that we chose Malmstrom Air Force Base and not Ellsworth or Whiteman is that Malmstrom obviously is the closest to the Pacific Ocean and affords the minimum of land over-flight, as opposed to flying from South Dakota or Missouri.

Now the way we will go about picking the specific launch facility, I will discuss right after this slide. But, in order to talk about this, I must first explain to you how a missile flies when it takes off, is launched from its silo to its target point in the Pacific. The missile lifts off and flies to a height almost straight up from the facility, to a height of 25 miles in the air. At that point, the first stage has burned out; it has burned all the propellant in the first stage and the first stage falls away from the rest of the missile. That empty first stage, which is about 28 feet long and about 54 inches in diameter and weighs something over 4,000 pounds, falls away from the missile and falls a ballistic trajectory and impacts the earth about 200 miles, some 198 to 200 statute miles from the launch point.

Also falling away from the missile shortly after that first stage are four inter-stage panels. These four panels are about three by three and one-half to four feet and weigh about 60 to 65 pounds each. These four panels fall away and they come down some 50 miles further down-range or about 250 miles from the launch point. The missile then flies on with the second stage burning to a point about 102 seconds in flight, and that point is called the "CONUS clear point;" that's the point the missile debris will clear the United States Coast, way out here, some 800 miles away. Sufficient velocity has been gained by the missile since -- no matter what happens to it after that point, even if we had to destroy it, all the debris will fall in the Pacific Ocean.

Shortly after that point, after 102 seconds, the second stage burns out and it falls away as an empty shell, but it falls in the ocean; it does not contact the Continental U.S. land-mass. It falls about 600 miles off the coast. The third stage ignites and burns to this point about which time the missile is over 165 miles high. It burns out and the third stage and the re-entry vehicle with the test equipment in the re-entry vehicle fly to its target point down in the South Pacific.

Now, of special interest to you here, are these inter-stage panels and where the missile is when it flies over northern Idaho. Northern Idaho is located approximately at this point on the map; that's about 200 to 280 miles from the launch point. At that point, the missile is well over a hundred miles in the air. I shouldn't really say air, because it is in space. It is higher than most satellites that fly overhead every day. In fact, by the time it exists the Continental U.S. it is higher than the Skylab satellite. So, it won't even be visible by the time it passes over Idaho.

Also of interest to you are the places where these pieces impact the face of the earth, because there is no doubt that they will impact in northern Idaho. Let me show you how we are insuring that these pieces do not pose a danger to anyone. If you look at this flight of the missile from the top looking down on it, you see a launch facility up here in Montana, somewhere, and the missile flies along and it drops these objects off, the first stage and the inter-stage panels. When anything falls through the atmosphere, it is affected by winds. We can't predict exactly the point it is going to land. It is going to be affected by such things as where the missile is exactly in its flight when the piece falls away, its going to be affected by the winds that will blow it as it falls through the atmosphere. It will be affected by the atmospheric density and many other factors must be considered.

So, the process we are going through right now, this week and next week, a team is up at Malmstrom Air Force Base making the site selections, which launch facilities we will launch from. The thing that is driving their selection is where these pieces will land. In order to be certain that we avoid populated areas like Grangeville, we build an oblong circle, called an ellipse, around the impact point of each one of these objects. What makes these ellipses large and not just a very small point where the object will impact, are the winds and other things which affect this fall. We take into account the worst possible, that is, the highest possible winds that could possibly affect that thing as it falls. The worst possible winds from the south, the worst that could be blowing from the north at that time, the east, the west, the worst possible or least possible atmospheric density, all of these things make us draw a large ellipse. With all certainty we know in the worst case, all the debris will fall in that ellipse. The ellipse for the first stage impact area is 26 by 12 miles, that is 26 miles long at its major axis and 12 miles wide on its minor axis. The ellipse for the inter-stage panels is 19 miles long and 8 miles wide. Now this, remember, is taking into account the worst possible case that could affect the pieces as they fall.

On launch day, we will know what the winds are, we will know what the atmospheric density is, we will know exactly where the missile flight is taking place when it drops these panels, and these ellipses will grow much smaller. So these -- remember, the size of these is the worst possible case. This is what we have to operate from right now, in selecting these launch sites. What we do is lay these ellipses out on a map and use photo-reconnaissance data from high altitude aircraft photographs that were done over this area last year, and during the winter again this year, and we looked for the areas here in Northern Idaho which do not contain population, do not contain cities such as Grangeville, do not contain schools, churches, any other population areas, and we lay these out on a map and work backwards to find a launch site which will land these ellipses in an unpopulated area. That is what we call the minimum risk process for selecting the launch sites. And, that is going on for the next two weeks up in Montana.

This is the way we conduct the range safety control of the missile as it flies. As you recall, I talked about these sky-screen devices that monitor the missile during its early phases of flight. This monitoring is done visually by two range safety officers. Please remember that the people associated with the range safety aspects are the same highly qualified people who have been doing this sort of business at Vandenberg for over 15 years. They are the best qualified people in the Air Force to conduct this sort of range safety operation. These people will be manning two of these sky-screen devices, one behind the trajectory, looking down, and one beside it looking at the trajectory from the side. They will look through a glass plate on which is prescribed a pre-computed trajectory and they will compare the actual missile as it flies to the pre-computed trajectory, and if it should err from this early phase of flight, which is a critical phase, they will tell the range safety officer to send the command destruct signal. This phase from lift-off to the completion of the maneuver, that is at 8 seconds of flight, is the most critical that the missile goes through in its entire flight. That is because it lifts off straight up, begins a maneuver called "pitch," and it pitches over toward the target, from here to here, it completes its maneuver, straightens out and then flies to a specific target area.

So, it is during this early phase of flight that is most critical, that data from Vandenberg shows us that if it is going to fail, it will most probably fail right in here. It is because of this and because of the experience gained at Vandenberg that we will evacuate an area right around the launch facility. Two reasons: Number one, it is the most critical flight; number two, if we have to destroy it, the debris is dense enough and there will probably be some danger of burning propellant reaching the ground right around the launch facility, so we consider it prudent to evacuate a small number of families residing in an area of about one and a half or two miles around the launch facility to a little over five miles down-range from the facility. This is about right here in its flight. It is picked up and monitored by mobile range safety officers and they will begin to track it, and they will track it until it leaves the coast of the United States.

All the time it is over western Montana, Idaho, and Oregon, radars will be tracking the missiles and there are two of them to guard against the failure of one. They feed data into a device called an Instantaneous Impact Predictor, located in one of these vans at the radar site. What this Instantaneous Impact Predictor does is, from the radar data which tells exactly where the missile is in the air, they feed data to a computer and in turn to a plot board called an Instantaneous Impact Predictor. What this does to the range safety officer sitting in this van here, is it tells him right at the given instant that if he blew up that missile in the air, there shown for him on this plot board is where the debris would land on the ground. It does this for him in real time, that is, exactly now if he blew it up he would know exactly where the debris would land. This gives him the ability to do what we call "selective destruct." That is, as the missile flies, and should err from its path, he has the ability to destroy it when the debris would pose no danger to any populated area. That is, if the missile were approaching a population center, like Missoula, Montana, or any other population center, he would have the ability to destroy it before the debris would reach there, or allow it to progress beyond that point and destroy it after the debris would pass beyond the population center. That is what we call "selective destruct." This completes the description of the range safety.

And, in summary, we have the need, we feel, to conduct this program because the test facilities do not, at Vandenberg, do not operationally -- they are not identical to the operational facilities up at the operational base. We feel that there is an extremely urgent need to conduct these tests, not only for their deterrent demonstration value, but also for the test objectives I have previously outlined. We have developed the capability over the past ten years to complement the Minuteman as a safe, reliable weapons system, and we have developed the people and the procedures and equipment over the past four years, since 1970, to conduct these tests in the safest manner possible. I thank you for your attention.

COL JORDAN: Thank you very much, Major Verdery. Now, as I stated previously, Captain Needham will give you the second portion of the Environmental Impact Statement. What Major Verdery gave you is actually the first part of the Draft Environmental Impact Statement; there are six other parts and Captain Needham will give you a summary or synopsis of that.

However, perhaps it might be advisable at this time, to take some questions. You might wish some aspects of the briefing that Major Verdery gave you clarified. We will try to answer any specific questions, factual questions you may have. I would request that if you have a question, to please identify yourself, give your address if you care to and any affiliation or group that you may represent. Again, these should be questions on the first portion of the Draft Environmental Impact Statement.

We will then get into our main purpose of our meeting here, which is, of course, the environmental effects of the OBL and that will be followed by your statements, after Captain Needham gives his briefing. But at this time, I want to give you the opportunity to ask any questions you may ha to clarify certain portions of this briefing. I unde nd there have been some misunderstandings, misconception bout the effect this program might have on your community. I trust those concerns have been allayed by this briefing. We will entertain any questions at this time. Yes Sir?

MR. WETHERELL: I am Mike Wetherell, Senator Church's representative. I am from Moscow, Idaho. I would like to have you point out, as clearly as you could, as clearly as you did last night at the hearing in Lewiston, the question of evacuation. I think that is one thing that has a great many people in Grangeville confused. (I.C.2 & 3; II.A.7)

MAJ VERDERY: Yes, it is very unfortunate that somewhere back in January, somehow, somebody was either misquoted or misinterpreted to the effect that possibly Grangeville or White Bird would be evacuated. That absolutely never was, and never will be the case. As I tried to point out in the briefing, one of the primary criteria in selecting the launch site in Montana, is that of not having to evacuate anyone, anywhere. We will most definitely not lay any of these ellipses on any populated center, especially a population center which contain a school, a nursing home, or anything of that nature. It is our full intent not to require evacuation of even the remotest ranch house or farm house. That is our intent. I hope that tonight will settle that issue once and for all, there is no, and never has been, any attempt to evacuate Grangeville.

COL JORDAN: Yes Sir?

MR. HECKMAN: Don Heckman from White Bird. Could you relate to us about where these 60 pound articles may fall in relation to White Bird and Grangeville, in area miles? (I.B.1)

MAJ VERDERY: Unfortunately, I can't give you the exact place now, because this selection process is on-going right now in Montana and should be complete by the end of next week at the latest. Now, when that selection is done, as I pointed out, we take these ellipses which contain all the possible area that might be even remotely impacted by this debris, and we lay it out on a map and lay such that it doesn't touch any populated areas, and that's what they are using right now to select those sites. As soon as the sites are selected, that information will be put in the Final Environmental Statement and it will be given out to the public, and then you will know with all certainty exactly where those pieces of debris will fall, but I am sorry that we are at a point right now --- It is a case of bad timing, if anything, that we are holding this hearing now, rather than about three weeks from now, because then we would have been able to pinpoint the exact location of the debris. The best I can tell you now is that it will not impact with any danger at all to Grangeville or White Bird, or any other population center.

COL JORDAN: If there are no further questions --- I'm sorry, this lady, I believe, was first.

Unidentified Individual: I am afraid probably you can't answer my question from your statements, but I just thought I would ask it in case you knew or someone else here knew. You drew two perpendicular lines, one up from White Bird, one up from Grangeville, and one down from the debris, and you crossed a horizontal line. How far would it be from a to b from b to c or from a to c?

MAJ VERDERY: Would you give me that one more time?

(Laughter.)

MAJ VERDERY: I can tell you how high the missile will be ---

Unidentified Individual: I want to know what the air miles are between Grangeville to the impact site, from the impact site, ground miles, to White Bird? This is air miles, not ground miles --

MAJ VERDERY: You mean where the debris is falling through air in its arc ---

Unidentified Individual: No, you got two lines going like this ---

MAJ VERDERY: Okay, one from Grangeville and one from White Bird ---

Unidentified Individual: All right, you got Grangeville and White Bird here, how far is it across, air miles?

MAJ VERDERY: The same as ground miles.

Unidentified Individual: Oh now, not in this country, it wouldn't be.

(Laughter and applause.)

MAJ VERDERY: I will have to yield to your greater knowledge of the geography of the area.

(Laughter.)

Unidentified Individual: In this country, we have three sides to every hill. (I.B.5; I.C.2; III.D.1)

MAJ VERDERY: I can't really tell you that because of the inability to pinpoint the exact location of the debris, if that's the question you would like addressed, we will be more than happy to address it, if that is part of your statement on the Environmental Impact Statement.

Unidentified Individual: Thank you.

COL JORDAN: I believe someone over here had a question?

Unidentified Individual: I believe the Major stated in his statement, that should the missile have to be destructed, that there would be --- everything would be completely blown up, and that nothing would land. I think that is what I heard, and I ---

MAJ VERDERY: I said no propellant, none of the burning materials will reach the ground. But, there will be particles and pieces, but the destruct system was designed such that the size and distribution and weight of these pieces would pose no danger to the population.

Unidentified Individual: How large a piece would there be, do you have any idea?

MAJ VERDERY: That depends on where in flight it is destructed. And, that's why we evacuate that area immediately around the facilities, that two mile by 5 mile area, because in that early area, if it is destroyed, the debris pieces are dense and large enough, because the missile is intact almost when it lifts off, to warrant evacuation of that area, but beyond that area, it presents no danger to the population.

Unidentified Individual: With all of the research you have done, I would think you would have some kind of data saying that 250 miles from the launch site the pieces would be 4 inches wide ---

MAJ VERDERY: We do have, there is an analysis that has been done based on destruct tests that were conducted at White Sands Missile Range in New Mexico, a full sized Minuteman II missile was destroyed sitting on a pad there, and recorded by high-speed cameras and much data was accumulated. Then, we launched one from Vandenberg two years ago and destroyed it in flight, intentionally, just to gain that kind of data. A complete report was done on that and that kind of data, I can't memorize it because it is a volume about that thick, but that kind of data will be addressed in the Final Environmental Impact Statement. Exactly the size and distribution of such debris. It is most certainly addressed. I must keep repeating this, that this system was designed with all due regard to public safety and we have the most confidence in it that it does not, in fact, will not present a hazard to the population.

I would like to point another thing, while I am talking, mentioning White Sands Missile Range, brought something to mind that I should have covered in the briefing, about evacuation of that launch area. This is not something that is new to the missile business, of evacuating people. The Army has done this routinely over the past eight to ten years and they have been flying Pershing and Athena Missiles from Blanding and Green River, Utah, down the White Sands Missile Range and these missiles over-fly populated areas of Utah and other states on the way to White Sands Missile Range, and routinely ranchers and folks under the flight path are paid per diem to evacuate from their ranches for a short period of time while the missiles are being fired, say for a 12 or 24 hour period. And as routinely, they refuse to evacuate simply because they feel it is more dangerous to get out and drive on the public highway than it is to sit there and let a missile fly over. So, this is not something new that we are doing.

Unidentified Individual: Seems to me like --- I don't know how small those debris would be, but it seems to me that at that altitude and at that speed falling to the ground, it could penetrate a human's head, or a cow or --- (III.D;I.D)

MAJ VERDERY: This is, if you appreciate the concept of terminal velocity then, I think, that would allay your fears. Regardless of how high a thing is, for example flying in space, when it enters the atmosphere, it slows drastically. The smaller the pieces and the lighter they are, the more they slow down. For example, a popular old wives tale is, if you dropped a feather off the Empire State Building, it would penetrate someone's head. That is not the case, you could drop it from the moon and it wouldn't penetrate, it would still float. So, pieces will not endanger the population. The main concern is not the destruction, but the five pieces that we know will land on the face of the earth. That is, the first stage, which is an empty cylinder, if you can imagine, the closest thing I can describe would be a large oil tank, a hollow cylinder about 28 feet long, and we know we can predict where it will land. Likewise, those four panels, or large pieces, we know where they will land, so these are the potential dangers. We know how big they are, we know where they will come down, and we avoid population areas.

Unidentified Individual: I have hauled these missiles on the railroad, and I think you would put the people at ease if you really told them what size they are. They are not a great big spaceship or anything like that; they could come right through that curtain there; they are that small.

MAJ VERDERY: A Minuteman missile, 55 feet is kind of ---

Unidentified Individual: Right, but the diameter would be ---

MAJ VERDERY: Yes, the diameter, I could reach around half of it with my two arms.

Unidentified Individual: Yeah, that's what I wanted --- see, everybody thinks of it as a great big spaceship and they are not. **(I. A. 2 & 4; I. B. 4)**

MAJ VERDERY: It is 50 --- the first stage, which is the largest part of the missile, is 50 inches in diameter and I can reach around half of it, this way -- it is not a very large -- you say that anything, you know, 28 feet long and weighing 4,000 pounds is large when it comes crashing down out of the sky. But especially the first stage impact area, that area will also be designated as a safety zone and away from any populated areas. As a matter of fact, it is relatively close to the Sellway-Bitterroot Wilderness area, where the first stage will impact.

Unidentified Individual: I gathered from your presentation, you had two major objections to launch from Vandenberg. The first, in effect, you would have to transfer it from Malmstrom to Vandenberg and, secondly, the fact that you wanted to know about the effect of gravitation ---

MAJ VERDERY: That's true.

Unidentified Individual: After you launched it ---

(Reporters Note: Unable to hear the rest of the question, Major Verdery repeated the substance of the question as indicated below.)

MAJ VERDERY: That is a very good question. In case nobody heard the question, the gentleman asked that since we had deployed this operational base safety system, which is all contained where the warhead normally is, and let us fly a missile as it looks operational without adding raceway and telemetry, why don't we just fly that kind of thing from Vandenberg. Well, that's a good question. That would solve part of our desires; it would not solve the exercise of the operational silos, however, which is primary and critical, of course. It would not satisfy that objective, nor would it allow the objective of flying over a landmass to validate those gravitational and geodetic effects.

Unidentified Individual: Okay. Well, as far as getting information on gravitation -- uh, NASA --- okay, well at the altitude you say that the missile would fly, you said it would be higher than ---

MAJ VERDERY: For a portion of the flight, that is true.

Unidentified Individual: For a portion? What portion?

MAJ VERDERY: Well, we can probably traject it from approximately -- let's see, about 70 miles down range, it begins to reach --- it begins to penetrate out of the atmosphere, about 70 miles from the launch, then it begins to fly into space.

Unidentified Individual: And there would be no other way you could obtain this information, in other words, say, I made reference to NASA, now I am sure that they have a lot of information.

MAJ VERDERY: That is true. And we have taken that information and used that to help extrapolate what we believe the case to be. But until we actually demonstrate it, it is an unknown. It is very well versified, and it's put into computers and gone over and over again, but until you actually demonstrate it, it is still somewhat of a doubtful situation.

Unidentified Individual: Well, if it has worked for them, why will it not work for you?

MAJ VERDERY: Worked for who?

Unidentified Individual: Well, you stated that they did have information ---

MAJ VERDERY: Yes, and we have used their information.

Unidentified Individual: Well, you said that they had information, but you are not sure it would work for you.

MAJ VERDERY: Well, they have information about gravity and geodetics from their satellites, which we have used. Okay, to target a missile, but until a missile flies, using that information, you cannot validate it.

Unidentified Individual: I see. And as far as seeing how the people inside, giving them the training, I think, is ---

MAJ VERDERY: Training has little or nothing to do with it. The missile combat crew, as part of the system, will be exercised; that's not in any way a major concern of the program, training anybody. Missile crews are trained in trainers like the Link-Trainer for an airplane.

Unidentified Individual: Could they not be tested in the same way at Vandenberg?

MAJ VERDERY: Missile crews are tested in this Link-Trainer device; testing of the crews is not, as I said, a critical part of it. It is primarily the mechanical electronic parts which must be tested.

Unidentified Individual: Well, okay, but you did, nonetheless, make reference to the crew at Malmstrom; what would be gained there?

MAJ VERDERY: I made reference only because they are part of the total system.

Unidentified Individual: But no gains will be made? As far as an isolated crew, no gain would be made?

MAJ VERDERY: Not appreciatively, no. (IV; I. A. 4; Appendix B. B.)

COL JORDAN: I will take just a few more questions, because we do want to proceed to hear the rest of the Impact Statement synopsis, and then we want to receive the statements of the public, on the Draft Environmental Impact Statement. But, I will take a few more questions. The gentleman in the rear, please?

MR. WALKER: My name is Bruce Walker. Am I correct in assuming that you haven't picked out the exact place where the missile will be fired from?

MAJ VERDERY: That's true. The exact launch facilities at Malmstrom; we have many candidate launch facilities, which look like good ones, but they are doing that narrowing down process right now, up at Malmstrom Air Force Base, in Montana.

MR. WALKER: Am I also correct in assuming that the radius of the ellipse that you showed us on the slide was not the exact site?

MAJ VERDERY: That 26 by 12 and 19 by 8? Yes, that's the worst case; that is the size that we know everything will fall in. Right now we can predict what will happen next year; we know we can predict to that accuracy. As we get closer to the launch date, we --- the size of that uncertainty actually gets smaller.

MR. WALKER: Well, I was just kind of interested in knowing how you come up to the exact size and didn't have any kind of general idea where it would be. (I. B. 3 & 5; I. D. 2)

MAJ VERDERY: The size of the ellipse is an abstract, that's true, no matter where it falls; it just takes into account the worst winds you could ever expect to experience during the months of January to March in Northern Idaho.

COL JORDAN: I believe you had a question, Sir?

MR. GIBBS: I am Lee Gibbs, KORT Radio. Getting back to this setting up your ellipses, I would like to know where this information is coming from that you established your ellipses with as far as weather is going to enter into it, the winds, etc.

MAJ VERDERY: That is taken from the National Weather Bureau historical data for this area.

MR. GIBBS: Okay, now say we approach the launch date or whatever, and you would have to go by weather forecast, right?

MAJ VERDERY: Yes, we would go by forecasts and finally by by actual observations taken hours before launch and finally minutes before launch.

MR. GIBBS: You are going to say like, in this particular area, in minutes before the launch?

MAJ VERDERY: The range safety people, who will be controlling the safety conduct aspects. We, SAC, will not control the safety aspects of the program. That will be controlled by these range safety individuals from Vandenberg, from the Space and Missile Test Center at Vandenberg, who do that same sort of thing for all the launches out there. They will be in constant communications from that range safety control van up in Montana with points all along this flight path.

MR. GIBBS: In other words, there would be individuals here in Grangeville?

MAJ VERDERY: I couldn't say he would be right here in Grangeville, but there will be information fed back from all along the flight path.

MR. GIBBS: Well, this is what I am getting at, because here, particularly here in this region, weather and winds, etc., can change in a matter of minutes.

MAJ VERDERY: That ellipse is big enough right now to take into account all the possible changes. But, in real-time as launch day approaches, and we know exactly what the conditions are becoming to be, for example, the wind is out of the southwest at 20 knots, then we will know exactly how small that ellipse --- for a certainty, it will get very small.

MR. GIBBS: But you can handle this down within say, well, even an hour because within an hour's time the wind can change here, and go about two different directions.

MAJ VERDERY: Certainly.

MR. GIBBS: And one question in reference to these panels, can you give me a velocity that they will hit the ground, now? (I.B.1)

MAJ VERDERY: I don't have that information with me, we can furnish it to you what the terminal velocity will be. That will also be part of the final study, the actual velocity of these things as they touch the ground. The panel, possible in the dar --- I couldn't describe accurately, it is about 3 feet wide, by a little over three and one half feet long, and if you picture a piece of roofing sheet metal, it is a thin piece, slightly curved, because four of these things must curve around the missile. It is the pieces that connect the first stage to the second stage, actually. It provides a connection between the two stages. And, of course, when the first stage falls away, there is no need for these pieces, so they are ejected. And, it is a cylinder and it falls away in four separate sections. So, it is a slightly curved piece about less than a quarter of an inch thick, of sheet metal, is what it is.

MR. WALKER: Okay, I guess that will take care of everything.

MR. WALRATH: I am Chuck Walrath from Grangeville. I realize that this hearing, as was the one last night, was had at the request of certain individuals, but I would like to know why the hearings in Boise, Helena, and Salem, were not held after the exact point of launch and the impact sites were known for all of these objects. (Appendix B.B.1)

COL JORDAN: Captain Needham?

CAPT NEEDHAM: The question is, why the hearings in Boise, Helena, and Salem, were not delayed until the exact point of impact was known, for all of these audiences? This is involved with the Draft Environmental Impact Statement. The National Environmental Policy Act requires us to prepare an Environmental Impact Statement, requires that the statement be prepared 90 days before the decision is made to either go ahead or not to go ahead with the project. So, the decision point was such that it was necessary in backing the decision point, for the decisions to be held before this final analysis was made. Does that answer the question? It is a legal requirement.

MR. WALRATH: Yes.

COL JORDAN: I believe now would be a good time Captain, to proceed with your briefing.

CAPT NEEDHAM: Major Verdery has given the first part, and I have six parts to give, but I can assure you that all six parts will not be as long as the first part. Okay, I am an Environmental Engineer from SAC Headquarters. I am a member of the working group that prepared the Environmental Impact Statement.

I would like to give you just a little bit of background before we go into the summary of the Environmental Impact Statement.

I would like to give you some background on the National Environmental Policy Act and really why it was necessary to prepare this Environmental Impact Statement. In 1969, Congress passed, and it was signed into law the first day of 1970, a National Environmental Policy Act. This Act requires that the environment be given appropriate consideration in decision making policies. That is, that all Federally funded actions which either may be controversial with regard to the environmental policies or which may have a significant impact on these policies of environment, require that all these actions be prepared in an Environmental Impact Statement. It further requires that the draft statement be prepared and furnished to the various agencies that would be affected and to the public which would be directly affected, and that we would receive comments on whether or not these agencies agree that the full environmental had, in fact, been determined. So, on this particular impact statement, we have sent it to some 25 different agencies, federal agencies, the states involved; they were also made available to public libraries and state clearing houses. And, we are holding these public hearings to get your reaction from the public on the Impact Statement.

As Colonel Jordan pointed out, the Environmental Statement is built in seven parts. Major Verdery has covered the first part. That means a complete description of the program. The second part of the Impact Statement requires us to characterize the environment. That is, what is there that would possibly be affected. In this program, the two areas that would be affected are the launch area in Montana, and then the impact areas in the first stage and the panels, inter-stage panels. The launch area in Montana is primarily an agricultural area. We have determined that this, that these proposed launches will not have an affect on natural resources or historical sites at all. We also looked at the first stage in the panel drop area, as Major Verdery has described, and included in this area the total possible area under consideration for the first stage and the panel impact area is the Lolo National Forest, Nez Perce, and the Wallowa National Forest, and portions of the Sellway-Bitterroot Wilderness area. It is also necessary to consider wildlife that is on the endangered species list. And, we determined that these launches will not propose a threat to wildlife and to the wildlife that are on the endangered species list.

The third section of the Environmental Impact Statement is the probable environmental impact of the action. Now, this says to look at all possible cases, to look at everything that could possibly -- that is, every environmental impact that could possibly result from the action. In doing this, we find that the environment will be affected by construction of support facilities and roads. This will be in the immediate area of the launch; that is, in Montana, sites will be constructed for placing the control vans that Major Verdery described. These will be composed of small concrete pads and gravel roads that will be constructed for access to the pads. There will also be some limited construction necessary for placement of communication facilities.

Another possible, probable environmental impact is that of the missile exhaust. The quantities shown here represent the quantities that will be emitted over the entire flight path. The threat that this was proposed to human life or to wildlife, would only be in the immediate areas of the launch. Major Verdery described the areas to be evacuated, some six miles by two miles immediately in the area of the launch site. Now, our experience at Vandenberg, as well as computer modeling, has demonstrated that toxic concentrations will not be realized outside of this evacuated area, so it will not pose a threat either to human beings or to wildlife outside of that area.

Missile noise is also a probable effect of the launch. And, we find there that noise will not have a harmful effect, will not be of a significant, sufficient intensity outside of this evacuated area to be of concern. It will merely be a short-term nuisance in the immediate area of the launch. The missile going super-sonic, of course, will cause a sonic boom, but the orientation of the missile will be such that this will not be realized on the ground.

The missile debris, in the event of normal launch, in the event of missile failure, has been discussed in very great detail by Major Verdery. Also, looking at the Environmental Impact, we consider that of forest fire probability, or a fire probability. We found that there was a possibility of burning propellant reaching the ground should the missile have to be destroyed in the first 40 seconds of flight. So, to take care of this problem, we have established a fire-watch corridor some 20 miles long and 8 miles wide, again, in the immediate area of the launch. We find that should a missile have to be destroyed after the first 40 seconds of flight, that the propellant would be consumed, it would burn up before it reached the ground. So, if there --- there would be no forest fire probability to Idaho, or Oregon, or really outside of this first 20 miles of flight. Forest Service is also making available an airborne fire fighting system to combat any fires, should the requirement occur to destroy the missile during the early part of the flight. Also, we intend to launch this in the wintertime when there is a snow cover to further reduce the possibility of fire.

We considered water pollution, and we determined that this really does not propose a potential threat to water.

We are also required to consider the socio-economic effect of the project. We find there that a few people will be sent, temporarily, to the Malmstrom area, but it will not be necessary to construct any capsule facilities; that there are sufficient eating places and billeting places in the area and on the base at Malmstrom, and that this will not be a significant impact on the local economy.

The fourth part of the Environmental Impact Statement is that of alternatives. This requires us to consider alternatives to the project. The alternatives that were considered for this project were to conduct the launch from a different wing; to use Vandenberg test sites; and to launch the Operational Base Launch configuration missiles from this test site; and to not conduct the launch at all. The Statement addresses why the Department of Defense does not consider these as viable alternatives.

The fifth part is the adverse effects which cannot be avoided. What this says is that after we look at all the probable effects, and after all the alternatives have been considered, what is left. What can absolutely not be avoided. We find that this project will really have a minimal effect on the environment. There will be some local short-term air pollution; some local short-term noise, and that is in the immediate vicinity, the immediate area of the launch at Montana; and there is a possible adverse impact from the debris, from failure, which we have already addressed.

The sixth part is local short-term use of the environment versus long-term productivity. We find that short-term use of the environment in this way, will have no effect on the long-term productivity.

And, finally, the detailed, the irreversible and irretrievable commitments to resources. This program will not --- the only irreversible and irretrievable commitment of resources here would be the missiles themselves. These are missiles that are already constructed; there will be no missiles constructed for this program, so there will be no irreversible or irretrievable commitments of resources from this program.

In summary, we feel that we can conduct this program in a manner so as not to propose a significant threat to the environment and in a way that it will be safe to population centers.

COL JORDAN: Thank you, Captain Needham. We now come to the portion of the hearing when we want to hear from you, the public. The first person is Mr. Eby. Would you please come to the rostrum?

MR. EBY: This is a larger audience than I usually speak to, so I am a little nervous. I have two questions in response to the presentations here, and I also have a prepared statement which I will leave with you. First of all, if I follow the logic given as a reason why we should have the test over land, if I follow it correctly, it would be because we don't now know the effects of gravity and geodetic effects of the continual land mass on these missiles. Now, if that's true, then Malmstrom would be the shortest land mass that you could fire one over, and most of the flight would be over the ocean. Now, can you use the information that is gained from a launch from Malmstrom and apply that to a launch in a facility in Missouri, to your satisfaction, or is this going to require another test from Missouri later on because the information from Malmstrom doesn't quite fit what you want to apply to those missiles in Missouri? **(Appendix B. B.)**

MAJ VERDERY: The answer is no. This will not require tests from other bases. The answer is yes to the fact that we can apply data gained from this test to all of the facilities. The power portion of missile flight is the very first three minutes, the missile actually only thrusts and is guided for the first three minutes of flight. That occurs in approximately the first 165 miles of land over which it flies. So, what we will do is validate the parameters, and validate the method by which we apply the geographic and geodetic and gravitational modeling to our targeting programs. Once we have validated it once, we know it works and we can apply it to all bases.

MR. EBY: My second question is ---

Unidentified Individual: What's your name, we haven't heard who you are? Who are you?

MR. EBY: My name is Ron Eby; I am from White Bird. I'm sorry, I thought you heard when the gentleman asked for me to come up here. My second question is, in the Environmental Impact Statement, there is a section on economic impacts, and I have heard no figures yet on what these tests are going to cost, and as an interested taxpayer, I would like to know what these are going to cost.

MAJ VERDERY: The cost has been well publicized by most of the media and is no secret. The total cost of the program consists of 6.3 million dollars in fiscal year 74 money, which we have already been granted approval to spend. That is money which was already in the Air Force budget for this current fiscal year, which we asked the Congress and asked the Defense Department to allow us to program away from other projects to spend on this project. So, it was money already in the budget. The next portion of monies which we will ask for are --- have been included in the fiscal year 75 Defense Budget, which will be submitted to Congress shortly to be voted on, and we have asked for 20.6 million dollars in the fiscal year 75 budget. And, it will not be until that amount is approved that we can actually conduct the launches. All we have now is permission to spend some 6.2 million to do the preliminary planning and the initial leasing of lands up in Montana for the building of these facilities. We do not have the full authority to conduct the launches, that will come along with the approval by Congress of the fiscal year 75 defense budget, and that amount of 20.6 million dollars.

MR. EBY: Thank you. I will now read my prepared statement, and I would not change too much of this, on account of what I heard tonight, I might change a few parts, but not much.

I have come to express my opposition to the proposed test firing of missiles over inhabited lands in the western United States. I have two objections to the project. If one of them is not appropriate, then the other one is and vice versa.

My first objection is based on concern for the safety of people living in the area over which the missiles will be fired. It is true that the chance of any one person being harmed is very small, but if you are hit, or I am hit, then that chance is too great. If there is any danger to anyone at all, however slight, the risk is too great and the missiles should not be fired. There is no doubt in my mind that the Air Force is willing to risk sacrificing a few people in order to carry out these tests. Compared to huge military budgets and stupendous military operations, a few common citizens in Idaho must seem insignificant to the upper echelons in the Pentagon. But, I am not willing to risk my life or the lives of any of my neighbors for this project.

The Air Force may tell us that there is little or no danger to those of us in the area. However, we must remind ourselves that this is the same Air Force which solemnly assured us that only military targets were being bombed in Vietnam and that civilian areas were not being touched. Later we were to learn that residential areas and dikes protecting them, and even medical facilities and hospitals, were being bombed indiscriminately. I will not dwell on this further. Suffice it to say that the veracity of the Air Force can be questioned, and that the credibility of the Air Force is indeed in disrepute.

Now, for my second objection. The fact that the Air Force considers a test necessary at all, suggests that the possibility exists for malfunction or failure of the system or something in the system. But suppose that there is no possibility of malfunction, that it is absolutely certain that everything will work perfectly, that the courses of the missiles and the landing spots of all debris are absolutely predictable. If that were to be the case, then why on this earth should we spend millions of tax dollars to test something that is a sure bet? This would be Government waste at its worst.

When these missile systems were deployed, we were told that they were strictly deterrents, that the mere fact that we had them insured that they would never be used. But I am not convinced that the Air Force really believed that they would never be launched. All these years people have been waiting to send the missiles on their way. Now with the rapprochement with China and detente with Russia, it appears for the first time in decades that we may never really need to fire them. So, what can be done with billions of dollars worth of unfired missiles? Well, they can be sent screaming out over the sea, over the heads of the citizens who paid for them in the first place. That way you can find out if they really would have worked had they been needed, and answer any nagging suspicions that they might not have.

As a side comment, I might add the observation that during peace time, promotions in the military tend to be slower than during a war. Projects such as this one, if successfully conducted, surely would result in promotions up and down the line.

29

This, I would suggest, is no small consideration for the officers involved.

In conclusion, if there is any danger to citizens at all, the missiles should not be fired. If they work so well that there is no danger, then the tests are unnecessary and are extravagantly wasteful. In either case, the project should be scrapped. That is the end of my prepared statement.

I would like to say that these are rather harsh comments, and I certainly do not mean it as a personal attack on the officers involved here tonight. As far as I know, they are very fine gentlemen, but these are my views on the project. Thank you for the opportunity to comment. (I.C.; I.D.; Appendix B.B.)

COL JORDAN: Thank you, Mr. Eby.

(Applause.)

COL JORDAN: Mr. Solberg?

MR. SOLBERG: My name is Nels Solberg. I am speaking for myself here, as a resident about two miles south of Grangeville, which would be about halfway between the area of the course where they predicted they might light, when it was first brought out in the paper. I attended the hearing last night in Lewiston, mostly so that I could see the presentation that they made and then have a chance to make a statement myself, and do some thinking on it, which I did this afternoon.

Before I make my statement, I would like to make sure that these officers understand that the one person that did promote their proposals strongly in Lewiston, last night, the Representative from District 2, Gary Ingram, does live in Post Falls. I wanted to make sure that you knew that -- (laughter), that's 200 miles up the road here, and the missiles aren't coming over that territory (More laughter). I appreciate very much his taking time to come down there to Lewiston, as we did, to tell you what his feelings were, and I respect his feelings, but I want you to understand that he doesn't represent the people that are sitting out here in the room tonight.

My statement is as follows: I would like to make a statement in opposition to the proposed firing of the Minuteman missiles over the Grangeville - White Bird area. The project has been federally labeled "GIANT PATRIOT" in an obvious attempt to gain support for it by inferring that those in opposition to this project, may be against national defense, or some such thing. I certainly agree that the missiles should be operational, but the question is, should another 27 million dollars of taxpayers' money be now needed to establish this fact. We have been led to believe that the missile was tested and fully operational since 1963. If an over-the-land test was necessary, why wasn't it done long previous to now.

My key objection to the test firing of these missiles is the possible evacuation of Grangeville and White Bird and the surrounding area. Major Howard Verdery, at the Lewiston hearing last night, said that absolutely no evacuation was planned, and never had been proposed by the Air Force. He blamed the Lewiston Morning Tribune for reporting this evacuation proposal in error. Air Force officials briefed this test firing for Governor Andrus and the press in his office in Boise in late January 1974. After Tribune reporter, J. Shelby, pointed out that the drop zone shown was over Grangeville and White Bird, and I might add here that they weren't just quite sure that these were inhabited areas at the time (laughter), Air Force Captain Ken Kissel stated that the evacuation of these two towns was a possibility. Now that's where this information came from that people are concerned about. It did come from the Air Force with the information I have. I spoke to the gentleman, Verdery, today and he also tells me that Mr. Chris Carlson was present when this statement was made and heard the statement, in fact, made. It seems that there is a serious credibility gap here. Which ones are we to believe?

Also, last night, Air Force officials stated that selection had not yet been made for the drop zone in this area, but it would be in about one week. Now I realize from the conversation that they may have had a deadline to get their meeting going, but it certainly seems to me that it is pretty hard for these people to make up their minds about it unless you know exactly where it's going to go. It would have been so much nicer if they had the meeting about a week or ten days later, if they had drawn a map for us over here and said here's where the stuff is going to fall. Thank you. (I.A.1, 3, 4; I.B.2, 3, & 5; I.C.2 & 3; I.D)

(Applause.)

COL JORDAN: Thank you, Mr. Solberg. Mr. Mancuso?

MR. MANCUSO: My name is Joe Mancuso, and I am from Grangeville, and I haven't got anything written. I might make it short and

sort of blunt and that is, no way am I in favor of any missile coming over Grangeville. I think it is a waste of money, it's only a show and is really of no value. No way -- no way.
(Appendix B.B.)
COL JORDAN: Thank you.

(Applause.)

COL JORDAN: I apologize if I don't pronounce your name correctly, is it Mr. Tinsley? George R. Kimsey, I am sorry, Sir.

MR. KIMSEY: Ladies and Gentlemen, I would like to take this opportunity to speak to you on behalf of those who do support the proposed missile launchings. There are those in the audience here to whom I have spoken that do support it, there are those in the community who do support them, and there are a number of those who, while they may not support them, do not oppose them. Perhaps some of those have not had an opportunity to voice their opinions, couldn't be here tonight; I would like to speak in their behalf.

It would seem to me that public support of these tests should rest on the answer to a single question. That question certainly is, what is the danger to our lives and our property. Reasonable people must surely realize that the probability of personal injury and appreciable property damage is, indeed, remote. The question we should ask ourselves is simply this: Are the benefits to be realized from these tests in terms of national security, your security and mine, worth the money the test will cost and perhaps the exceedingly small risk of lives and property? Now, this isn't an easy question to answer, perhaps, but answer it, we must. Buying national security isn't like buying cattle, or property, where the worth of the commodity is readily apparent. National security isn't something you can touch or measure, or feel, or see; indeed, it is a composite of a host of both tangible and intangible things, which together create in the minds of people throughout the world, not just the possibility, but a certainty, that we have the wherewith-all to protect our interests, and that we have the willingness to do so if necessary.

Many of us in the community sincerely believe that the conduct of GIANT PATRIOT will do much to maintain and strengthen this certainty. The small cost in dollars and the remote possibility that someone might be injured, would appear to be a small price to pay, and I would think constitute a real bargain.

In closing, I would like to express to our visitors, Colonel Jordan, and his associates, our appreciation for their untiring efforts on our behalf. At a time when it is the vogue to deride the military and anything connected with it, it must surely require an extra measure of devotion to duty to continue to do what must be done and to make the personal sacrifices which must be made while suffering the ill-will and insults of fellow countrymen for whose protection you have pledged your very lives. Gentlemen, to you and the organization you represent, our undying gratitude. (I.C; I.D)

(Loud applause and shouts of approval.)

COL JORDAN: Thank you very much, Mr. Walker?

MR. WALKER: My name is Bruce Walker from Grangeville. I represent myself. I am certainly sure that the Air Force has taken all precautions possible for these missile firings, and I certainly don't want to make any opinions on whether or not these are necessary. We could talk all night on the pros and cons of the need for these for national security. I think the main concern for people in this area is the evacuation part of it. And, as for evacuation, I would like to go on record as opposing any evacuation of any populated area, due to said missile firings, which is pretty much been confirmed here tonight. But, and as for persons to be evacuated from a so-called non-populated area, I would think that people directly involved in being evacuated should at least have a chance to express their views, whether or not they want missiles fired over them, at another public hearing at a future date in a convenient place to the people being evacuated; I think this would be only fair. Also, I am sure the Air Force has every intent of reimbursing people for any damages that may occur or any and all expenses that they might have due to evacuation, and I certainly think this is appropriate. In conclusion, I would just like to say that I feel that any person who pays tax dollars and whose business, farm or ranch, or whatever, is interrupted due to a Government program, these people should at least have a right to voice their opinion and be heard. This is the right of every American citizen, and certainly the right of the people in Idaho. (I.C.2 & 3; III.G.1 & 2)

(Applause.)

COL JORDAN: Thank you, Mr. Walker. Mr. Jackman?

(No response from the audience.)

COL JORDAN: Mr. Stewart? I'm sorry, Mrs. Stewart?

MRS. STEWART: My name is Mrs. Stewart, and I am the Administrator of Park Hill Manor Nursing Home. My primary concern is, of course, with my patients. I have voiced my opinions in several letters. In the event of evacuation, my primary concern is the rapidity in which we would have to be evacuated. If evacuation was necessary, this can't be accomplished in five minutes. Preparation would be at least over a two-month period. Evacuation involves having personal clothing, medical records, medications, this type of thing. It can't be accomplished in two minutes. People are upset by this. My patients would be upset by this. There is just --- I am just against this because of my patients, I am speaking for them. If evacuation was necessary, there are patients in both hospitals and two nursing homes to consider. Lewiston cannot absorb all these patients. They have to go somewhere. The evacuation itself, people are going to have to be moved by ambulance, you can't just put some of these people in the car and move them, they are too critically ill. A lot of these people are on welfare, welfare isn't going to pay for a trip like this. Yes, I have had assurances that the military will help, and I believe this, but still again, I am more concerned with the human life, with the people that I have to be concerned with. I want reassurance for me and for them. **(I.C.2 & 3; I.D.; III.G.1 & 2)**

(Applause.)

COL JORDAN: Thank you, Mrs Stewart. Perhaps at this point -- Major Verdery has asked that he begiven an opportunity to restate some of the portions of his briefing that would take into consideration some of the matters raised by Mrs. Stewart and to allay some of her concern.

MAJ VERDERY: I would simply like to reiterate again, I think several hundred times, since we arrived in Lewiston two days ago, that we absolutely will not evacuate any populated area under any circumstances. Especially a circumstance that would involve moving invalids from a hospital, it is just --- it disturbs me that anyone thought would be the case, to begin with. The apparent misquote or misinterpretation of something an Air Force officer said in the State Capitol, I might point out that if you will check the records, that if the press would take the effort to check the records, a retraction of that or a request for a retraction of that in the press was issued by the Pentagon. That was not the case as stated by the purported Captain Kissel in Boise. There was never any intent to evacuate a populated area, such as Grangeville, especially a nursing home. I would just like once and for all to lay your fears to rest on that --- about that matter, once and for all. Thank you.

COL JORDAN: Mrs. Heckman?

MRS. HECKMAN: I decline.

COL JORDAN: How about Mr. Heckman?

MR. HECKMAN: I decline, thank you.

COL JORDAN: Mr. Groom?

MR. GROOM: My name is Brit Groom, and I am from Grangeville. Through this whole thing, I have been confused on several issues. First of all, they stated in their first part, that no missiles will be constructed for this, well they also stated in the first part that the missiles have to be of a certain number. Now, how are the missiles going to be replaced that they shoot, these eight missiles, and if they don't have to be replaced, it kind of upsets me that they thought they could already fire them and plan ahead enough to build them before they contacted the people. And, another point that I am slightly confused on, is that when we consider these missiles, it is not one missile, it is eight missiles. Over two years, it is eight missiles, am I right?

COL JORDAN: That's correct.

MR. GROOM: Now it is eight missiles, four each year, and two missiles from each squadron, is that right?

MAJ VERDERY: That's right.

MR. GROOM: Okay. How come it takes eight missiles to do what apparently one would do? And, if it takes eight missiles to do this, then maybe, there maybe should be some more reconsideration. And, another thing, especially in this area, when predominately everbody is farmers, everybody knows that mechanical things fail or they don't work the same way twice. Okay now, if they don't work the same way twice, then the way this one missile reacts isn't going to affect one bit how the others react. Everything is different. Okay, now if there is a possibility there is war, of which predominately this is constructed for, they aren't going to have time to measure the weather, how that's going to affect, or anything else, they are going to be fired. So all this preparation wouldn't really do anything but assure that under conditions where they could make preparations, that it would work. And, if things don't work the first time, if they don't work the same the second time as they do the first, then why does there have to be a first? Thank you. (VI; I. A. 1, 2, & 4; I. B. 1 & 2)

(Applause.)

COL JORDAN: Mr. Groom, I think some of your questions indicate that perhaps something has to be clarified in the briefing that Major Verdery gave. He has indicated that he would like to address those points, for your clarification.

MAJ VERDERY: First, let me address the first point you made, and that is the replacement of missiles. The missiles which we will fire from Montana will be ones which we would normally have fired from Vandenberg. This is out of a group of missiles which were built in the original production of Minuteman II missiles and set aside for testing purposes. They will be replaced out of that group. So, we are not building any new missiles. We are simply going to fire from Montana, missiles which we would normally have fired from Vandenberg. I think that should answer the first question. My purpose --- I am reluctant to even get up and address things at this point, because our intent is not to conduct a debate on environmental issues. I just hope to clarify something that I should have clarified more sufficiently in the briefing. Now, as far as one missile not being like the other, missiles are built to a little greater accuracy and tolerance than farm equipment, that's why they are expensive.

(Applause and shouts of approval.)

So what we do indeed have profited because one missile flies the right way, it is representative, indeed, of all one thousand of them that are on alert every day.

COL JORDAN: Thank you. Mr. Chamberlin?

MR. CHAMBERLIN: No comment at this time.

COL JORDAN: All right. David Bodine

(No response.)

COL JORDAN: Mr. Spencer?

MR. SPENCER: I don't believe I can add any constructive information; however, I was representing the Republican Central Committee and we passed a resolution opposing this, because we needed some more information and some consultation on the matters that were pertinent to us or the matters directly related to us. And, you have given us that and you have given assurances that there will be no evacuation. And, we want --- we would like to be further assured in the future months that there will be no further evacuation, and we would like to be continually consulted in a forum on matters directly related to our position on the firing. **(I.C.2 & 3; III.G.1 & 2)**

COL JORDAN: Thank you very much. You certainly will be so assured. Mr. Erdman?

MR. ERDMAN: Ladies and Gentlemen, my name is Earl Erdman, and I am a Consulting Engineer in Grangeville, Idaho. I think the question is academic ---

(Audience protested that they could not hear Mr. Erdman.)

I think the question is academic as to whether these missiles will be fired. My question is, why were the initial public hearings made in the populous centers of the State of Idaho, and along the flight lines; these people in Lewiston and Boise have no concern whatsoever with what happens right here in Grangeville or the back country between here and White Bird. Gentlemen, that's my question. **(Appendix B.B.1)**

COL JORDAN: My answer to that is that we are here tonight.

(Laughter and applause.)

MR. ERDMAN: You are here tonight, but you weren't here previously. Thank you.

COL JORDAN: Mr. Long?

MR. LONG: Mine is simply a question, do you want me to come up there or not?

COL JORDAN: I think we can here you from there.

MR. LONG: My ranch is about four miles southwest of Grangeville. About the north edge of the area as shown as impact area of the panels on the newspaper maps. My question is: Is there any plan or need that will effect the management, operation or work of individual farms, ranches or rural homes, or the evacuation thereof? I realize you --- the towns seemed to be okay, but I wondered about individual farms, ranches along the foothills there. I see several of my neighbors that might field the same question. (I.C.1, 2, & 3; I.D.2; I.B.5)

MAJ VERDERY: I would like to stress that the representative chart that you have seen, both in this briefing and in the news media, is simply an artist's depiction, if you will, to enable us to describe the impact area. The specific areas --- it is our intent to not cause interruption in the nature that you just described of anyone's business activities, or require evacuation of these. That's the best that I can answer you at this point. That, as I said, is a subject that will be addressed in the Final Environmental Impact Statement and the final hazard analysis; there will be detailed hazard analysis foot by foot of the entire flight path, including these drop areas. And it will be afforded to the public to everyone who desires a copy. There will be details--they will be addressed in detail.

MR. LONG: Thank you, I would like to thank you for being here. I realize that there is a lot of difference of opinion, but there aren't too many countries where a Government would care to speak with citizens like this. If we disagree, it's okay, but I am glad it works out this way.

COL JORDAN: Thank you very much. I have run out of cards now, but does anyone else desire to make a statement? Mr. Wetherell?

MR. WETHERELL: I don't have a statement as such, because of the lateness of the hour and the fact that the Senator has already made a statement stating his opposition to the firing over part of Idaho. The one thing I would like to ask, because I think it is extremely important ---

COL JORDAN: Excuse me, our reporter just can't hear you, I hate to interrupt you, but could you ---

MR. WETHERELL: I don't have a prepared statement because the Senator made ---

(Man from the audience said, "neither can we.")

COL JORDAN: Could you come up here?

(Mr Wetherell did not come to the rostrum.)

MR. WETHERELL: --- an extensive statement last night, but due to the lateness of the hour, there is no sense in reading it again. What I would like to ask, is when will the Air Force make public the actual locations, the actual spots that they have worked out that the debris will fall,so the people will finally know where it is going to be? (I.B.5; I.C.2 & 3; III.D.1)

MAJ VERDERY: Before the briefing and again in some of the questions and answers, that selection process is going on right now. It is supposed to be completed in approximately two weeks. There will be a time period after the selection process is completed where all the data must be compiled, put into this hazard analysis, and put into the Final Environmental Impact Statement. Everyone who made a statement here, either recorded on the cards or otherwise identified themselves by name and location, will receive a copy of that Final Environmental Statement. Publication time is not determined yet, because it will depend on when we finish the final site selection. So, I can't give you a specific date when that information will be available, but it most certainly will be made available to concerned citizens everywhere along the flight path, most especially here in Grangeville and the surrounding areas.

COL JORDAN: Yes?

Unidentified Individual: Mr. Chairman, I would like to know how much danger there is to this launching compared to all our launchings that we made for the moon, in the flight path around the world, when so many lives were endangered. How does this compare to our reaching the moon?

MAJ VERDERY: Yes, I would like to address that. The specific hazards to people, that is the total population along the flight path from Montana all the way to the exit point in Oregon, near the California-Oregon border, the hazard in terms of possibility of injury to all peoples or any person along that launch corridor, is less than the danger posed by a single Saturn V launch, which launched an Apollo to the moon.

Unidentified Individual: In other words, we would not have gotten to the moon if we had made a study on all that? (I.D)

MAJ VERDERY: True.

COL JORDAN: I believe this gentleman has a question.

Unidentified Individual: I have a question. I understand from your briefing that you will construct gavel roads and concrete pads for mobile surveillance equipment. Are you trying to tell me that we don't have adequate roads, or airplanes, or surveillance, modern radar equipment that we can't cover these things without spending more taxpayers' money? **(III.A;VI)**

MAJ VERDERY: The constructural construction involved is a very small portion of that 20 million dollars, is the construction. The sites must be prepared, these vans and radars are already built, this mobile system. It is in place at Vandenberg now undergoing testing for the testing for the past three years. The sites must be prepared up in Montana to rest these pieces of equipment.

COL JORDAN: Are there any more statements?

Unidentified Individual: I have a question -- not a question -- I would like to thank you for a great job of protecting our country. I think that anybody from any nation that has put men on the moon and brought them back safely can certainly do a fantastic job.

(Loud applause.)

COL JORDAN: Thank you. Yes Sir?

MR.REED: I am State Representative Harold Reed of District 8, and first I would like to thank the Air Force for arranging a meeting at Grangeville. It was at the request of Representative Branson and Senator Tacke and myself that I feel this was accomplished. I am somewhat concerned yet, because I find that there are different statements, and after the meeting at Boise, it came out and they stated that any input by a letter would be received up to April 8th. Now, here it is the 10th of April,and still we do not know whether they will still take more information, input from the people that are in the flight path of these missiles. I believe that is wrong to, first to make the statements that I received that they only held hearings at State Capitols in the areas involved, and then find that they had already scheduled one at Missoula, Montana, and to my knowledge, that isn't the Capitol of Montana. I do thank them for arranging this meeting here, I believe that the people in this area have expressed their opinion. Hopefully that if it is necessary, that they will provide information up and until the time of the firing. I thank you. **(VIII; Appendix B.A; Appendix B.B.**

(Applause.)

COL JORDAN: Thank you very much, Representative Reed. In answer to your question about receiving written inputs, of course, if you would mail them to me at my office at Offutt Air Force Base, Nebraska, Headquarters SAC, and that zip code is 68113, we will make those statements a part of the record. It will take approximately a week to transcribe this hearing, and if I receive those inputs by that time, they will be considered a part of this hearing.

COL JORDAN: We will take a few more questions. Mr.Long?

MR. LONG: I have one question. Were you gentlemen at all these other hearings?

COL JORDAN: Three of us were.

MR. LONG: Well, any one of you then, but I would like to know since we are basically working in a democracy, we have other hearings in other areas of the country, and they are affected in different ways than we are here. What has been the general feeling towards this program in these other communities?

COL JORDAN: Well, we haven't transcribed the hearings yet. I want to congratulate this community, we have had an excellent turn-out here and that's what we want, is to receive public comments. As to the public comments that we received at the other places we have been, some have been in favor and some against, of course. That's the purpose of the public hearings, to receive comments from the public. I can't tell you just exactly what the assessment would be at the various places, just to say that we have received comments both for and against the project.

MR. LONG: You can't say specifically which way the balance has went? I mean being there yourself, there has to be, over this period of time, how long ago, Boise one was several weeks ago, and these others must have been before that or were they after? I mean that's enough time, I would think, you are talking about a week to transcribe this, what has been the input, the feelings in the other areas? (Appendix B)

COL JORDAN: Well, as I said, the feelings have been both in favor and against the project. We tried to get comments on the Draft Environmental Impact Statement; however, many of the comments have not been addressed to the Impact Statement, but have addressed the rationale of the OBL.

MAJ VERDERY: Although I didn't participate in the hearings at Boise, I have been part of public addresses in Helena and Missoula, Montana; and Great Falls, Montana; here; Lewiston; Portland, Oregon; and Spokane, Washington, and I would have to say the most reaction has been one of just wanting to know the facts about the program. Not a great deal for or a great deal against, but one of curiosity and, at the worst, skepticism, which we hoped to satisfy with our briefings. But it has been mostly a seeking for facts, and we find that, generally, once the briefing is presented, the facts are laid out to the people as clearly as we can make them known, that their questions are answered. That's been my impression of the meetings and briefings that I have been to in giving this briefing and answering questions from the public. It is one of seeking answers. Not violently for or violently opposed to the program.

COL JORDAN: Young lady?

Unidentified Individual: I won't forget that. I write pretty fast, but I couldn't get your address, and I thought you could repeat it, a lot of people might want to take it down.

(This lady was Senator McClure's representative in Lewiston, Idaho.)

COL JORDAN: Certainly. My name again is Colonel Jordan, I am at Headquarters SAC, JA, Offutt Air Force Base, Nebraska, 68113. I believe this gentleman in the front has been impatiently seeking my eye.

Unidentified Individual: I would like to ask this question of Major Verdery, if I may. You spoke of a moment ago, you spoke on the perfection of the missiles and I am afraid, to my recollection, that he didn't answer one question that was - why it is found necessary, if they are so perfect, to fire eight missiles instead of one. Thank you. **(I. A. 1, 3 & 4; I. B. 1 & 2)**

MAJ VERDERY: I am sorry, I overlooked that one in the addressing the other questions the gentleman asked. The reason we are firing eight is we feel that is a statistically significant sample, such as the results that can be applied to the entire Minuteman force. If you understood the game of statistics, it is a rather complicated esoteric thing. You have to do a certain thing a certain number of times in order to have confidence that what you prove by that demonstration, isn't the truth; it is a matter of confidence level that you have and that what you tested was, indeed, representative of all possible cases. So, eight is considered a statistically significant sample.

COL JORDAN: I believe you had your hand up earlier?

MR. ROYCE: I am Arty Royce from Grangeville. It has been indicated that the missile launching will occur during the winter of 1974 and 1975. Do you have the specific date as to when that would be occurring, and also what time of the day would the launches be happening? (I.B.1)

MAJ VERDERY: That's a very good question. I would normally cover that in the briefing, I am sorry I left it out tonight. The launches are specifically going to be conducted in the months of January and March, in the winter, and that is for a reason. Twofold reason; first of all, the fire index is at its lowest point during the month, those months. From historical data taken along the entire flight path, the fire index is at its lowest in the January through March time period. The second point is that during the winter, we are less apt to have casual camping going on in the National Forest areas, which is the drop zone for the first stage, so we avoid one potential problem of making it less in magnitude by conducting the launches in the dead of winter. The time of day, okay, in January and March, specifically the last two weeks in January and about the last week in March. We haven't picked the specific dates yet, that will depend a great deal on the weather conditions and many other factors relating to the safety of the launches on the specific dates. But they will be well publicized in advance. Now as to --- now let's see, what was the other part of the question?

MR. ROYCE: The time of day. (I.B.1)

MAJ VERDERY: Time of day, in the middle of the night, as a matter of fact. This is for two reasons, the launch will be conducted at night. First of all, for range safety purposes, for the acquisition of those optical devices called the "skyscreen," it's much easier to track the flame from the exhaust of the missile at night, on a clear night, than it is to look at a dark object rising to sky in the daytime. That's one reason we will do it at night. Another reason we will do it at night, is that it will cause evacuation of those people in the up-range area to take place during the launches and it's simply easier to have someone spend the night away from home than it is to try to take them away from their activities during the day.

But we hope to take the evacuation measures, say in the late afternoon, and then the following morning the people can return to their homes. Now, there is an additional consideration in that, generally, in the dead of winter and the middle of night, most people are inside some sort of structure, be it their home or a motel or wherever they happen to be sleeping that night, this adds an additional measure of safety to anyone from any possible parts of the debris coming back to earth.

COL JORDAN: Sir?

MR. WALRATH: I am Chuck Walrath from Grangeville. Since this firing would occur when the atmosphere is most stable, how could this result --- results of this be interpreted or extrapolated to a summertime firing? **(I. A. 2 & 4; I. B. 1)**

MAJ VERDERY: The effects of climatology on missile as it lifts off from its silo and progresses through power flight are so negligible, that is, the density of atmospheric winds on the missile itself as it is flying are compensated for by the guidance system. They don't have --- the missile doesn't care whether it is summer or winter. Now, the effects of the atmosphere most certainly affect the pieces that fall back to earth. While the mi le is cresting and the guidance system is working, it automa cally compensates for these changes in the atmosphere.

COL JORDAN: Yes, Sir?

Unidentified Individual: You stated that the guidance system would correct for any changes the atmosphere might pose for the missile, well why --- my question earlier was an interpret question, why would they compensate for the changes in gravity and the guidance system is one hundred percent accurate, we assume it must be if --- **(I. A. 2 & 4)**

MAJ VERDERY: I would like to give you a condensed course in ICBM technology, but, the question was how does the guidance system, since it can correct for things like winds in the atmosphere, why can't it correct for gravity. It is a matter of gravity constants being built into the target tapes, that is a constant sort of thing as the missile flies. That must be compensated for in the target tapes, the wind effects are a real-time consideration.

Unidentified Individual: If it is a constant thing, why would it make any difference between land and water? (Appendix B.B.11)

MAJ VERDERY: It is not constant between water and land. When I say constant, it is a constant factor. You know what constant is in an equation?

Unidentified Individual: Yes.

MAJ VERDERY: The gravitational constant in the equation is a variable constant. Depending on where you are flying, if you are flying over a mountain range or a valley, the "mass-cons" that are underneath have greater gravitational effects in some areas than others. All these must be pre-built into the tape. There is also the geodetic --- you know the earth is not a true sphere, there are differences between where the missile believes it to be and where the surface of the earth actually is, all these must be built into the target area. The way it compensates for weather is entirely different than the gravitational constants that are built into the tape.

COL JORDAN: I think we will take a question from a man in the rear, he has had his hand up.

Unidentified Individual: These public meetings are a nice gesture in the direction of democratic process, but would the public reaction, pro or con have any effect, one way or the other, on the initial decision of the Air Force to conduct these missile firings? (Appendix B.A)

COL JORDAN: As I indicated earlier, the purpose of these meetings is to obtain public comments on the Draft Environmental Impact Statement. Those comments will be addressed in the preparation of the Final Environmental Impact Statement.

Again, I want to thank all of you for this tremendous turnout, it is most gratifying to us to have an audience of this size. I believe there is another lady who would like to ask a question, and she is Secretary of the Chamber of Commerce here in Grangeville.

Secretary of CC: I would just like to announce that we have coffee and cookies for those people who would like them.

COL JORDAN: Coffee and donuts are available for all. Thank you very much, good evening, it certainly has been a pleasure.

(Applause.)

//////////////////////////////GRANGEVILLE, IDAHO/////////////////////

Attached is a statement by Ronald L. Eby, Grangeville, Idaho, dated 10 April 1974.

45

Testimony on Proposed Minute Man II Tests Over Northern Idaho

Presented at hearing at Grangeville, Idaho, April 10, 1974, by Ronald L. Eby, Slate Creek Ranger Station, White Bird, Idaho 83554.

I have come to express my opposition to the proposed test firing of missiles over inhabited lands in the Western United States. I have two objections to the project. If one of them is not appropriate then the other one is and vice versa.

My first objection is based on concern for the safety of people living in the area over which the missiles will be fired. It is true that the chance of any one person being harmed is very small. But, if you are hit or I am hit, then that chance is too great. If there is any danger to anyone at all, however slight, the risk is too great and the missiles should not be fired. There is no doubt in my mind that the Air Force is willing to risk sacrifice a few people in order to carry out these tests. Compared to huge military budgets and stupendous military operations a few common citizens in Idaho must seem insignificant to the upper echelon in the Pentagon. But I am not willing to risk my life or the lives of any of my neighbors for this project.

The Air Force may tell us that there is little or no danger to those of us in the area. However, we must remind ourselves that this is the same Air Force which solemnly assured us that only military targets were being bombed in Viet Nam and that civilian areas were not being touched. Later we were to learn that residential areas and dikes protecting them and even medical facilities and hospitals were being bombed indiscriminately. I will not dwell on this further. Suffice it to say that the veracity of the Air Force can be questioned and that the credibility of the Air Force is indeed in disrepute.

Now for my second objection. The fact that the Air Force considers a test necessary at all suggests that the possibility exists for malfunction or failure of the system or something in the system. But suppose that there is no possibility of a malfunction, that it is absolutely certain that every thing will work perfectly, that the courses of the missiles and the landing spots of all debris are absolutely predictable. If that were to be the case then why on this earth should we spend millions of tax dollars to test something that is a sure bet? This would be government waste at its worst.

When these missile systems were deployed we were told that they were strictly deterrents, that the mere fact that we had them insured that they would never be used. But I am not convinced that the Air Force really believed that they would never be launched. All these years people have been waiting to send the missiles on their way. Now with the rapproachment with China and detente with Russia it appears for the first time in decades that we may never really need to fire them. So, what can be done with billions of dollars worth of unfired missiles? Well, they can be sent screaming out to sea over the heads of the citizens who paid for them in the first place. That way you can find out if they really would have worked had they been needed and answer any nagging suspicions that they might not have.

As a side comment I might add the observation that during peace time, promotions in the military tend to be much slower than during a war. Projects such as this one, if successfully conducted, surely would result in promotions up and down the line. This, I would suggest, is no small consideration for the officers involved.

In conclusion, if there is any danger to citizens at all the missiles should not be fired. If they work so well that there is no danger then the tests are unnecessary and are extravagantly wasteful. In either case the project should be scrapped.

Thank you for the opportunity to comment.

(I. C;I. D; Appendix B. B.')

APPENDIX C. HAZARD ANALYSIS RESULTS

A. GENERAL

1. This appendix presents a summary of GIANT PATRIOT hazard analysis performed using a computer program designated SAFETE 3. Program inputs include the specific trajectory data for the planned missile flights, failure parameters, destruct action data, population data, prevailing winds and abort criteria. The program calculates the probability of impact of missile debris in all areas hazarded by the missile destruct and the probability that injury will occur in the populated areas in which the debris may impact, should the missile be destroyed or break up due to an inflight malfunction.

2. This appendix includes the results of twelve separate computer runs; three runs were required for each of the planned missile launches (S-40, G-3, G-4 and G-5) since the total population data for an overland launch cannot be accommodated in a single run. The total probability of a casualty resulting from the impact of missile debris (E_C) for a given launch then becomes the sum of the E_Cs for the three runs. The S-40 launch is planned for January and the G-3, G-4 and G-5 launches are planned for April; therefore seperate wind tables are used for these runs.

3. The computer printouts contained in this appendix all have the same format for the hazard summary tables. Individual columns contain the following data.

Column Name	Contents
(1) LOCATION NAME	This column contains an abbreviated name for the city or locality to which the data applies. Names containing G3, G4, G5, G6, G7, S37, or S40 followed by numbers are references to individual structures within the local launch site areas. These are all in Montana. Names ending in CO are counties. All others are cities or local towns. City and individual structure numbers are not included in county totals.

States are indicated as follows:

M - Montana
I - Idaho
O - Oregon
W - Washington
C - California

(2) TMIN (SECS) — This column gives the earliest time after launch (in seconds) at which a destruct would have to be initiated to cause an impact on the named location. Destruct before this time would not result in any impact to the location under consideration.

(3) TMAX (SECS) — This column gives the latest time after launch (in seconds) at which a destruct would have to be initiated to cause an impact on the named location. Destruct after this time would not result in any impact to the location under consideration.

(4) PI($x10^{-6}$) — This column contains the probability that at least one fragment will impact within the land area of the location. The number in this column represents the number of chances out of one million that any fragments would impact.

(5) EC($x10^{-6}$) — This column contains the probability that at least one person within the named location would be injured (i. e., casuality expectation) as a result of a single launch. The number represents the number of chances in one million that an injury would occur as the result of a single launch. This column presents the total risk to the population within the named locations.

(6) EC($x10^{-6}$) CLASS 2, EC($x10^{-6}$) CLASS 3 — The number in these columns represent the casualty expectations for different categories of debris fragments. Probabilities from all debris categories were summed to produce the totals given in column (5). The phrase "HAZARD LT 1.0E-09" is printed whenever the total chance of an injury is less than one in a billion.

d. The computer runs have been separated according to launch site and state affected as follows:

SECTION		CONTENTS
B.	HAZARD FROM S-40 LAUNCH	
	1.	Hazards to Montana and Idaho
	2.	Hazards to Oregon
	3.	Hazards to Washington and California
C.	HAZARDS FROM G-3 LAUNCH	
	1.	Hazards to Montana and Idaho
	2.	Hazards to Oregon
	3.	Hazards to Washington and California
D.	HAZARDS FROM G-4 LAUNCH	
	1.	Hazards to Montana and Idaho
	2.	Hazards to Oregon
	3.	Hazards to Washington and California
E.	HAZARDS FROM G-5 LAUNCH	
	1.	Hazards to Montana and Idaho
	2.	Hazards to Oregon
	3.	Hazards to Washington and California

B. HAZARDS FROM S-40 LAUNCH

This section contains computer printouts of hazards from the S-40 Launch.

1. Hazards to Montana and Idaho

This section contains computer printouts of hazards to Montana and Idaho from the S-40 launch.

STC/SAI SAFETE RUN FOR S-40. GFM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	FC(X10-6) CLASS 3	FC(X10-6) CLASS 4
SUNBURST M					HAZARD LT	1.0E-09		
TOOLE CO M			0.022	0.000	0.	0.000	0.000	-0.
SHELBY M					HAZARD LT	1.0E-09		
BELT M					HAZARD LT	1.0E-09		
S40 45					HAZARD LT	1.0E-09		
S40 4					HAZARD LT	1.0E-09		
S40 3					HAZARD LT	1.0E-09		
S40 5					HAZARD LT	1.0E-09		
BLAKEGLE M					HAZARD LT	1.0E-09		
S40 6					HAZARD LT	1.0E-09		
S40 46					HAZARD LT	1.0E-09		
S40 42					HAZARD LT	1.0E-09		
S40 41					HAZARD LT	1.0E-09		
S40 40					HAZARD LT	1.0E-09		
S40 7					HAZARD LT	1.0E-09		
S40 2					HAZARD LT	1.0E-09		
S40 1					HAZARD LT	1.0E-09		
S40 39					HAZARD LT	1.0E-09		
S40 47					HAZARD LT	1.0E-09		
S40 38					HAZARD LT	1.0E-09		
S40 8					HAZARD LT	1.0E-09		
S40 10					HAZARD LT	1.0E-09		
STOCKETT M					HAZARD LT	1.0E-09		
S40 9					HAZARD LT	1.0E-09		
S40 37					HAZARD LT	1.0E-09		
S40 43					HAZARD LT	1.0E-09		
S40 36					HAZARD LT	1.0E-09		
S40 48					HAZARD LT	1.0E-09		
GREATFLL M					HAZARD LT	1.0E-09		
S40 49					HAZARD LT	1.0E-09		
S40 11					HAZARD LT	1.0E-09		
S40 35					HAZARD LT	1.0E-09		
SANDCULE M					HAZARD LT	1.0E-09		
CUT BANK M					HAZARD LT	1.0E-09		
S40 12					HAZARD LT	1.0E-09		
S40 15					HAZARD LT	1.0E-09		
S40 50					HAZARD LT	1.0E-09		
S40 13					HAZARD LT	1.0E-09		
S40 16					HAZARD LT	1.0E-09		
S40 34					HAZARD LT	1.0E-09		
S40 33					HAZARD LT	1.0E-09		
S40 32					HAZARD LT	1.0E-09		
S40 14					HAZARD LT	1.0E-09		
S40 17					HAZARD LT	1.0E-09		
S40 22					HAZARD LT	1.0E-09		
S40 31					HAZARD LT	1.0E-09		
S40 29	6.9	[illegible]			HAZARD LT	1.0E-09		
S40 30	6.3	[illegible]			HAZARD LT	1.0E-09		
S40 28	7.0	17.6			HAZARD LT	1.0E-09		
S40 23	7.1	13.7			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR S-40, GFM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S40	21	9.4	17.2			HAZARD LT	1.0E-09		
S40	24	9.5	17.3			HAZARD LT	1.0E-09		
S40	27	9.5	17.4			HAZARD LT	1.0E-09		
S40	52	9.6	17.5			HAZARD LT	1.0E-09		
S40	54	10.8	19.2			HAZARD LT	1.0E-09		
S40	18	10.8	19.3			HAZARD LT	1.0E-09		
S40	20	11.1	19.7			HAZARD LT	1.0E-09		
S40	19	11.7	20.3			HAZARD LT	1.0E-09		
S40	25	12.2	20.8			HAZARD LT	1.0E-09		
S40	53	12.2	20.9			HAZARD LT	1.0E-09		
S40	26	12.6	21.2			HAZARD LT	1.0E-09		
S40	55	13.1	21.8			HAZARD LT	1.0E-09		
S40	56	13.3	22.1			HAZARD LT	1.0E-09		
S40	66	13.7	22.4			HAZARD LT	1.0E-09		
S40	67	14.2	23.2			HAZARD LT	1.0E-09		
S40	57	14.4	23.[illegible]			HAZARD LT	1.0E-09		
* CONRAD	M	13.6	2[illegible].1	1.414	0.105	0.	0.105	0.000	-0.
S40	70	15.4	25.[illegible]	0.001	0.006	0.	0.006	0.000	-0.
DUTTON	M	15.1	25.2			HAZARD LT	1.0E-09		
S40	68	16.0	26.6			HAZARD LT	1.0E-09		
GLACIERCOM				0.031	0.000	0.	0.000	0.000	-0.
S40	61	16.7	27.6	0.001	0.003	0.	0.003	0.000	-0.
CSCADECO	M			0.010	0.000	0.	0.000	0.000	-0.
S40	60	17.3	28.5	0.001	0.003	0.	0.003	0.000	-0.
S40	62	17.8	29.3	0.001	0.002	0.	0.002	0.000	-0.
S40	69	17.9	29.4	0.001	0.003	0.	0.003	0.000	-0.
S40	44	18.1	29.7			HAZARD LT	1.0E-09		
PONDERACOM						LAUNCH	VICINITY		
S37	47	19.6	31.2			HAZARD LT	1.0E-09		
S37	46	20.6	32.4	0.001	0.002	0.	0.002	0.000	-0.
S37	54	21.0	32.9			HAZARD LT	1.0E-09		
S37	53	21.2	33.1			HAZARD LT	1.0E-09		
MEGHERCO	M			0.001	0.000	0.	0.000	0.000	-0.
S37	12	22.0	34.2			HAZARD LT	1.0E-09		
S37	23	23.3	35.8			HAZARD LT	1.0E-09		
S37	13	23.4	36.0			HAZARD LT	1.0E-09		
S37	50	23.7	36.3			HAZARD LT	1.0E-09		
S37	45	23.9	36.5			HAZARD LT	1.0E-09		
S37	24	24.1	36.8			HAZARD LT	1.0E-09		
S37	14	24.2	37.0			HAZARD LT	1.0E-09		
S37	22	24.7	37.5			HAZARD LT	1.0E-09		
S37	48	24.8	37.7			HAZARD LT	1.0E-09		
S37	27	25.0	38.0			HAZARD LT	1.0E-09		
S37	49	25.2	38.3			HAZARD LT	1.0E-09		
S37	52	25.6	39.0			HAZARD LT	1.0E-09		
ULM	M	25.3	38.5			HAZARD LT	1.0E-09		
S37	60	25.8	39.2	0.006	0.003	0.	0.000	0.003	-0.
S37	41	25.9	39.3	0.009	0.006	0.	0.001	0.005	-0.
S37	29	25.9	39.5			HAZARD LT	1.0E-09		
S37	15	26.2	39.9			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR S-40. GFM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
VALIER	M	26.1	40.0			HAZARD LT 1.0E-09			
S37	17	26.7	40.7			HAZARD LT 1.0E-09			
S37	34	26.9	41.0			HAZARD LT 1.0E-09			
S37	28	26.9	41.0			HAZARD LT 1.0E-09			
S37	43	27.0	41.1			HAZARD LT 1.0E-09			
S37	16	27.1	41.1			HAZARD LT 1.0E-09			
S37	51	27.1	41.2			HAZARD LT 1.0E-09			
S37	59	27.3	41.5			HAZARD LT 1.0E-09			
S37	36	27.4	41.6			HAZARD LT 1.0E-09			
S37	26	27.5	41.7			HAZARD LT 1.0E-09			
S37	31	27.5	41.8			HAZARD LT 1.0E-09			
S37	37	27.6	41.9			HAZARD LT 1.0E-09			
S37	38	27.8	42.2			HAZARD LT 1.0E-09			
S37	1	27.9	42.2	0.067	0.102	0.	0.016	0.085	-0.
S37	33	28.0	42.6			HAZARD LT 1.0E-09			
S37	57	28.2	42.8	0.003	0.002	0.	0.001	0.001	-0.
S37	56	28.2	42.8	0.009	0.009	0.	0.006	0.004	-0.
S37	55	28.2	42.9	0.002	0.003	0.	0.001	0.002	-0.
S37	42	28.3	42.9	0.001	0.001	0.	0.000	0.001	-0.
S37	21	28.3	42.9			HAZARD LT 1.0E-09			
S37	32	28.6	43.4			HAZARD LT 1.0E-09			
S37	39	28.8	43.7			HAZARD LT 1.0E-09			
S37	40	28.8	43.8			HAZARD LT 1.0E-09			
S37	3	29.1	44.2	0.304	0.021	0.	0.010	0.021	-0.
S37	18	29.2	44.3			HAZARD LT 1.0E-09			
S37	44	29.3	44.6			HAZARD LT 1.0E-09			
S37	4	29.4	44.7	0.015	0.014	0.	0.011	0.003	-0.
S37	9	29.5	44.8			HAZARD LT 1.0E-09			
S37	2	29.6	44.9	0.005	0.006	0.	0.003	0.002	-0.
S37	10	29.8	45.1			HAZARD LT 1.0E-09			
S37	11	29.8	45.2			HAZARD LT 1.0E-09			
WITSLFSP	M	29.4	44.7			HAZARD LT 1.0E-09			
S37	19	30.2	45.9			HAZARD LT 1.0E-09			
S37	6	30.3	46.0	0.048	0.010	0.	0.008	0.002	-0.
S37	7	30.5	46.3	0.408	0.214	0.	0.010	0.204	-0.
S37	8	30.7	46.7	0.051	0.040	0.	0.010	0.030	-0.
S37	20	30.8	46.9			HAZARD LT 1.0E-09			
S37	5	30.8	47.0	0.001	0.001	0.	0.000	0.001	-0.
S37	30	30.9	47.1			HAZARD LT 1.0E-09			
S37	58	31.2	47.7			HAZARD LT 1.0E-09			
G4	13A	33.1	50.2			HAZARD LT 1.0E-09			
G4	13B	33.2	51.1			HAZARD LT 1.0E-09			
G3	7	33.4	51.4			HAZARD LT 1.0E-09			
G3	6	33.6	51.7			HAZARD LT 1.0E-09			
G3	8	33.6	51.7			HAZARD LT 1.0E-09			
* TETON CO	M	56.5	[illegible]	11577.773	0.000	0.	0.000	0.000	-0.
G3	5	33.7	51.9			HAZARD LT 1.0E-09			
S37	25	33.7	51.9			HAZARD LT 1.0E-09			
G3G4	11	34.2	52.5			HAZARD LT 1.0E-09			
FAIRFLD	M	34.1	52.7			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR S-40. GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G3G4	12	34.6	53.0			HAZARD LT 1.0E-09			
G3	9	34.6	53.0			HAZARD LT 1.0E-09			
G4	18	34.8	53.3			HAZARD LT 1.0E-09			
CASCADE	M	34.9	53.3			HAZARD LT 1.0E-09			
G3	4A	35.3	54.4			HAZARD LT 1.0E-09			
G4	16	35.3	54.4			HAZARD LT 1.0E-09			
G4	19	35.4	54.9			HAZARD LT 1.0E-09			
CHOTEAU	M	35.3	54.4			HAZARD LT 1.0E-09			
G3	4B	35.5	55.0			HAZARD LT 1.0E-09			
G4	20	35.7	55.3			HAZARD LT 1.0E-09			
G3	3	35.7	55.5			HAZARD LT 1.0E-09			
G3G4G514		35.8	55.6			HAZARD LT 1.0E-09			
G3	2	35.8	55.7			HAZARD LT 1.0E-09			
G3	1	36.1	56.2			HAZARD LT 1.0E-09			
G5	27	37.5	59.7			HAZARD LT 1.0E-09			
BROWNING	M	37.3	58.5			HAZARD LT 1.0E-09			
G5	30	37.7	59.2			HAZARD LT 1.0E-09			
G6	32	37.8	59.3			HAZARD LT 1.0E-09			
G5G6	28	38.0	59.8			HAZARD LT 1.0E-09			
G6	36	38.9	61.0			HAZARD LT 1.0E-09			
G6	34B	39.0	60.8			HAZARD LT 1.0E-09			
G6	34A	39.0	60.8			HAZARD LT 1.0E-09			
G6	37	39.3	61.3			HAZARD LT 1.0E-09			
G6G7	38	39.7	61.7			HAZARD LT 1.0E-09			
G6	33A	39.7	61.7			HAZARD LT 1.0E-09			
G6	33B	39.7	61.8			HAZARD LT 1.0E-09			
G6G7	39	39.8	61.8			HAZARD LT 1.0E-09			
G6G7	40	40.3	62.7			HAZARD LT 1.0E-09			
AUGUSTA	M	40.3	62.7			HAZARD LT 1.0E-09			
G7	44B	40.4	62.9			HAZARD LT 1.0E-09			
G7	44A	40.4	62.9			HAZARD LT 1.0E-09			
TOWNSEND	M	40.5	63.1			HAZARD LT 1.0E-09			
BRDWTRCO	M	36.2	60.0	0.001	0.000	0.	0.000	0.000	-0.
G7	41A	40.6	63.4			HAZARD LT 1.0E-09			
G7	42A	40.7	63.5			HAZARD LT 1.0E-09			
G7	42B	40.7	63.5			HAZARD LT 1.0E-09			
G7	43	40.8	63.6			HAZARD LT 1.0E-09			
LWSCLKCO	M	33.4	60.0	0.006	0.000	0.	0.000	0.000	-0.
HELENA	M	41.5	65.0			HAZARD LT 1.0E-09			
BOULDER	M	43.5	67.2			HAZARD LT 1.0E-09			
LINCOLN	M	44.0	67.7			HAZARD LT 1.0E-09			
MRTNCTY	M	44.1	67.7			HAZARD LT 1.0E-09			
JEFRSNCO	M	41.5	64.9	0.001	0.000	0.	0.000	0.000	-0.
CORAM	M	44.2	67.9			HAZARD LT 1.0E-09			
HNGRYHRSE	M	44.3	68.0			HAZARD LT 1.0E-09			
WALKRVLL	M	44.4	68.1			HAZARD LT 1.0E-09			
CLMBIAFL	M	44.8	68.5			HAZARD LT 1.0E-09			
SLVRBCCO	M	43.6	67.3			HAZARD LT 1.0E-09			
POWELLCO	M	42.5	66.1	0.002	0.000	0.	0.000	0.000	-0.
WHITEHAL	M	45.1	68.8			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR S-40, GEM 90 PCT JANUARY WINDS 5/29/74
JANUARY 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	FC(X10-6) CLASS 4
WHITEFSH	M	45.2	69.2			HAZARD LT	1.0E-09		
BIGFORK	M	45.4	69.5			HAZARD LT	1.0E-09		
SLVRBOPK	M	45.4	69.5			HAZARD LT	1.0E-09		
FLATHDCO	M	42.0	67.3	0.003	0.000	0.	0.000	0.000	-0.
EVRGREEN	M	45.5	69.7			HAZARD LT	1.0E-09		
DEERLODG	M	45.5	69.7			HAZARD LT	1.0E-09		
KALISPLL	M	45.6	69.9			HAZARD LT	1.0E-09		
SOMERS	M	45.8	70.1			HAZARD LT	1.0E-09		
LAKESIDE	M	45.9	70.2			HAZARD LT	1.0E-09		
FLORALPK	M	45.8	70.1			HAZARD LT	1.0E-09		
BUTTE	M	45.8	70.1			HAZARD LT	1.0E-09		
DRUMMOND	M	46.1	70.4			HAZARD LT	1.0E-09		
* LAKE CO	M	45.3	69.2	675.423	0.128	0.	0.016	0.112	-0.
POLSON	M	46.5	70.7			HAZARD LT	1.0E-09		
OPPRTNTY	M	46.5	70.8			HAZARD LT	1.0E-09		
DERLDGCO	M	46.2	70.3			HAZARD LT	1.0E-09		
PABLO	M	46.7	70.9	0.004	0.000	0.	0.000	0.000	-0.
RONAN	M	46.8	71.0	0.138	0.005	0.	0.005	0.000	-0.
ANACONDA	M	45.8	71.0			HAZARD LT	1.0E-09		
SLVRBOCO2	M	46.9	71.0			HAZARD LT	1.0E-09		
* STIGNATS	M	47.3	71.5	140.836	3.399	0.	0.606	2.793	-0.
PHILPBRG	M	47.2	71.5			HAZARD LT	1.0E-09		
* MISULACO	M	46.2	70.5	8.080	0.003	0.	0.003	0.000	-0.
GRANITCO	M	46.1	70.4	0.001	0.000	0.	0.000	0.000	-0.
MILLTOWN	M	47.6	71.9			HAZARD LT	1.0E-09		
MISSOULA	M	47.8	72.0			HAZARD LT	1.0E-09		
HOTSPRNG	M	47.9	72.2			HAZARD LT	1.0E-09		
PARADISE	M	48.2	73.1	0.004	0.000	0.	0.000	0.000	-0.
PLAINS	M	48.9	73.1			HAZARD LT	1.0E-09		
* ALBERTON	M	49.0	73.2	2.146	0.017	0.	0.002	0.016	-0.
STVNSVLL	M	49.0	73.2			HAZARD LT	1.0E-09		
RAVALICO	M	48.3	72.5			HAZARD LT	1.0E-09		
VICTOR	M	49.3	73.4			HAZARD LT	1.0E-09		
* MINERLCO	M	48.7	72.9	1384.559	0.240	0.	0.022	0.218	-0.
CORVALIS	M	49.6	73.7			HAZARD LT	1.0E-09		
SUPERIOR	M	49.6	73.7	0.552	0.011	0.	0.007	0.004	-0.
* SANDERCO	M	47.6	71.9	25.356	0.001	0.	0.001	0.000	-0.
HAMILTON	M	49.8	73.9			HAZARD LT	1.0E-09		
THOMSNFL	M	49.9	74.0			HAZARD LT	1.0E-09		
RAVALICO	M	49.2	73.4			HAZARD LT	1.0E-09		
ST REGIS	M	50.4	74.5	0.001	0.000	0.	0.000	0.000	-0.
DARBY	M	50.5	74.6			HAZARD LT	1.0E-09		
LEMHI CO	I	49.7	73.8			HAZARD LT	1.0E-09		
MULLAN	I	51.7	75.5			HAZARD LT	1.0E-09		
* SHOSHNCO	I	49.8	76.3	12.969	0.001	0.	0.001	0.000	-0.
SALMON	I	51.9	75.6			HAZARD LT	1.0E-09		
WALLACE	I	51.9	75.7			HAZARD LT	1.0E-09		
SILVRTON	I	52.0	75.7			HAZARD LT	1.0E-09		
AVERY	I	52.0	75.7			HAZARD LT	1.0E-09		
OSBURN	I	52.2	75.8			HAZARD LT	1.0E-09		

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WORDNER I	52.4	75.9			HAZARD LT 1.0E-09			
KELLOGG I	52.4	76.0			HAZARD LT 1.0E-09			
HAYDEN I	52.6	76.1			HAZARD LT 1.0E-09			
SMLTRVLL I	52.7	76.2			HAZARD LT 1.0E-09			
PINEHRST I	52.8	76.2			HAZARD LT 1.0E-09			
SPIRITLK I	53.8	76.9			HAZARD LT 1.0E-09			
PLUMMER I	53.9	76.9			HAZARD LT 1.0E-09			
* HDQUARTR I	53.9	77.0	1.700	0.011	0.	0.001	0.010	-0.
DALTNGRDNI	54.0	77.0			HAZARD LT 1.0E-09			
FERNWOOD I	54.0	77.1			HAZARD LT 1.0E-09			
STMARIES I	54.0	77.0			HAZARD LT 1.0E-09			
CORDALEN I	54.1	77.1			HAZARD LT 1.0E-09			
* PIERCE I	54.1	77.1	1.226	0.028	0.	0.008	0.020	-0.
RATHDRUM I	54.2	77.2			HAZARD LT 1.0E-09			
KOOTNICO I	52.9	76.3			HAZARD LT 1.0E-09			
* CLRWTRCO I	53.4	76.6	8298.294	0.687	0.	0.334	0.353	-0.
PORTFALS I	54.5	77.4			HAZARD LT 1.0E-09			
BENEWACO I	53.5	76.7	0.029	0.000	0.	0.000	0.000	-0.
* ELKRIVER I	54.8	77.5	1.434	0.011	0.	0.002	0.009	-0.
WEIPPE I	54.8	77.5	0.718	0.013	0.	0.003	0.009	-0.
BOVILL I	55.4	77.8	0.333	0.003	0.	0.001	0.003	-0.
KOOSKIA I	55.9	78.0	0.037	0.000	0.	0.000	0.000	-0.
* OROFINO I	55.9	78.0	16.834	0.578	0.	0.194	0.384	-0.
DEARY I	56.2	78.1	0.168	0.002	0.	0.000	0.002	-0.
KAMIAH I	55.3	78.2	0.874	0.017	0.	0.003	0.014	-0.
* KENDRICK I	56.4	78.2	2.061	0.022	0.	0.004	0.017	-0.
* NEZPERCE I	56.9	78.4	1.309	0.014	0.	0.003	0.011	-0.
* LEWIS CO I	55.6	77.9	2690.566	0.375	0.	0.315	0.059	-0.
* LATAH CO I	54.9	77.6	1832.607	0.389	0.	0.313	0.075	-0.
GRANGVLL I	57.2	78.5	0.035	0.000	0.	0.000	0.000	-0.
TROY I	57.6	78.6	0.240	0.003	0.	0.001	0.002	-0.
POTLATCH I	57.7	78.7	0.007	0.000	0.	0.000	0.000	-0.
* JULAIETA I	59.0	78.8	3.412	0.078	0.	0.069	0.009	-0.
* CRAIGMONTI	61.0	78.8	1.778	0.017	0.	0.	0.017	-0.
COTNWOOD I	61.0	78.8	0.408	0.005	0.	0.000	0.006	-0.
* NEZPRCCO I	56.8	78.3	8885.390	5.603	0.	5.012	0.591	-0.
MOSCOW I	61.6	79.1	0.282	0.005	0.	0.000	0.005	-0.
* LAPWAI I	61.8	79.1	1.672	0.010	0.	0.001	0.009	-0.
* GENESEE I	61.9	79.2	1.074	0.007	0.	0.000	0.007	-0.
* LEWISTON I	62.4	79.4	18.590	0.267	0.	0.000	0.267	-0.
RIGGINS I	64.0	80.0			HAZARD LT 1.0E-09			
IDAHO CO I	57.9	78.7	0.163	0.000	0.	0.000	0.000	-0.
MCCALL I	62.1	80.5			HAZARD LT 1.0E-09			
VALLEYCO I	63.9	80.0			HAZARD LT 1.0E-09			
NEWMEDOW I	62.8	80.8			HAZARD LT 1.0E-09			
CASCADE I	63.1	80.9			HAZARD LT 1.0E-09			
COUNCIL I	64.3	81.4			HAZARD LT 1.0E-09			
ADAMS CO I	62.1	80.5			HAZARD LT 1.0E-09			
CAMBRIDG I	65.8	82.0			HAZARD LT 1.0E-09			
WSHNGTNCOI	64.5	81.5			HAZARD LT 1.0E-09			

STC/SAI SAFETF RUN FOR S-40, GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
BOISE	I	66.8	82.4			HAZARD LT 1.0E-09			
WEISER	I	68.0	93.0			HAZARD LT 1.0E-09			

2. Hazards to Oregon

This section contains computer printouts of hazards to Oregon from the S-40 launch.

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G4 15	35.3	54.6			HAZARD LT 1.0E-09			
G3G4 10A	35.8	55.6			HAZARD LT 1.0E-09			
G3 10B	36.0	56.1			HAZARD LT 1.0E-09			
G3G4G521	36.8	57.4			HAZARD LT 1.0E-09			
G4G5 22	36.8	57.4			HAZARD LT 1.0E-09			
G5 23	37.0	57.9			HAZARD LT 1.0E-09			
G5 24	37.0	57.9			HAZARD LT 1.0E-09			
G5 26	37.4	58.6			HAZARD LT 1.0E-09			
G5 29	37.7	59.1			HAZARD LT 1.0E-09			
G5 31	37.7	59.2			HAZARD LT 1.0E-09			
G3 10C	38.3	60.2			HAZARD LT 1.0E-09			
* WALCWACO O	63.0	79.6	10143.966	0.101	0.	0.047	0.054	-0.
ENTRPRSE O	64.6	81.5	0.041	0.000	0.	0.000	0.000	-0.
JOSEPH O	64.8	81.6	0.011	0.000	0.	0.000	0.000	-0.
* WALLOWA O	65.1	81.7	1.469	0.017	0.	0.009	0.008	-0.
* ELGIN O	66.7	82.4	1.752	0.022	0.	0.003	0.018	-0.
* MLTNFRWTRO	67.2	82.6	2.935	0.045	0.	0.021	0.024	-0.
COVE O	67.4	82.7	0.186	0.001	0.	0.000	0.001	-0.
* WESTON O	67.8	82.9	1.060	0.015	0.	0.008	0.006	-0.
UNION O	67.9	82.9	0.167	0.002	0.	0.000	0.002	-0.
* ATHENA O	68.2	83.0	1.341	0.019	0.	0.011	0.008	-0.
* UNION CO O	65.6	82.0	6635.089	0.211	0.	0.111	0.101	-0.
* MAY PARK O	68.3	83.1	1.618	0.031	0.	0.018	0.013	-0.
* LAGRANDE O	68.5	83.2	4.740	0.201	0.	0.115	0.086	-0.
ONTARIO O	68.6	83.2			HAZARD LT 1.0E-09			
NO.PWDR O	68.9	83.3	0.012	0.000	0.	0.000	0.000	-0.
* BAKER CO O	65.7	82.0	6.232	0.000	0.	0.000	0.000	-0.
NYASSA O	69.3	83.5			HAZARD LT 1.0E-09			
BAKER O	69.4	83.6	0.003	0.000	0.	0.000	0.000	-0.
* UMTILACO O	66.3	82.3	9596.289	0.835	0.	0.477	0.357	-0.
* PNDLTON O	69.9	83.8	6.735	0.269	0.	0.154	0.115	-0.
VALE O	70.0	83.8			HAZARD LT 1.0E-09			
ADRIAN O	70.1	83.9			HAZARD LT 1.0E-09			
* PILOT RK O	70.9	84.2	1.693	0.029	0.	0.004	0.026	-0.
ECHO O	71.0	84.3	0.164	0.002	0.	0.001	0.001	-0.
MCNARY O	71.0	84.3	0.007	0.000	0.	0.000	0.000	-0.
UMATILLA O	71.1	84.4	0.006	0.000	0.	0.000	0.000	-0.
STNFLD O	71.1	84.4	0.070	0.001	0.	0.000	0.000	-0.
HRMSTON O	71.2	84.4	0.083	0.000	0.	0.000	0.000	-0.
UKIAH O	72.6	85.0	0.937	0.006	0.	0.000	0.006	-0.
DATES O	72.8	85.2	0.004	0.000	0.	0.000	0.000	-0.
* MORROWCO O	71.5	84.5	1134.989	0.023	0.	0.011	0.012	-0.
PRARECTY O	74.0	85.7	0.006	0.000	0.	0.000	0.000	-0.
* HEPPNER O	74.0	85.7	1.054	0.016	0.	0.005	0.011	-0.
MALHEURCOO	69.0	83.4			HAZARD LT 1.0E-09			
IONE O	74.5	86.0	0.072	0.000	0.	0.000	0.000	-0.
JOHN DAY O	75.0	86.2	0.019	0.000	0.	0.000	0.000	-0.
* GRANT CO C	71.4	84.5	2239.411	0.022	0.	0.011	0.011	-0.
ARLNGTN O	75.1	86.2	0.002	0.000	0.	0.000	0.000	-0.
CNYN CTY O	75.2	86.3	0.008	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR S-40, GFM 90 PCT JANUARY WINDS 5/30/74

JANUARY 90 PERCENT WINDS

RUN NO.

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	MTVERNON	O	75.5	86.5	0.018	0.000	0.	0.000	0.000	-0.
	SENECA	O	75.9	86.7	0.001	0.000	0.	0.000	0.000	-0.
*	GILLAMCC	O	74.6	86.0	255.058	0.002	0.	0.001	0.002	-0.
	CONDON	O	76.5	87.0	0.504	0.007	0.	0.002	0.005	-0.
	RUFUS	O	76.9	87.3			HAZARD LT 1.0E-09			
	WASCO	O	77.1	87.4	0.001	0.000	0.	0.000	0.000	-0.
*	SHRMANCO	O	76.1	86.8	9.074	0.000	0.	0.000	0.000	-0.
*	WHELR CO	O	75.6	86.6	5059.314	0.031	0.	0.008	0.022	-0.
*	KINZUA	O	77.5	87.6	5.256	0.067	0.	0.026	0.041	-0.
	FOSSIL	O	77.8	87.7	0.570	0.005	0.	0.000	0.005	-0.
	BURNS	O	77.8	87.8			HAZARD LT 1.0E-09			
	HINES	O	78.0	87.9			HAZARD LT 1.0E-09			
*	HARNEYCO	O	73.7	85.6	2.362	0.000	0.	0.000	0.000	-0.
	THEDALLES	O	78.5	88.1	0.001	0.000	0.	0.000	0.000	-0.
	CHNOWTH	O	78.6	88.2			HAZARD LT 1.0E-09			
	DUFUR	O	78.9	88.4	0.001	0.000	0.	0.000	0.000	-0.
	HOODRVR	O	79.2	88.5			HAZARD LT 1.0E-09			
*	WASCO CO	O	77.2	87.4	196.836	0.005	0.	0.001	0.004	-0.
	ODELL	O	79.7	88.8			HAZARD LT 1.0E-09			
	MAUPIN	O	79.7	88.8	0.011	0.000	0.	0.000	0.000	-0.
*	CROOK CO	O	77.7	87.7	6494.496	0.151	0.	0.042	0.109	-0.
	HOODRVCO	O	79.2	88.5	0.142	0.000	0.	0.000	0.000	-0.
	CSCADLKS	O	80.6	89.3			HAZARD LT 1.0E-09			
	MADRAS	O	81.3	89.8	0.852	0.014	0.	0.004	0.010	-0.
	WRM SPRG	O	81.4	89.8	0.311	0.002	0.	0.001	0.002	-0.
*	PRINVLLE	O	81.4	89.9	12.926	0.317	0.	0.085	0.232	-0.
*	JEFF CO	O	79.7	88.8	4074.019	0.165	0.	0.050	0.115	-0.
	RDENDRON	O	81.6	89.9			HAZARD LT 1.0E-09			
	WEMME	O	81.7	90.0			HAZARD LT 1.0E-09			
	CULVER	O	81.9	90.1	0.329	0.002	0.	0.000	0.002	-0.
	SPRNGDLE	O	82.2	90.3			HAZARD LT 1.0E-09			
*	TRREBONN	O	82.2	90.4	1.191	0.011	0.	0.001	0.010	-0.
	RAINIER	O	82.2	90.4			HAZARD LT 1.0E-09			
	TRO[illegible]	O	82.3	90.4			HAZARD LT 1.0E-09			
	HAZEL	O	82.3	90.4			HAZARD LT 1.0E-09			
	SANDY	O	82.3	90.4			HAZARD LT 1.0E-09			
	WOODVLGE	O	82.4	90.5			HAZARD LT 1.0E-09			
	DE[illegible] ISL	O	82.4	90.5			HAZARD LT 1.0E-09			
	COLMBCTY	O	82.5	90.5			HAZARD LT 1.0E-09			
	FAIRVIEW	O	82.5	90.5			HAZARD LT 1.0E-09			
	STHELENS	O	82.5	90.5			HAZARD LT 1.0E-09			
*	REDMOND	O	82.5	90.6	14.548	0.330	0.	0.102	0.228	-0.
	MCNULTY	O	82.6	90.6			HAZARD LT 1.0E-09			
	GRESHAM	O	82.5	90.6			HAZARD LT 1.0E-09			
	[illegible]YWOOD[illegible]		82.7	90.6			HAZARD LT 1.0E-09			
	RKWOOD	O	82.6	90.6			HAZARD LT 1.0E-09			
	PWLHRST	O	82.7	90.6			HAZARD LT 1.0E-09			
	EPRKROSE	O	82.7	90.7			HAZARD LT 1.0E-09			
	GLNDOVER	O	82.7	90.7			HAZARD LT 1.0E-09			
	WARREN	O	82.7	90.7			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR S-40, GFM 90 PCT JANUARY WINDS 5/30/74

JANUARY 90 PERCENT WINDS RUN NO.

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
PRKROSE O	82.7	90.7			HAZARD LT 1.0E-09			
ESTACADA O	82.9	90.8			HAZARD LT 1.0E-09			
CLTSKNE O	82.9	90.8			HAZARD LT 1.0E-09			
MLTNMHCO O	82.2	90.3	0.001	0.000	0.	0.000	0.000	-0.
WPOWLHRSTO	83.0	90.8			HAZARD LT 1.0E-09			
SCAPOOSE O	83.0	90.9			HAZARD LT 1.0E-09			
PORTLAND O	82.6	90.6			HAZARD LT 1.0E-09			
GILBERT O	83.0	90.9			HAZARD LT 1.0E-09			
CCLMB CO O	82.1	90.3			HAZARD LT 1.0E-09			
KENDALL O	83.1	90.9			HAZARD LT 1.0E-09			
FRROLHTS O	83.1	91.0			HAZARD LT 1.0E-09			
WSTPORT O	83.3	91.0			HAZARD LT 1.0E-09			
GLDSTCNE O	83.3	91.1			HAZARD LT 1.0E-09			
CLKMSHTS O	83.4	91.1			HAZARD LT 1.0E-09			
ORGCNCTY O	83.4	91.1			HAZARD LT 1.0E-09			
WESTLINN O	83.4	91.2			HAZARD LT 1.0E-09			
* BEND O	83.5	91.2	22.444	0.934	0.	0.221	0.713	-0.
SISTERS O	83.5	91.2	0.302	0.002	0.	0.000	0.002	-0.
WSTHAVN O	83.5	91.2			HAZARD LT 1.0E-09			
VRNCNIA O	83.5	91.2			HAZARD LT 1.0E-09			
CFDARMIL O	83.6	91.2			HAZARD LT 1.0E-09			
WSTSLOPE O	83.5	91.2			HAZARD LT 1.0E-09			
CEDRHILL O	83.6	91.2			HAZARD LT 1.0E-09			
RALEGHHL O	83.6	91.2			HAZARD LT 1.0E-09			
GRDNHCME O	83.6	91.2			HAZARD LT 1.0E-09			
HAPYVALY O	83.6	91.3			HAZARD LT 1.0E-09			
MPLENEVLGO	83.6	91.3			HAZARD LT 1.0E-09			
METZGER O	83.6	91.3			HAZARD LT 1.0E-09			
BEVRTCN O	83.6	91.3			HAZARD LT 1.0E-09			
LAKOSWGO O	83.7	91.3			HAZARD LT 1.0E-09			
ALCHA O	83.7	91.4			HAZARD LT 1.0E-09			
TIGARD O	83.7	91.4			HAZARD LT 1.0E-09			
BATTIN O	83.8	91.4			HAZARD LT 1.0E-09			
* CLKMSCO O	82.0	90.2	1.533	0.000	0.	0.000	0.000	-0.
IDANHA O	83.8	91.4	0.017	0.000	0.	0.000	0.000	-0.
CANBY O	83.9	91.5			HAZARD LT 1.0E-09			
WESTWOOD O	83.9	91.5			HAZARD LT 1.0E-09			
CLAKAMAS O	83.9	91.5			HAZARD LT 1.0E-09			
KINGCTY O	83.9	91.5			HAZARD LT 1.0E-09			
SVENSON O	83.9	91.5			HAZARD LT 1.0E-09			
MOLALLA O	83.9	91.5			HAZARD LT 1.0E-09			
* DSHUTSCO O	81.7	90.0	7013.704	0.289	0.	0.080	0.209	-0.
MWAUKIE O	84.0	91.5			HAZARD LT 1.0E-09			
HILSBORO O	84.0	91.5			HAZARD LT 1.0E-09			
CONCORD O	84.0	91.5			HAZARD LT 1.0E-09			
SHRWOOD O	84.1	91.6			HAZARD LT 1.0E-09			
WLSNVLLE O	84.1	91.6			HAZARD LT 1.0E-09			
DETROIT O	84.1	91.6	0.016	0.000	0.	0.000	0.000	-0.
OAKGROVE O	84.1	91.6			HAZARD LT 1.0E-09			
JNINGSLG O	84.1	91.6			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR 5-40, GFM 90 PCT JANUARY WINDS 5/30/74
JANUARY 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WASH CO	O	83.1	90.9			HAZARD LT	1.0E-09		
BANKS	O	84.1	91.6			HAZARD LT	1.0E-09		
AURORA	O	84.3	91.7			HAZARD LT	1.0E-09		
ASTORIA	O	84.3	91.7			HAZARD LT	1.0E-09		
HAMMOND	O	84.4	91.8			HAZARD LT	1.0E-09		
CRABTREE	O	84.4	91.8	0.019	0.000	0.	0.000	0.000	-0.
WRRNTON	O	84.5	91.8			HAZARD LT	1.0E-09		
HUBBARD	O	84.5	91.9			HAZARD LT	1.0E-09		
CLTSOPCO	O	83.4	91.1			HAZARD LT	1.0E-09		
* LAKE CO	O	80.9	89.5	119.776	0.000	0.	0.000	0.000	-0.
NEWBERG	O	84.6	91.9			HAZARD LT	1.0E-09		
GASTON	O	84.7	92.0			HAZARD LT	1.0E-09		
DUNDEE	O	84.8	92.0			HAZARD LT	1.0E-09		
WOODBURN	O	84.8	92.0			HAZARD LT	1.0E-09		
MT.ANGEL	O	84.9	92.1			HAZARD LT	1.0E-09		
STPAUL	O	84.9	92.1			HAZARD LT	1.0E-09		
GERVAIS	O	85.0	92.2			HAZARD LT	1.0E-09		
DAYTON	O	85.0	92.2			HAZARD LT	1.0E-09		
FORSTGRV	O	85.0	92.2			HAZARD LT	1.0E-09		
SLVRTON	O	85.0	92.2	0.001	0.000	0.	0.000	0.000	-0.
LYONS	O	85.0	92.2	0.004	0.000	0.	0.000	0.000	-0.
YAMHILL	C	85.1	92.2			HAZARD LT	1.0E-09		
LFAYETTE	O	85.2	92.3			HAZARD LT	1.0E-09		
LA PINE	O	85.2	92.3	0.373	0.004	0.	0.001	0.003	-0.
CARLTON	O	85.2	92.3			HAZARD LT	1.0E-09		
MARIONCO	O	83.9	91.5	0.669	0.000	0.	0.000	0.000	-0.
BROOKS	O	85.3	92.4			HAZARD LT	1.0E-09		
YMHILLCC	O	84.4	91.8	0.007	0.000	0.	0.000	0.000	-0.
SBLIMITY	O	85.4	92.5	0.001	0.000	0.	0.000	0.000	-0.
MCMNVLLE	O	85.4	92.5			HAZARD LT	1.0E-09		
COBURG	O	85.4	92.5	0.347	0.003	0.	0.001	0.002	-0.
HAYESVIL	O	85.5	92.6			HAZARD LT	1.0E-09		
STAYTON	O	85.5	92.6	0.003	0.000	0.	0.000	0.000	-0.
AUMSVLLE	O	85.6	92.6	0.001	0.000	0.	0.000	0.000	-0.
KEIZER	O	85.6	92.6			HAZARD LT	1.0E-09		
4CORNERS	O	85.7	92.7	0.001	0.000	0.	0.000	0.000	-0.
CRNELIUS	O	85.7	92.7			HAZARD LT	1.0E-09		
AMITY	O	85.8	92.7			HAZARD LT	1.0E-09		
SALEM	O	85.7	92.7	0.005	0.000	0.	0.000	0.000	-0.
TURNER	O	85.8	92.8			HAZARD LT	1.0E-09		
SCIO	O	85.8	92.8	0.002	0.000	0.	0.000	0.000	-0.
NMZNITA	O	85.9	92.8			HAZARD LT	1.0E-09		
LAKEVIEW	O	85.9	92.8			HAZARD LT	1.0E-09		
FOSTER	O	86.0	92.9	0.044	0.000	0.	0.000	0.000	-0.
TLMOOKCO	O	84.7	92.0			HAZARD LT	1.0E-09		
LRLWDACC	O	86.1	93.0			HAZARD LT	1.0E-09		
SWETHOME	O	86.1	93.0	0.135	0.002	0.	0.000	0.002	-0.
BLUERVR	O	86.1	93.0	0.398	0.003	0.	0.001	0.002	-0.
RCKAWAY	O	86.2	93.1			HAZARD LT	1.0E-09		
SHERIDAN	O	86.3	93.1			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR S-40. GFM 90 PCT JANUARY WINDS 5/30/74

JANUARY 90 PERCENT WINDS

RUN NO.

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
TWNROCKS O	86.3	93.1			HAZARD LT 1.0E-09			
GARIBLDI O	86.3	93.1			HAZARD LT 1.0E-09			
BAY CTY O	86.3	93.2			HAZARD LT 1.0E-09			
INDPNDNC O	86.4	93.2	0.001	0.000	0.	0.000	0.000	-0.
TLAMOCK O	86.4	93.2			HAZARD LT 1.0E-09			
LEBANON O	86.5	93.2	0.013	0.000	0.	0.000	0.000	-0.
MONMOUTH O	86.5	93.3	0.001	0.000	0.	0.000	0.000	-0.
LBNCNSOU O	86.5	93.3	0.017	0.000	0.	0.000	0.000	-0.
WILLAMNA O	86.6	93.3			HAZARD LT 1.0E-09			
DALLAS O	86.6	93.4			HAZARD LT 1.0E-09			
NETARTS O	86.6	93.4			HAZARD LT 1.0E-09			
POLK CO O	85.7	92.7	0.176	0.000	0.	0.000	0.000	-0.
ALBANY O	86.6	93.4	0.015	0.000	0.	0.000	0.000	-0.
PCFICCTY O	86.8	93.5			HAZARD LT 1.0E-09			
GILCHRST O	86.8	93.5	0.393	0.004	0.	0.002	0.003	-0.
FALLCTY O	86.9	93.6			HAZARD LT 1.0E-09			
* LINN CO O	85.2	92.3	116.395	0.018	0.	0.003	0.015	-0.
GRNDRONC O	86.9	93.6			HAZARD LT 1.0E-09			
BRWNSVLE O	87.0	93.7	0.020	0.000	0.	0.000	0.000	-0.
LWISBURG O	87.1	93.7	0.001	0.000	0.	0.000	0.000	-0.
CHEMULT O	87.2	93.8	0.286	0.003	0.	0.001	0.002	-0.
CORVALIS O	87.3	93.9	0.027	0.000	0.	0.000	0.000	-0.
* OAKRIDGE O	87.4	93.9	2.097	0.054	0.	0.001	0.053	-0.
HALSEY O	87.4	94.0	0.009	0.000	0.	0.000	0.000	-0.
WESTFIR O	87.5	94.0	0.505	0.006	0.	0.000	0.006	-0.
VALSETZ O	87.6	94.1			HAZARD LT 1.0E-09			
* BENTONCO O	86.7	93.4	4.392	0.000	0.	0.000	0.000	-0.
JCT CTY O	87.7	94.1	0.113	0.002	0.	0.000	0.002	-0.
PHILOMTH O	87.7	94.1	0.003	0.000	0.	0.000	0.000	-0.
NSKOWIN O	87.7	94.2			HAZARD LT 1.0E-09			
LOWELL O	87.8	94.2	0.420	0.004	0.	0.001	0.003	-0.
HRSBURG O	87.9	94.3	0.028	0.000	0.	0.000	0.000	-0.
GLENWOOD O	87.9	94.3	0.465	0.008	0.	0.002	0.006	-0.
MONROE O	88.1	94.4	0.008	0.000	0.	0.000	0.000	-0.
* SPRNGFLD O	88.1	94.4	2.321	0.143	0.	0.036	0.107	-0.
GOSHEN O	88.2	94.5	0.297	0.002	0.	0.001	0.001	-0.
LNCLNCTY O	88.2	94.6			HAZARD LT 1.0E-09			
SNTACLRA O	88.2	94.5	0.571	0.022	0.	0.003	0.019	-0.
RIVERROD O	88.3	94.6	0.684	0.030	0.	0.005	0.025	-0.
* EUGENE O	88.2	94.5	5.191	0.308	0.	0.067	0.241	-0.
* KLMTH CO O	85.5	92.6	971.059	0.027	0.	0.008	0.019	-0.
COLGCRSJ O	88.4	94.7	0.201	0.003	0.	0.001	0.002	-0.
CRSWELL O	88.5	94.7	0.593	0.010	0.	0.004	0.007	-0.
GLNEDNBH O	88.5	94.8			HAZARD LT 1.0E-09			
SILETZ O	88.6	94.8			HAZARD LT 1.0E-09			
DPOE BAY O	88.7	94.9			HAZARD LT 1.0E-09			
LNCLN CO O	87.5	94.0	0.399	0.000	0.	0.000	0.000	-0.
ALSEA O	88.7	94.9	0.003	0.000	0.	0.000	0.000	-0.
* LANE CO O	86.4	93.2	1764.529	0.267	0.	0.050	0.218	-0.
* COTAGGRV O	88.9	95.0	1.214	0.042	0.	0.013	0.029	-0.

STC/SAI SAFETE RUN FOR S-40. GEM 90 PCT JANUARY WINDS) 5/30/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	ELMIRA	0	88.9	95.1	0.057	0.001	0.	0.000	0.001	-0.
	TOLEDO	0	88.9	95.1			HAZARD LT 1.0E-09			
	VENETA	0	88.9	95.1	0.112	0.002	0.	0.000	0.002	-0.
	CHILOQUN	0	89.0	95.1	0.005	0.000	0.	0.000	0.000	-0.
	AGTE RCH	0	89.0	95.1			HAZARD LT 1.0E-09			
	NEWPORT	0	89.1	95.2			HAZARD LT 1.0E-09			
	SOUTHBCH	0	89.2	95.3			HAZARD LT 1.0E-09			
	NOTI	0	89.2	95.3	0.068	0.000	0.	0.000	0.000	-0.
	MALIN	0	89.3	95.3			HAZARD LT 1.0E-09			
	SEAL RCK	0	89.5	95.5			HAZARD LT 1.0E-09			
	ALTAMONT	0	89.6	95.6	0.001	0.000	0.	0.000	0.000	-0.
	KLMTHFLS	0	89.6	95.6	0.003	0.000	0.	0.000	0.000	-0.
	MERRILL	0	89.7	95.7			HAZARD LT 1.0E-09			
	FALCONHT	0	89.7	95.7			HAZARD LT 1.0E-09			
	WALDPORT	0	89.8	95.7			HAZARD LT 1.0E-09			
	SWISSHOM	0	89.8	95.7	0.014	0.000	0.	0.000	0.000	-0.
	DRAIN	0	89.9	95.8	0.523	0.008	0.	0.003	0.006	-0.
	MIDLAND	0	89.9	95.8			HAZARD LT 1.0E-09			
	YONCALLA	0	90.0	95.9	0.302	0.003	0.	0.001	0.002	-0.
	YACHATS	0	90.1	96.0	0.001	0.000	0.	0.000	0.000	-0.
	PROSPECT	0	90.2	96.0	0.191	0.002	0.	0.000	0.001	-0.
	MAPLETON	0	90.2	96.0	0.016	0.000	0.	0.000	0.000	-0.
*	GLIDE	0	90.2	96.1	3.831	0.047	0.	0.017	0.031	-0.
	KENO	0	90.4	96.2			HAZARD LT 1.0E-09			
	OAKLAND	0	90.4	96.2	0.363	0.003	0.	0.000	0.003	-0.
	SUTHERLN	0	90.5	96.3	0.844	0.014	0.	0.000	0.013	-0.
	BUTEFALS	0	90.8	96.5	0.036	0.000	0.	0.000	0.000	-0.
	WILBUR	0	90.8	96.5	0.674	0.005	0.	0.000	0.005	-0.
*	WNCHSTER	0	90.9	96.6	1.334	0.020	0.	0.001	0.018	-0.
*	DUGLASCO	0	88.4	94.7	9159.427	0.694	0.	0.193	0.501	-0.
	FLORENCE	0	91.0	96.7	0.028	0.000	0.	0.000	0.000	-0.
*	ROSEBURG	0	91.0	96.7	15.844	0.910	0.	0.216	0.694	-0.
	SHADYCOV	0	91.2	96.9	0.333	0.005	0.	0.002	0.004	-0.
*	MRTLCREK	0	91.4	97.0	5.280	0.136	0.	0.026	0.110	-0.
*	GREEN	0	91.4	97.0	9.000	0.185	0.	0.077	0.108	-0.
*	WINSTON	0	91.4	97.1	10.340	0.281	0.	0.112	0.168	-0.
*	DILLARD	0	91.5	97.1	5.259	0.089	0.	0.036	0.053	-0.
	GARDINER	0	91.5	97.1	0.059	0.001	0.	0.000	0.001	-0.
	REEDSPRT	0	91.6	97.2	0.230	0.007	0.	0.001	0.006	-0.
*	TRI CITY	0	91.6	97.2	1.569	0.027	0.	0.002	0.025	-0.
	CNYNVLLE	0	91.6	97.2	0.665	0.011	0.	0.000	0.011	-0.
*	RIDDLE	0	91.7	97.3	1.593	0.027	0.	0.002	0.026	-0.
	WHITECTY	0	91.7	97.3	0.088	0.001	0.	0.000	0.001	-0.
	WNCHSTRBA	0	91.8	97.4	0.067	0.001	0.	0.000	0.001	-0.
*	MILO	0	91.9	97.4	1.004	0.009	0.	0.000	0.009	-0.
	BELVIEW	0	91.9	97.5	0.008	0.000	0.	0.000	0.000	-0.
	ASHLAND	0	91.9	97.5	0.054	0.000	0.	0.000	0.000	-0.
	CENTRLPT	0	92.0	97.6	0.182	0.006	0.	0.001	0.005	-0.
*	JKSN CO	0	90.3	96.1	713.422	0.105	0.	0.031	0.075	-0.
	MEDFORD	0	92.0	97.5	0.714	0.025	0.	0.002	0.023	-0.

STC/SAI SAFETE RUN FOR S-40. GFM 90 PCT JANUARY WINDS 5/30/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	TALENT	0	92.0	97.6	0.031	0.000	0.	0.000	0.000	-0.
	PHOENIX	0	92.1	97.6	0.036	0.000	0.	0.000	0.000	-0.
	LAKESIDE	0	92.1	97.6	0.206	0.003	0.	0.001	0.002	-0.
	CNTRLPTW	0	92.1	97.6	0.162	0.003	0.	0.000	0.003	-0.
	MDFRDWST	0	92.1	97.6	0.128	0.004	0.	0.000	0.003	-0.
	SOUMDFRD	0	92.1	97.6	0.090	0.002	0.	0.000	0.002	-0.
	GOLDHILL	0	92.2	97.7	0.250	0.003	0.	0.001	0.002	-0.
	JKSNVLLE	0	92.3	97.8	0.120	0.002	0.	0.000	0.002	-0.
	WOLF CRK	0	92.4	97.8	0.204	0.001	0.	0.000	0.001	-0.
	ROGUERVR	0	92.5	98.0	0.330	0.005	0.	0.002	0.004	-0.
	EASTSIDE	0	92.6	98.0	0.672	0.012	0.	0.004	0.008	-0.
*	NORTHBND	0	92.6	98.0	1.251	0.064	0.	0.021	0.043	-0.
*	COOS BAY	0	92.6	98.1	2.002	0.103	0.	0.035	0.067	-0.
	POWERS	0	92.6	98.1	0.404	0.007	0.	0.002	0.004	-0.
	BUNKRHLL	0	92.7	98.1	0.670	0.012	0.	0.004	0.008	-0.
	LIBBY	0	92.7	98.2	0.336	0.002	0.	0.001	0.002	-0.
	MLNGTCN	0	92.8	98.2	0.339	0.002	0.	0.001	0.002	-0.
*	COOS CO	0	91.5	97.1	746.769	0.090	0.	0.023	0.068	-0.
*	GRANTPAS	0	92.8	98.2	2.662	0.128	0.	0.044	0.084	-0.
	MERLIN	0	92.8	98.3	0.286	0.002	0.	0.001	0.001	-0.
	FRUTDALE	0	92.8	98.3	0.857	0.021	0.	0.007	0.014	-0.
	BARVIEW	0	92.9	98.3	0.564	0.010	0.	0.003	0.007	-0.
	CHRLSTON	0	93.0	98.4	0.379	0.005	0.	0.002	0.003	-0.
*	JOSFINCO	0	91.7	97.3	723.348	0.067	0.	0.017	0.049	-0.
	GRNTPSSW	0	93.0	98.4	0.839	0.026	0.	0.009	0.017	-0.
	COQUILLE	0	93.1	98.5	0.678	0.015	0.	0.003	0.012	-0.
	MYRTLEPT	0	93.2	98.6	0.476	0.004	0.	0.000	0.004	-0.
	BANDON	0	93.7	99.0	0.543	0.010	0.	0.003	0.007	-0.
	APPLGATE	0	93.8	99.0	0.365	0.006	0.	0.002	0.004	-0.
	CAVE JCT	0	94.2	99.4	0.297	0.003	0.	0.001	0.002	-0.
	PRTORFRD	0	94.8	99.9	0.538	0.009	0.	0.000	0.009	-0.
*	CURRYCO	0	94.5	99.6	3224.309	0.160	0.	0.050	0.110	-0.
	HARBOR	0	95.8	100.8	0.298	0.004	0.	0.001	0.003	-0.
	BROOKNGS	0	95.9	100.9	0.595	0.013	0.	0.004	0.010	-0.
	GOLDBCH	0	96.1	101.2	0.390	0.004	0.	0.001	0.003	-0.

3. Hazards to Washington and California

This section contains computer printouts of hazards to Washington and California from the S-40 launch.

STC/SAI SAFETE RUN FOR S-40, GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LIBRTYLK	W	54.5	77.4			HAZARD LT	1.0E-09		
OTISORCH	W	54.5	77.4			HAZARD LT	1.0E-09		
TRNTWOOD	W	54.8	77.5			HAZARD LT	1.0E-09		
DEERPARK	W	54.9	77.6			HAZARD LT	1.0E-09		
OPRTUNTY	W	54.9	77.6			HAZARD LT	1.0E-09		
MILLWOOD	W	55.0	77.7			HAZARD LT	1.0E-09		
DISHMAN	W	55.1	77.7			HAZARD LT	1.0E-09		
PARKWTER	W	55.2	77.7			HAZARD LT	1.0E-09		
MORGNACR	N	55.2	77.8			HAZARD LT	1.0E-09		
ROCKFORD	W	55.2	77.8			HAZARD LT	1.0E-09		
COUNTYHM	W	55.3	77.8			HAZARD LT	1.0E-09		
FAIRFELD	W	55.9	78.0			HAZARD LT	1.0E-09		
TEKOA	W	56.1	78.1			HAZARD LT	1.0E-09		
SPOKNECO	W	54.0	77.0			HAZARD LT	1.0E-09		
AIRWYHTS	W	55.8	78.4			HAZARD LT	1.0E-09		
SPOKANE	W	56.6	78.3			HAZARD LT	1.0E-09		
FAIRCHLD	W	57.1	78.4			HAZARD LT	1.0E-09		
CHENEY	W	57.3	78.5			HAZARD LT	1.0E-09		
OAKSDALE	W	57.4	78.6			HAZARD LT	1.0E-09		
MEDCALLK	W	57.5	78.6			HAZARD LT	1.0E-09		
GARFILLD	W	57.5	78.6			HAZARD LT	1.0E-09		
ROSALIA	W	57.6	78.6			HAZARD LT	1.0E-09		
PALOUSE	W	57.6	78.6			HAZARD LT	1.0E-09		
PULLMAN	W	61.6	79.1	0.012	0.000	0.	0.000	0.000	-0.
ALBION	W	61.9	79.2			HAZARD LT	1.0E-09		
COLFAX	W	62.0	79.2			HAZARD LT	1.0E-09		
ST JOHN	W	62.1	79.2			HAZARD LT	1.0E-09		
UNIONTWN	W	62.1	79.3	0.034	0.000	0.	0.000	0.000	-0.
* WHTMANCO	W	56.9	78.4	10.943	0.000	0.	0.000	0.000	-0.
ENDICOTT	W	63.4	79.7			HAZARD LT	1.0E-09		
LINCLNCO	W	57.7	78.7			HAZARD LT	1.0E-09		
CLARKSTN	W	61.0	80.0	0.195	0.004	0.	0.000	0.004	-0.
ASOTIN	W	61.3	80.2	0.307	0.003	0.	0.000	0.003	-0.
CLRKSTNHT	W	61.5	80.3	0.053	0.000	0.	0.000	0.000	-0.
LACROSSE	W	61.6	80.3			HAZARD LT	1.0E-09		
POMEROY	W	61.7	80.3	0.020	0.000	0.	0.000	0.000	-0.
* GARFLDCO	W	63.2	79.7	26.260	0.000	0.	0.000	0.000	-0.
RITZVLLE	W	62.4	80.6			HAZARD LT	1.0E-09		
* ASOTINCO	W	61.2	80.1	465.204	0.040	0.	0.016	0.024	-0.
ADAMS CO	W	63.8	79.9			HAZARD LT	1.0E-09		
WSHTUCNA	W	63.6	81.1			HAZARD LT	1.0E-09		
DAYTON	W	63.9	81.2	0.029	0.000	0.	0.000	0.000	-0.
* COLMBIACO	W	62.4	80.6	67.872	0.001	0.	0.000	0.001	-0.
LIND	W	64.2	81.3			HAZARD LT	1.0E-09		
WAITSBRG	W	64.9	81.6	0.013	0.000	0.	0.000	0.000	-0.
KAHLOTUS	W	65.1	81.7			HAZARD LT	1.0E-09		
DUGLASCO	W	63.0	80.9			HAZARD LT	1.0E-09		
EPHRATA	W	65.4	81.9			HAZARD LT	1.0E-09		
MOSESLAK	W	66.0	82.1			HAZARD LT	1.0E-09		
MSLAKNOR	W	66.1	82.1			HAZARD LT	1.0E-09		

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
CHELAN	W	66.1	92.1			HAZARD LT 1.0E-09			
CONNELL	W	66.3	82.2			HAZARD LT 1.0E-09			
* WLAWLACO	W	64.4	81.4	92.710	0.009	0.	0.001	0.007	-0.
WALLAWLA	W	66.5	82.3	0.925	0.028	0.	0.003	0.025	-0.
GRANT CO	W	63.8	81.2			HAZARD LT 1.0E-09			
COLEGEPL	W	66.8	82.4	0.236	0.006	0.	0.001	0.005	-0.
OTHELLO	W	66.9	82.5			HAZARD LT 1.0E-09			
FRNKLNCO	W	65.5	81.9	0.110	0.000	0.	0.000	0.000	-0.
QUINCY	W	67.9	82.9			HAZARD LT 1.0E-09			
TOUCHET	W	69.0	83.0	0.020	0.000	0.	0.000	0.000	-0.
BURBANK	W	68.8	83.3	0.001	0.000	0.	0.000	0.000	-0.
PASCO	W	68.9	83.3	0.002	0.000	0.	0.000	0.000	-0.
RVRVIEW	W	69.0	83.4	0.001	0.000	0.	0.000	0.000	-0.
WENATCHE	W	69.9	83.4			HAZARD LT 1.0E-09			
KENEWICK	W	69.1	83.4	0.002	0.000	0.	0.000	0.000	-0.
RICHLAND	W	69.4	83.6	0.001	0.000	0.	0.000	0.000	-0.
CHELANCO	W	66.4	82.3			HAZARD LT 1.0E-09			
WRICHLND	W	69.6	83.7			HAZARD LT 1.0E-09			
BENTNCTY	W	70.2	83.9			HAZARD LT 1.0E-09			
BENTONCO	W	68.0	83.0	0.686	0.000	0.	0.000	0.000	-0.
KITITSCO	W	68.9	83.3			HAZARD LT 1.0E-09			
FLENSBRG	W	71.5	84.6			HAZARD LT 1.0E-09			
PROSSER	W	71.6	84.6			HAZARD LT 1.0E-09			
SUNYSIDE	W	72.0	84.8			HAZARD LT 1.0E-09			
GRNDVIEW	W	72.0	84.8			HAZARD LT 1.0E-09			
SBRODWAY	W	72.1	84.8			HAZARD LT 1.0E-09			
MOXEECTY	W	72.3	84.9			HAZARD LT 1.0E-09			
OUTLOOK	W	72.4	84.9			HAZARD LT 1.0E-09			
MARTON	W	72.4	85.0			HAZARD LT 1.0E-09			
SELAH	W	72.6	85.1			HAZARD LT 1.0E-09			
ZILLAH	W	72.7	85.1			HAZARD LT 1.0E-09			
YAKIMACO	W	69.9	83.8	0.001	0.000	0.	0.000	0.000	-0.
GRANGER	W	72.7	85.1			HAZARD LT 1.0E-09			
TRRACEHT	W	72.7	85.1			HAZARD LT 1.0E-09			
BUENA	W	72.8	85.2			HAZARD LT 1.0E-09			
FAIRVIEW	W	72.8	85.2			HAZARD LT 1.0E-09			
FRUITVLE	W	72.9	85.2			HAZARD LT 1.0E-09			
YAKIMA	W	72.7	85.1			HAZARD LT 1.0E-09			
UNIONGAP	W	73.0	85.2			HAZARD LT 1.0E-09			
NACHES	W	73.0	85.3			HAZARD LT 1.0E-09			
GLEED	W	73.0	85.3			HAZARD LT 1.0E-09			
TOPPNISH	W	73.0	85.3			HAZARD LT 1.0E-09			
PARKER	W	73.1	85.3			HAZARD LT 1.0E-09			
WAPATO	W	73.1	85.3			HAZARD LT 1.0E-09			
TIETON	W	73.4	85.5			HAZARD LT 1.0E-09			
WILEY	W	73.7	85.6			HAZARD LT 1.0E-09			
HARRAH	W	73.8	85.7			HAZARD LT 1.0E-09			
KING CO	W	72.0	84.7			HAZARD LT 1.0E-09			
REDMOND	W	74.5	85.9			HAZARD LT 1.0E-09			
BOTHELL	W	74.5	86.0			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR S-40, GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
ROSEHILL	W	74.8	86.1			HAZARD LT	1.0E-09		
ISSAQUAH	W	74.9	86.1			HAZARD LT	1.0E-09		
KENMORE	W	74.9	86.1			HAZARD LT	1.0E-09		
INGLWOOD	W	74.8	86.1			HAZARD LT	1.0E-09		
JUANITA	W	74.8	86.1			HAZARD LT	1.0E-09		
KIRKLAND	W	74.9	86.1			HAZARD LT	1.0E-09		
RCHMDHLN	W	74.9	86.2			HAZARD LT	1.0E-09		
BELLEVUE	W	74.8	86.1			HAZARD LT	1.0E-09		
EASTGATE	W	75.0	86.2			HAZARD LT	1.0E-09		
CLYDHILL	W	75.0	86.2			HAZARD LT	1.0E-09		
NORTHCTY	W	75.0	86.2			HAZARD LT	1.0E-09		
RDGECRST	W	75.1	86.3			HAZARD LT	1.0E-09		
RCHMDBCH	W	75.1	86.3			HAZARD LT	1.0E-09		
BRTTWKSN	W	75.1	86.3			HAZARD LT	1.0E-09		
MRCERISL	W	75.2	86.3			HAZARD LT	1.0E-09		
MEDINA	W	75.3	86.4			HAZARD LT	1.0E-09		
LAKRIDGE	W	75.5	86.5			HAZARD LT	1.0E-09		
RENTON	W	75.4	86.5			HAZARD LT	1.0E-09		
SEATTLE	W	75.3	86.4			HAZARD LT	1.0E-09		
LAKFRSTPK	W	75.5	86.5			HAZARD LT	1.0E-09		
TUKWILA	W	75.6	86.5			HAZARD LT	1.0E-09		
SKYWAY	W	75.6	86.6			HAZARD LT	1.0E-09		
ENUMCLAW	W	75.8	86.6			HAZARD LT	1.0E-09		
RVRTNHTS	W	75.9	86.6			HAZARD LT	1.0E-09		
WHITECTR	W	75.8	86.7			HAZARD LT	1.0E-09		
KENT	W	75.9	86.7			HAZARD LT	1.0E-09		
BURIEN	W	75.9	86.7			HAZARD LT	1.0E-09		
BUCKLEY	W	76.0	86.8			HAZARD LT	1.0E-09		
SEAHURST	W	76.0	86.8			HAZARD LT	1.0E-09		
NRMNDYPK	W	76.1	86.8			HAZARD LT	1.0E-09		
DESMOINE	W	76.1	86.8			HAZARD LT	1.0E-09		
AUBURN	W	76.2	86.9			HAZARD LT	1.0E-09		
BRMRTNEA	W	76.5	87.0			HAZARD LT	1.0E-09		
FEDRLWAY	W	76.4	87.0			HAZARD LT	1.0E-09		
KITSAPCO	W	75.7	86.6			HAZARD LT	1.0E-09		
BREMRTON	W	76.5	87.0			HAZARD LT	1.0E-09		
SUMNER	W	76.5	87.1			HAZARD LT	1.0E-09		
BONNYLAK	W	76.5	87.1			HAZARD LT	1.0E-09		
PRTOCHRD	W	76.6	87.1			HAZARD LT	1.0E-09		
NAVYDCTY	W	76.6	87.1			HAZARD LT	1.0E-09		
GOLDNDLE	W	76.6	87.1			HAZARD LT	1.0E-09		
MILTON	W	76.7	87.1			HAZARD LT	1.0E-09		
PUYALLUP	W	76.8	87.2			HAZARD LT	1.0E-09		
TACOMA	W	76.9	87.3			HAZARD LT	1.0E-09		
PIERCECO	W	75.3	86.4			HAZARD LT	1.0E-09		
MIDLAND	W	77.2	87.4			HAZARD LT	1.0E-09		
FIRCREST	W	77.3	87.5			HAZARD LT	1.0E-09		
PARKLAND	W	77.3	87.5			HAZARD LT	1.0E-09		
KLIKTATCO	W	75.4	86.4	0.680	0.000	0.	0.000	0.000	-0.
UNIV.PL	W	77.3	87.5			HAZARD LT	1.0E-09		

STC/SAI SAFFTE RUN FOR S-40, GFM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	FC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LAKWDCTR	W	77.4	87.5			HAZARD LT	1.0E-09		
SPANAWAY	W	77.5	87.6			HAZARD LT	1.0E-09		
WISHRAM	W	77.6	87.7			HAZARD LT	1.0E-09		
STEILACM	W	77.8	87.7			HAZARD LT	1.0E-09		
JEFPSNCO1	W	76.5	87.0			HAZARD LT	1.0E-09		
LEWISCO1	W	76.3	86.9			HAZARD LT	1.0E-09		
LYLE	W	78.6	88.2			HAZARD LT	1.0E-09		
LACEY	W	78.9	88.3			HAZARD LT	1.0E-09		
MASON CO	W	77.5	87.6			HAZARD LT	1.0E-09		
BINGEN	W	79.0	88.4			HAZARD LT	1.0E-09		
OLYMPIA	W	79.1	88.5			HAZARD LT	1.0E-09		
THRSTNCO	W	73.1	87.9			HAZARD LT	1.0E-09		
TUMWATER	W	79.3	88.6			HAZARD LT	1.0E-09		
CARSON	W	80.1	89.0			HAZARD LT	1.0E-09		
JFRSNCO2	W	78.8	88.3			HAZARD LT	1.0E-09		
LEWISCO2	W	78.6	88.2			HAZARD LT	1.0E-09		
CNTRALIA	W	80.4	89.2			HAZARD LT	1.0E-09		
STVNSON	W	80.4	89.2			HAZARD LT	1.0E-09		
SKMANIACO	W	78.6	88.2	0.041	0.000	0.	0.000	0.000	-0.
CHEHALIS	W	80.5	89.3			HAZARD LT	1.0E-09		
NBONNVLL	W	80.7	89.4			HAZARD LT	1.0E-09		
GRAHBRCO	W	79.3	88.6			HAZARD LT	1.0E-09		
COWLTZCO	W	79.8	88.9			HAZARD LT	1.0E-09		
MNTESANO	W	81.3	89.8			HAZARD LT	1.0E-09		
YACOLT	W	81.4	89.8			HAZARD LT	1.0E-09		
AMBOY	W	81.4	89.8			HAZARD LT	1.0E-09		
CNTRALPK	W	81.6	90.0			HAZARD LT	1.0E-09		
KELSO	W	82.0	90.2			HAZARD LT	1.0E-09		
ABERDEEN	W	81.9	90.2			HAZARD LT	1.0E-09		
MEDWGLDE	W	82.0	90.2			HAZARD LT	1.0E-09		
WSHOUGAL	W	82.1	90.2			HAZARD LT	1.0E-09		
CLARKCO	W	81.1	89.6			HAZARD LT	1.0E-09		
LONGVIEW	W	82.0	90.2			HAZARD LT	1.0E-09		
HOQUIAM	W	82.1	90.3			HAZARD LT	1.0E-09		
LACENTER	W	82.2	90.3			HAZARD LT	1.0E-09		
CAMAS	W	82.2	90.4			HAZARD LT	1.0E-09		
WOODLAND	W	82.3	90.4			HAZARD LT	1.0E-09		
SALMNCRK	W	82.3	90.4			HAZARD LT	1.0E-09		
SIFTON	W	82.3	90.4			HAZARD LT	1.0E-09		
BTTLGRND	W	82.4	90.5			HAZARD LT	1.0E-09		
ORCHARDS	W	82.4	90.5			HAZARD LT	1.0E-09		
RIDGEFLD	W	82.5	90.5			HAZARD LT	1.0E-09		
RAYMOND	W	82.6	90.6			HAZARD LT	1.0E-09		
LAKESHOR	W	82.6	90.6			HAZARD LT	1.0E-09		
PACFICCO	W	81.4	89.9			HAZARD LT	1.0E-09		
HAZLDELL	W	82.7	90.6			HAZARD LT	1.0E-09		
MINEHAHA	W	82.7	90.6			HAZARD LT	1.0E-09		
VANCOUVER	W	82.8	90.7			HAZARD LT	1.0E-09		
WAKAKMCO	W	82.8	90.7			HAZARD LT	1.0E-09		
						HAZARD LT	1.0E-09		

STC/SAI SAFFTE RUN FOR S-49, GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
MODOC CO C	86.1	93.0			HAZARD LT	1.0E-09		
TULELAKE C	89.8	95.7			HAZARD LT	1.0E-09		
LASSENCO C	88.0	94.4			HAZARD LT	1.0E-09		
DORRIS C	90.6	96.4			HAZARD LT	1.0E-09		
SUSANVLL C	91.1	96.8			HAZARD LT	1.0E-09		
PLUMASCO1C	90.7	96.4			HAZARD LT	1.0E-09		
HRNBROOK C	92.4	97.9			HAZARD LT	1.0E-09		
HILT C	92.5	98.0			HAZARD LT	1.0E-09		
MONTAGUE C	92.7	98.2			HAZARD LT	1.0E-09		
MTSHASTA C	92.9	98.2			HAZARD LT	1.0E-09		
PLMASCO2 C	91.7	97.3			HAZARD LT	1.0E-09		
WEED C	92.8	98.3			HAZARD LT	1.0E-09		
GRENADA C	92.9	98.3			HAZARD LT	1.0E-09		
* SISKYUCO C	90.3	96.2	2.617	0.000	0.	0.000	0.000	-0.
YREKA C	92.9	98.3			HAZARD LT	1.0E-09		
MCLOUD C	92.9	98.3			HAZARD LT	1.0E-09		
QUINCY C	92.9	96.3			HAZARD LT	1.0E-09		
DUNSMUIR C	93.2	98.5			HAZARD LT	1.0E-09		
SHASTACO C	91.5	97.1	0.001	0.000	0.	0.000	0.000	-0.
FTJONES C	93.5	98.9			HAZARD LT	1.0E-09		
ETNA C	93.9	99.1			HAZARD LT	1.0E-09		
HAPYCAMP C	94.1	99.3	0.001	0.000	0.	0.000	0.000	-0.
ENTPRRIS C	94.7	99.9			HAZARD LT	1.0E-09		
YUBA CO1 C	94.2	99.4			HAZARD LT	1.0E-09		
REDDING C	94.9	99.9			HAZARD LT	1.0E-09		
BONNYVEW C	94.9	100.0			HAZARD LT	1.0E-09		
PARADISE C	95.0	100.1			HAZARD LT	1.0E-09		
BUTTE CO C	93.7	99.0			HAZARD LT	1.0E-09		
ANDERSON C	95.0	100.1			HAZARD LT	1.0E-09		
TEHAMACO1C	93.9	99.1			HAZARD LT	1.0E-09		
COLUSACO C	94.2	99.4			HAZARD LT	1.0E-09		
OROVILLE C	95.3	100.4			HAZARD LT	1.0E-09		
SOROVLLE C	95.4	100.4			HAZARD LT	1.0E-09		
REDBLUFF C	95.4	100.4			HAZARD LT	1.0E-09		
THRMOLTO C	95.4	100.4			HAZARD LT	1.0E-09		
LEWISTON C	95.5	100.6			HAZARD LT	1.0E-09		
CHICO C	95.5	100.5			HAZARD LT	1.0E-09		
CHCONRTH C	95.5	100.6			HAZARD LT	1.0E-09		
CHCOVCNO C	95.5	100.6			HAZARD LT	1.0E-09		
GASQUET C	95.6	100.7	0.014	0.000	0.	0.000	0.000	-0.
SMITHRVR C	95.7	100.8	0.043	0.000	0.	0.000	0.000	-0.
GRIDLEY C	95.8	100.9			HAZARD LT	1.0E-09		
CORNING C	95.8	100.9			HAZARD LT	1.0E-09		
YUBA CO2 C	95.4	100.4			HAZARD LT	1.0E-09		
WEVRVILL C	95.9	100.9			HAZARD LT	1.0E-09		
TRINTYCO1C	94.9	99.9	0.028	0.000	0.	0.000	0.000	-0.
* DLNORTCO C	95.0	100.1	45.973	0.003	0.	0.000	0.003	-0.
ORLEANS C	95.9	101.0	0.001	0.000	0.	0.000	0.000	-0.
CRSNTNRTHC	96.0	101.1	0.044	0.001	0.	0.000	0.001	-0.
NRTHCRST C	96.0	101.1	0.023	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR S-40. GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LIVE OAK	C	96.0	101.1			HAZARD LT 1.0E-09			
CRSNTCTY	C	96.0	101.1	0.035	0.000	0.	0.000	0.000	-0.
MARYSVLL	C	96.1	101.2			HAZARD LT 1.0E-09			
OLIVHRST	C	96.1	101.2			HAZARD LT 1.0E-09			
KLAMATH	C	96.1	101.2	0.007	0.000	0.	0.000	0.000	-0.
TEHMACO2	C	95.1	100.2			HAZARD LT 1.0E-09			
ORLAND	C	96.2	101.2			HAZARD LT 1.0E-09			
LINDA	C	96.1	101.2			HAZARD LT 1.0E-09			
YUBACITY	C	96.2	101.2			HAZARD LT 1.0E-09			
YBACTYSO	C	96.2	101.3			HAZARD LT 1.0E-09			
TRINTYCO	C	94.9	100.0	0.381	0.000	0.	0.000	0.000	-0.
SUTTERCO	C	95.9	101.0			HAZARD LT 1.0E-09			
HAYFORK	C	96.6	101.7			HAZARD LT 1.0E-09			
HOOPA	C	96.6	101.7	0.001	0.000	0.	0.000	0.000	-0.
WILLOWS	C	96.6	101.7			HAZARD LT 1.0E-09			
WILLWCRK	C	96.8	101.8			HAZARD LT 1.0E-09			
SALYER	C	96.8	101.8			HAZARD LT 1.0E-09			
COLUSA	C	96.9	101.9			HAZARD LT 1.0E-09			
GLENN CO	C	95.9	101.0			HAZARD LT 1.0E-09			
ORICK	C	97.0	102.0	0.098	0.000	0.	0.000	0.000	-0.
WASHNGTN	C	97.0	102.1			HAZARD LT 1.0E-09			
WSCRMNTO	C	97.0	102.1			HAZARD LT 1.0E-09			
BRYTE	C	97.1	102.1			HAZARD LT 1.0E-09			
SACRMNTO	C	96.8	101.9			HAZARD LT 1.0E-09			
TRNTYCO2	C	96.2	101.2	0.002	0.000	0.	0.000	0.000	-0.
STOKTON	C	97.2	102.3			HAZARD LT 1.0E-09			
WOODLAND	C	97.4	102.5			HAZARD LT 1.0E-09			
FIELDBRK	C	97.5	102.6	0.001	0.000	0.	0.000	0.000	-0.
WSTHAVEN	C	97.5	102.6	0.003	0.000	0.	0.000	0.000	-0.
TRINIDAD	C	97.5	102.6	0.003	0.000	0.	0.000	0.000	-0.
BLUELAKE	C	97.6	102.7	0.001	0.000	0.	0.000	0.000	-0.
DAVIS	C	97.6	102.7			HAZARD LT 1.0E-09			
YOLO CO	C	96.8	101.8			HAZARD LT 1.0E-09			
MKNLYVLL	C	97.6	102.7	0.003	0.000	0.	0.000	0.000	-0.
ALLIANCE	C	97.8	102.9	0.001	0.000	0.	0.000	0.000	-0.
ARCATA	C	97.9	102.9	0.004	0.000	0.	0.000	0.000	-0.
SUNNYBRA	C	97.9	103.0	0.001	0.000	0.	0.000	0.000	-0.
MYRTLTWN	C	98.0	103.2	0.002	0.000	0.	0.000	0.000	-0.
ROSEWOOD	C	98.1	103.2	0.001	0.000	0.	0.000	0.000	-0.
EUREKA	C	98.1	103.2	0.006	0.000	0.	0.000	0.000	-0.
PINEHILL	C	98.1	103.3	0.001	0.000	0.	0.000	0.000	-0.
BAYVIEW	C	98.2	103.3	0.001	0.000	0.	0.000	0.000	-0.
CUTTEN	C	98.2	103.3	0.002	0.000	0.	0.000	0.000	-0.
SAMOA	C	98.2	103.3	0.001	0.000	0.	0.000	0.000	-0.
ALDRPOIN	C	98.3	103.4			HAZARD LT 1.0E-09			
CARLOTTA	C	98.4	103.5			HAZARD LT 1.0E-09			
FIELDLDG	C	98.4	103.5	0.001	0.000	0.	0.000	0.000	-0.
* HMBOLTCO	C	95.7	101.8	1.278	0.000	0.	0.000	0.000	-0.
HYDESVLL	C	98.5	103.7			HAZARD LT 1.0E-09			
FERNDALE	C	98.5	103.7			HAZARD LT 1.0E-09			

STC75AT SAFETY RUN FOR S-49. GEM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO.

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	FC(X10-6) CLASS 3	FC(X10-6) CLASS 4
LOLETA	C	98.5	103.7			HAZARD LT 1.0E-09			
FORTUNA	C	98.6	103.7	0.001	0.000	0.	0.000	0.000	-0.
CMPTNHTS	C	98.6	103.8			HAZARD LT 1.0E-09			
WEOTT	C	98.6	103.8			HAZARD LT 1.0E-09			
LAKE CO	C	97.7	102.8			HAZARD LT 1.0E-09			
RIO DELL	C	98.6	103.8			HAZARD LT 1.0E-09			
SCOTIA	C	98.6	103.8			HAZARD LT 1.0E-09			
CLRLKHLN	C	98.7	103.9			HAZARD LT 1.0E-09			
MNDCNOCO1	C	98.0	103.1			HAZARD LT 1.0E-09			
MIRANDA	C	98.7	103.9			HAZARD LT 1.0E-09			
CAPPRVLL	C	98.8	104.0			HAZARD LT 1.0E-09			
REDWAY	C	98.8	104.0			HAZARD LT 1.0E-09			
HEALDBRG	C	98.9	104.1			HAZARD LT 1.0E-09			
ANGWIN	C	99.0	104.2			HAZARD LT 1.0E-09			
NAPA CO	C	98.3	103.4			HAZARD LT 1.0E-09			
LAKEPORT	C	99.1	104.4			HAZARD LT 1.0E-09			
STHELENA	C	99.2	104.4			HAZARD LT 1.0E-09			
WILLITS	C	99.2	104.4			HAZARD LT 1.0E-09			
NAPA	C	99.3	104.5			HAZARD LT 1.0E-09			
UKIAH	C	99.4	104.7			HAZARD LT 1.0E-09			
HOYSHTSP	C	99.6	104.8			HAZARD LT 1.0E-09			
SONOMA	C	99.6	104.9			HAZARD LT 1.0E-09			
CLOVRDLE	C	99.7	105.0			HAZARD LT 1.0E-09			
MNDCNOCO2	C	99.1	104.3			HAZARD LT 1.0E-09			
SNTAROSA	C	99.8	105.0			HAZARD LT 1.0E-09			
SONOMACO	C	98.8	104.0			HAZARD LT 1.0E-09			
ROHNRTPK	C	99.9	105.2			HAZARD LT 1.0E-09			
ROSELAND	C	99.9	105.2			HAZARD LT 1.0E-09			
BERKELEY	C	99.8	105.1			HAZARD LT 1.0E-09			
PETALUMA	C	100.0	105.3			HAZARD LT 1.0E-09			
SBSTOPOL	C	100.1	105.4			HAZARD LT 1.0E-09			
FRTBRAGG	C	100.2	105.5			HAZARD LT 1.0E-09			
MARIN CO	C	99.6	104.9			HAZARD LT 1.0E-09			
NOVATO	C	100.2	105.5			HAZARD LT 1.0E-09			
OAKLAND	C	99.9	105.2			HAZARD LT 1.0E-09			
IGNACIO	C	100.3	105.5			HAZARD LT 1.0E-09			
STAVNTIA	C	100.3	105.6			HAZARD LT 1.0E-09			
FREMONT	C	100.1	105.3			HAZARD LT 1.0E-09			
TRRALNDA	C	100.3	105.6			HAZARD LT 1.0E-09			
MARINWOD	C	100.4	105.6			HAZARD LT 1.0E-09			
SAN JOSE	C	100.1	105.4			HAZARD LT 1.0E-09			
BLVEDERE	C	100.4	105.7			HAZARD LT 1.0E-09			
TIBURON	C	100.4	105.7			HAZARD LT 1.0E-09			
GRENBRAE	C	100.4	105.7			HAZARD LT 1.0E-09			
SNRAFAEL	C	100.4	105.6			HAZARD LT 1.0E-09			
LARKSPUR	C	100.5	105.8			HAZARD LT 1.0E-09			
CORTMDRA	C	100.5	105.8			HAZARD LT 1.0E-09			
KNTFIELD	C	100.5	105.8			HAZARD LT 1.0E-09			
FAIRFAX	C	100.5	105.8			HAZARD LT 1.0E-09			
ROSS	C	100.5	105.8			HAZARD LT 1.0E-09			

STC/SAI SAFFTF RUN FOR S-40. GFM 90 PCT JANUARY WINDS 5/29/74

JANUARY 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SNANSLMO C	100.5	105.8			HAZARD LT	1.0E-09		
STPBRYPT C	100.5	105.9			HAZARD LT	1.0E-09		
MILVALLY C	100.6	105.9			HAZARD LT	1.0E-09		
TMLPSVLY C	100.6	105.9			HAZARD LT	1.0E-09		
SNFRNCSCOC	100.5	105.9			HAZARD LT	1.0E-09		
SAUSLITO C	100.8	106.1			HAZARD LT	1.0E-09		

C. HAZARDS FROM G-3 LAUNCH

This section contains computer printouts of hazards from the G-3 Launch.

1. Hazards to Montana and Idaho

This section contains computer printouts of hazards to Montana and Idaho from the G-3 launch.

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS) 5/30/74

APRIL 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SUNBURST M					HAZARD LT	1.0E-09		
TOOLE CO M			0.004	0.000	0.	0.000	0.000	-0.
SHELBY M					HAZARD LT	1.0E-09		
BELT M					HAZARD LT	1.0E-09		
S40 45					HAZARD LT	1.0E-09		
S40 4					HAZARD LT	1.0E-09		
S40 3					HAZARD LT	1.0E-09		
BLAKEGLE M					HAZARD LT	1.0E-09		
S40 5					HAZARD LT	1.0E-09		
S40 6					HAZARD LT	1.0E-09		
S40 46					HAZARD LT	1.0E-09		
S40 42					HAZARD LT	1.0E-09		
S40 41					HAZARD LT	1.0E-09		
S40 40					HAZARD LT	1.0E-09		
S40 7					HAZARD LT	1.0E-09		
S40 2					HAZARD LT	1.0E-09		
S40 1					HAZARD LT	1.0E-09		
S40 39					HAZARD LT	1.0E-09		
S40 47					HAZARD LT	1.0E-09		
S40 38					HAZARD LT	1.0E-09		
S40 8					HAZARD LT	1.0E-09		
STOCKETT M					HAZARD LT	1.0E-09		
S40 10					HAZARD LT	1.0E-09		
S40 9					HAZARD LT	1.0E-09		
S40 37					HAZARD LT	1.0E-09		
S40 43					HAZARD LT	1.0E-09		
S40 36					HAZARD LT	1.0E-09		
GREATFLL M					HAZARD LT	1.0E-09		
S40 48					HAZARD LT	1.0E-09		
S40 49					HAZARD LT	1.0E-09		
S40 11					HAZARD LT	1.0E-09		
SANDCULE M					HAZARD LT	1.0E-09		
S40 35					HAZARD LT	1.0E-09		
CUT BANK M					HAZARD LT	1.0E-09		
S40 12					HAZARD LT	1.0E-09		
S40 50					HAZARD LT	1.0E-09		
S40 15					HAZARD LT	1.0E-09		
S40 13					HAZARD LT	1.0E-09		
S40 16					HAZARD LT	1.0E-09		
S40 34					HAZARD LT	1.0E-09		
S40 63					HAZARD LT	1.0E-09		
S40 33					HAZARD LT	1.0E-09		
S40 32					HAZARD LT	1.0E-09		
S40 14					HAZARD LT	1.0E-09		
S40 17					HAZARD LT	1.0E-09		
S40 22					HAZARD LT	1.0E-09		
S40 31					HAZARD LT	1.0E-09		
S40 29					HAZARD LT	1.0E-09		
S40 64					HAZARD LT	1.0E-09		
S40 30					HAZARD LT	1.0E-09		

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN TMAX (SECS)(SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S40 23				HAZARD LT 1.0E-09			
S40 28				HAZARD LT 1.0E-09			
S40 51				HAZARD LT 1.0E-09			
S40 21				HAZARD LT 1.0E-09			
S40 52				HAZARD LT 1.0E-09			
S40 24				HAZARD LT 1.0E-09			
S40 27				HAZARD LT 1.0E-09			
S40 65				HAZARD LT 1.0E-09			
S40 54				HAZARD LT 1.0E-09			
S40 18				HAZARD LT 1.0E-09			
S40 20				HAZARD LT 1.0E-09			
S40 19				HAZARD LT 1.0E-09			
S40 53				HAZARD LT 1.0E-09			
S40 25				HAZARD LT 1.0E-09			
S40 26				HAZARD LT 1.0E-09			
S40 55				HAZARD LT 1.0E-09			
S40 56				HAZARD LT 1.0E-09			
S40 66				HAZARD LT 1.0E-09			
S40 67				HAZARD LT 1.0E-09			
S40 57				HAZARD LT 1.0E-09			
S40 72				HAZARD LT 1.0E-09			
S40 71				HAZARD LT 1.0E-09			
CONRAD M				HAZARD LT 1.0E-09			
S40 70				HAZARD LT 1.0E-09			
S40 58				HAZARD LT 1.0E-09			
S40 59				HAZARD LT 1.0E-09			
DUTTON M				HAZARD LT 1.0E-09			
S40 68				HAZARD LT 1.0E-09			
S40 61				HAZARD LT 1.0E-09			
GLACIERCCM		0.005	0.000	0.	0.000	0.000	-0.
CSCADECO M				LAUNCH VICINITY			
S40 60				HAZARD LT 1.0E-09			
S40 62				HAZARD LT 1.0E-09			
S40 69				HAZARD LT 1.0E-09			
S40 44				HAZARD LT 1.0E-09			
PONDERACOM		0.008	0.0C0	0.	0.000	0.000	-0.
S37 47				HAZARD LT 1.0E-09			
S37 46				HAZARD LT 1.0E-09			
MEGHERCO M		0.002	0.000	0.	0.000	0.000	-0.
S37 54				HAZARD LT 1.0E-09			
S37 53				HAZARD LT 1.0E-09			
S37 12				HAZARD LT 1.0E-09			
S37 23				HAZARD LT 1.0E-09			
S37 13				HAZARD LT 1.0E-09			
S37 50				HAZARD LT 1.0E-09			
S37 45				HAZARD LT 1.0E-09			
S37 24				HAZARD LT 1.0E-09			
S37 14				HAZARD LT 1.0E-09			
S37 22				HAZARD LT 1.0E-09			
S37 48				HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FCR G-03. GFM 90 PCT APRIL WINDS 5/30/74

~~APRIL 90 PERCENT WINDS~~

~~RUN NO.~~

HAZARD SUMMARY TAHLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S37	27					HAZARD LT 1.0E-09			
S37	49					HAZARD LT 1.0E-09			
ULM	M					HAZARD LT 1.0E-09			
S37	52					HAZARD LT 1.0E-09			
S37	60					HAZARD LT 1.0E-09			
S37	41					HAZARD LT 1.0E-09			
S37	29					HAZARD LT 1.0E-09			
S37	15					HAZARD LT 1.0E-09			
VALIER	M					HAZARD LT 1.0E-09			
S37	17					HAZARD LT 1.0E-09			
S37	34					HAZARD LT 1.0E-09			
S37	28					HAZARD LT 1.0E-09			
S37	43					HAZARD LT 1.0E-09			
S37	16					HAZARD LT 1.0E-09			
S37	81					HAZARD LT 1.0E-09			
S37	59					HAZARD LT 1.0E-09			
S37	36					HAZARD LT 1.0E-09			
S37	26					HAZARD LT 1.0E-09			
S37	31					HAZARD LT 1.0E-09			
S37	37					HAZARD LT 1.0E-09			
S37	38					HAZARD LT 1.0E-09			
S37	1					HAZARD LT 1.0E-09			
S37	33					HAZARD LT 1.0E-09			
S37	57					HAZARD LT 1.0E-09			
S37	56					HAZARD LT 1.0E-09			
S37	55					HAZARD LT 1.0E-09			
S37	42					HAZARD LT 1.0E-09			
S37	21					HAZARD LT 1.0E-09			
S37	32					HAZARD LT 1.0E-09			
S37	39					HAZARD LT 1.0E-09			
S37	40					HAZARD LT 1.0E-09			
S37	3					HAZARD LT 1.0E-09			
S37	18					HAZARD LT 1.0E-09			
S37	44					HAZARD LT 1.0E-09			
S37	4					HAZARD LT 1.0E-09			
WITSLFSP	M					HAZARD LT 1.0E-09			
S37	9					HAZARD LT 1.0E-09			
S37	2					HAZARD LT 1.0E-09			
S37	10					HAZARD LT 1.0E-09			
S37	11					HAZARD LT 1.0E-09			
S37	19					HAZARD LT 1.0E-09			
S37	6					HAZARD LT 1.0E-09			
S37	7					HAZARD LT 1.0E-09			
S37	8					HAZARD LT 1.0E-09			
S37	20					HAZARD LT 1.0E-09			
S37	5					HAZARD LT 1.0E-09			
S37	30					HAZARD LT 1.0E-09			
S37	58					HAZARD LT 1.0E-09			
G4	13A					HAZARD LT 1.0E-09			
G4	13B					HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G3 7					HAZARD LT 1.0E-09			
G3 6					HAZARD LT 1.0E-09			
G3 8					HAZARD LT 1.0E-09			
G3 5					HAZARD LT 1.0E-09			
S37 25					HAZARD LT 1.0E-09			
TETON CO M			0.022	C.000	0.	0.000	0.000	-0.
G3G4 11					HAZARD LT 1.0E-09			
FAIRFLD M					HAZARD LT 1.0E-09			
G3G4 12					HAZARD LT 1.0E-09			
G3 9					HAZARD LT 1.0E-09			
G4 18					HAZARD LT 1.0E-09			
CASCADE M					HAZARD LT 1.0E-09			
G3 4A					HAZARD LT 1.0E-09			
G4 16					HAZARD LT 1.0E-09			
G4 15					HAZARD LT 1.0E-09			
G4 19					HAZARD LT 1.0E-09			
G3 4B					HAZARD LT 1.0E-09			
CHOTEAU M					HAZARD LT 1.0E-09			
G4 20					HAZARD LT 1.0E-09			
G3 3					HAZARD LT 1.0E-09			
G3G4G514					HAZARD LT 1.0E-09			
G3 2					HAZARD LT 1.0E-09			
G3 1	9.3	14.4			HAZARD LT 1.0E-09			
G3G4G521	16.4	26.8			HAZARD LT 1.0E-09			
G4G5 22	16.5	27.0			HAZARD LT 1.0E-09			
G5 23	18.5	30.3			HAZARD LT 1.0E-09			
G5 24	18.7	30.5			HAZARD LT 1.0E-09			
G5 26	21.1	33.6			HAZARD LT 1.0E-09			
G5 27	21.5	34.1			HAZARD LT 1.0E-09			
BROWNING M	21.3	33.9			HAZARD LT 1.0E-09			
G5 29	22.5	35.7			HAZARD LT 1.0E-09			
G5 31	22.7	36.0			HAZARD LT 1.0E-09			
G5 30	22.8	36.1			HAZARD LT 1.0E-09			
G6 32	23.3	36.9			HAZARD LT 1.0E-09			
G5G6 28	24.6	38.8			HAZARD LT 1.0E-09			
G6 36	28.4	45.1	0.001	0.0C3	0.	0.000	0.003	-0.
G6 34B	28.6	45.3			HAZARD LT 1.0E-09			
G6 34A	28.7	45.4			HAZARD LT 1.0E-09			
G6 37	30.1	47.2	0.026	0.043	0.	0.009	0.033	-0.
G6G7 38	30.8	48.7	0.002	0.005	0.	0.004	0.001	-0.
G6 33A	30.8	48.9			HAZARD LT 1.0E-09			
G6 33B	30.9	49.2			HAZARD LT 1.0E-09			
G6G7 39	31.0	49.3	0.010	0.037	0.	0.025	0.012	-0.
G6G7 40	32.8	52.5			HAZARD LT 1.0E-09			
AUGUSTA M	32.9	52.5			HAZARD LT 1.0E-09			
G7 44B	33.3	53.2			HAZARD LT 1.0E-09			
G7 44A	33.3	53.3			HAZARD LT 1.0E-09			
TOWNSEND M	33.6	53.6			HAZARD LT 1.0E-09			
BRDWTRCO M	9.5	60.0	0.003	0.000	0.	0.000	0.000	-0.
G7 41A	34.5	55.1			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-03, GFW 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G7 42A	34.8	55.3			HAZARD LT	1.0E-09		
G7 42B	34.9	55.4			HAZARD LT	1.0E-09		
G7 43	35.1	55.6			HAZARD LT	1.0E-09		
* LWSCLKCO M	56.5	60.0	17495.345	6.430	0.	0.000	6.4[illegible]	-0.
HELENA M	36.8	60.0			HAZARD LT	1.0E-09		
BOULDER M	40.6	63.7			HAZARD LT	1.0E-09		
LINCOLN M	41.1	64.6	0.076	0.002	0.	0.002	0.000	-0.
JEFRSNCO M	36.6	60.0	0.003	0.000	0.	0.000	0.000	-0.
MRTNCTY M	41.2	64.7			HAZARD LT	1.0E-09		
CORAM M	41.3	65.0			HAZARD LT	1.0E-09		
HNGRYHRSEM	41.4	65.1			HAZARD LT	1.0E-09		
WALKRVLL M	41.4	65.1			HAZARD LT	1.0E-09		
SLVRBCCO1M	40.7	63.9	0.001	0.000	0.	0.000	0.000	-0.
CLMBIAFL M	41.9	65.6			HAZARD LT	1.0E-09		
* POWELLCO M	39.0	67.9	72555.437	4.657	0.	0.130	4.527	-0.
WHITEHAL M	42.1	65.8			HAZARD LT	1.0E-09		
WHITEFSH M	42.5	66.2			HAZARD LT	1.0E-09		
SLVRBOPK M	42.7	66.5			HAZARD LT	1.0E-09		
BIGFORK M	42.8	66.5			HAZARD LT	1.0E-09		
FLATHDCO M	38.0	60.8	0.003	0.000	0.	0.000	0.000	-0.
DEFRLODG M	42.9	66.6			HAZARD LT	1.0E-09		
EVRGREEN M	43.0	66.7			HAZARD LT	1.0E-09		
KALISPLL M	43.1	66.9			HAZARD LT	1.0E-09		
SOMERS M	43.4	67.1			HAZARD LT	1.0E-09		
FLORALPK M	43.4	67.2			HAZARD LT	1.0E-09		
BUTTE M	43.3	67.0			HAZARD LT	1.0E-09		
LAKESIDE M	43.6	67.3			HAZARD LT	1.0E-09		
DRUMMOND M	43.9	67.7			HAZARD LT	1.0E-09		
LAKE CO M	42.6	66.3	0.001	0.000	0.	0.000	0.000	-0.
POLSON M	44.5	68.3			HAZARD LT	1.0E-09		
OPCRTNTY M	44.6	68.4			HAZARD LT	1.0E-09		
DERLDGCO M	43.8	67.5			HAZARD LT	1.0E-09		
PABLO M	44.9	68.7			HAZARD LT	1.0E-09		
ANACONDA M	45.0	68.8			HAZARD LT	1.0E-09		
RONAN M	45.1	68.8			HAZARD LT	1.0E-09		
SLVRBOCO2M	45.0	68.8			HAZARD LT	1.0E-09		
PHILPBRG M	45.5	69.7			HAZARD LT	1.0E-09		
STIGNATS M	45.5	69.7			HAZARD LT	1.0E-09		
* GRANITCO M	43.9	67.6	6.833	0.000	0.	0.000	0.000	-0.
* MISULACO M	44.2	67.9	26072.096	6.743	0.	0.788	5.955	-0.
MILLTOWN M	45.8	70.1	0.028	0.001	0.	0.001	0.000	-0.
MISSOULA M	46.0	70.3	0.140	0.011	0.	0.011	0.000	-0.
HOTSPRNG M	46.2	70.5			HAZARD LT	1.0E-09		
PARADISE M	47.1	71.3			HAZARD LT	1.0E-09		
PLAINS M	47.2	71.4			HAZARD LT	1.0E-09		
ALBERTON M	47.2	71.4			HAZARD LT	1.0E-09		
* STVNSVLL M	47.2	71.4	7.026	0.093	0.	0.012	0.080	-0.
* RAVALICO M	46.6	70.8	18153.275	2.468	0.	0.437	2.032	-0.
* VICTOR M	47.5	71.6	1.203	0.013	0.	0.003	0.010	-0.
CORVALIS M	47.8	71.9	0.049	0.001	0.	0.001	0.000	-0.

SYC/SAI SAFETE RUN FOR G-03, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
MINERLCO M	46.9	71.1			HAZARD LT	1.0E-09		
SUPERIOR M	47.8	72.0			HAZARD LT	1.0E-09		
SANDERCO M	45.9	70.2	0.002	0.000	0.	0.000	0.000	-0.
HAMILTON M	48.0	72.1	0.094	0.004	0.	0.004	0.000	-0.
THOMSNFL M	48.1	72.2			HAZARD LT	1.0E-09		
RAVALICO M	47.4	71.6	0.830	0.000	0.	0.000	0.000	-0.
ST REGIS M	48.6	72.7			HAZARD LT	1.0E-09		
DARBY M	48.6	72.7			HAZARD LT	1.0E-09		
LEMHI CO I	47.9	72.0	0.001	0.000	0.	0.000	0.000	-0.
MULLAN I	49.8	73.8			HAZARD LT	1.0E-09		
SHOSHNCO I	48.0	72.1	0.001	0.000	0.	0.000	0.000	-0.
SALMON I	49.9	73.9			HAZARD LT	1.0E-09		
WALLACE I	50.1	74.0			HAZARD LT	1.0E-09		
SILVRTON I	50.1	74.1			HAZARD LT	1.0E-09		
AVERY I	50.2	74.1			HAZARD LT	1.0E-09		
OSBURN I	50.3	74.2			HAZARD LT	1.0E-09		
WORDNER I	50.5	74.4			HAZARD LT	1.0E-09		
KELLOGG I	50.6	74.5			HAZARD LT	1.0E-09		
HAYDEN I	50.8	74.6			HAZARD LT	1.0E-09		
SMLTRVLL I	50.8	74.7			HAZARD LT	1.0E-09		
PINEHRST I	50.9	74.8			HAZARD LT	1.0E-09		
SPIRITLK I	51.9	75.5			HAZARD LT	1.0E-09		
PLUMMER I	52.0	75.5			HAZARD LT	1.0E-09		
HDQUARTR I	52.0	75.5			HAZARD LT	1.0E-09		
DALTNGRDNI	52.1	75.6			HAZARD LT	1.0E-09		
FERNWOOD I	52.2	75.6			HAZARD LT	1.0E-09		
STMARIES I	52.1	75.6			HAZARD LT	1.0E-09		
PIERCE I	52.2	75.7	0.004	0.000	0.	0.000	0.000	-0.
CORDALEN I	52.2	75.7			HAZARD LT	1.0E-09		
RATHDRUM I	52.3	75.8			HAZARD LT	1.0E-09		
KOOTNICO I	51.0	76.6			HAZARD LT	1.0E-09		
* CLRWTRCO I	51.5	75.2	1.517	0.000	0.	0.000	0.000	-0.
PORTFALS I	52.7	76.0			HAZARD LT	1.0E-09		
BENEWACO I	51.7	75.3			HAZARD LT	1.0E-09		
ELKRIVER I	52.9	76.1			HAZARD LT	1.0E-09		
WEIPPE I	52.9	76.1	0.008	0.000	0.	0.000	0.000	-0.
BOVILL I	53.3	76.4			HAZARD LT	1.0E-09		
KOOSKIA I	53.5	76.6	0.323	0.007	0.	0.003	0.004	-0.
OROFINO I	53.6	76.6	0.001	0.000	0.	0.000	0.000	-0.
DEARY I	53.8	76.7			HAZARD LT	1.0E-09		
KAMIAH I	53.8	76.7	0.031	0.000	0.	0.000	0.000	-0.
KENDRICK I	53.8	76.8			HAZARD LT	1.0E-09		
NEZPERCE I	54.1	76.9	0.012	0.000	0.	0.000	0.000	-0.
* LEWIS CO I	53.4	76.5	28.184	0.001	0.	0.001	0.001	-0.
LATAH CO I	53.0	76.2			HAZARD LT	1.0E-09		
* GRANGVLL I	54.3	77.1	3.740	0.103	0.	0.02[illegible]	0.079	-0.
TROY I	54.5	77.2			HAZARD LT	1.0E-09		
POTLATCH I	54.6	77.2			HAZARD LT	1.0E-09		
JULAIETA I	54.7	77.3			HAZARD LT	1.0E-09		
CRAIGMONTI	54.8	77.4	0.002	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
COTNWOOD	I	54.8	77.4	0.079	0.001	0.	0.000	0.001	-0.
NEZPRCCO	I	54.0	76.9	0.234	0.000	0.	0.000	0.000	-0.
MOSCOW	I	55.3	77.6			HAZARD LT 1.0E-09			
LAPWAI	I	55.5	77.7			HAZARD LT 1.0E-09			
GENESEE	I	55.6	77.8			HAZARD LT 1.0E-09			
LEWISTON	I	56.2	77.9			HAZARD LT 1.0E-09			
RIGGINS	I	57.8	78.5	0.619	0.013	0.	0.008	0.005	-0.
* IDAHO CO	I	54.6	77.3	11223.255	2.087	0.	1.874	0.213	-0.
MCCALL	I	62.0	79.0			HAZARD LT 1.0E-09			
VALLEYCO	I	57.7	78.5			HAZARD LT 1.0E-09			
NEWMEDOW	I	62.8	79.3			HAZARD LT 1.0E-09			
CASCADE	I	63.1	79.5			HAZARD LT 1.0E-09			
COUNCIL	I	61.3	80.0			HAZARD LT 1.0E-09			
* ADAMS CO	I	62.0	79.1	1.444	0.000	0.	0.000	0.000	-0.
CAMBRIDG	I	62.9	80.6			HAZARD LT 1.0E-09			
WSHNGTNCO	I	61.5	80.1	0.322	0.000	0.	0.000	0.000	-0.
BOISE	I	63.8	81.0			HAZARD LT 1.0E-09			
WEISER	I	65.1	81.6			HAZARD LT 1.0E-09			

2. Hazards to Oregon

This section contains computer printouts of hazards to Oregon from the G-3 launch.

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
*	WALOWACO	O	56.7	78.1	16104.204	1.112	0.	0.992	0.120	-0.
*	ENTRPRSE	O	61.7	80.2	2.124	0.034	0.	0.013	0.020	-0.
*	JOSEPH	O	61.9	80.2	11.438	0.130	0.	0.058	0.072	-0.
	WALLOWA	O	62.2	80.3	0.425	0.003	0.	0.000	0.003	-0.
	ELGIN	O	63.9	81.0	0.043	0.000	0.	0.000	0.000	-0.
	MLTNFRWTR	O	64.4	81.2			HAZARD LT 1.0E-09			
*	COVE	O	64.5	81.3	1.043	0.009	0.	0.005	0.004	-0.
	WESTON	O	65.0	81.5			HAZARD LT 1.0E-09			
*	UNION	O	65.1	81.5	1.545	0.022	0.	0.010	0.013	-0.
	ATHENA	O	65.3	81.7			HAZARD LT 1.0E-09			
*	UNION CO	O	62.8	80.6	9043.440	0.249	0.	0.122	0.127	-0.
*	MAY PARK	O	65.4	81.7	1.158	0.018	0.	0.007	0.011	-0.
*	LAGRANDE	O	65.6	81.8	3.802	0.133	0.	0.059	0.074	-0.
	ONTARIO	O	65.7	81.8			HAZARD LT 1.0E-09			
*	NO.PWDR	O	66.0	82.0	7.645	0.067	0.	0.036	0.031	-0.
*	BAKER CO	O	62.8	80.6	11093.525	0.249	0.	0.120	0.129	-0.
	NYASSA	O	66.4	82.1			HAZARD LT 1.0E-09			
*	BAKER	O	66.5	82.2	4.916	0.162	0.	0.081	0.081	-0.
*	UMTILACO	O	63.5	80.9	50.124	0.002	0.	0.000	0.002	-0.
	VALE	C	67.1	82.4			HAZARD LT 1.0E-09			
	PNDLTON	O	67.1	82.4	0.001	0.000	0.	0.000	0.000	-0.
	ADRIAN	O	67.3	82.5			HAZARD LT 1.0E-09			
	PILOT RK	O	68.2	82.9	0.004	0.000	0.	0.000	0.000	-0.
	ECHO	O	68.3	82.9			HAZARD LT 1.0E-09			
	MCNARY	O	68.3	82.9			HAZARD LT 1.0E-09			
	UMATILLA	C	68.5	83.0			HAZARD LT 1.0E-09			
	STNFLD	O	68.5	83.0			HAZARD LT 1.0E-09			
	HRMSTON	C	68.5	83.0			HAZARD LT 1.0E-09			
	UKIAH	O	70.1	83.7	0.062	0.000	0.	0.000	0.000	-0.
	BATES	O	70.3	83.8	0.894	0.007	0.	0.001	0.006	-0.
*	MORROWCO	O	68.9	83.2	1.339	0.000	0.	0.000	0.000	-0.
	PRARLCTY	O	71.4	84.3	0.949	0.010	0.	0.001	0.009	-0.
	HEPPNER	O	71.5	84.4	0.001	0.000	0.	0.000	0.000	-0.
	MALHEURCO	O	66.1	82.0	0.171	0.000	0.	0.000	0.000	-0.
	IONE	O	72.0	84.6			HAZARD LT 1.0E-09			
*	JOHN DAY	O	72.4	84.8	5.758	0.107	0.	0.023	0.084	-0.
*	GRANT CO	O	68.8	83.1	10084.605	0.124	0.	0.073	0.051	-0.
	ARLNGTN	O	72.6	84.9			HAZARD LT 1.0E-09			
*	CNYN CTY	O	72.6	84.9	1.295	0.014	0.	0.001	0.013	-0.
*	MTVERNON	O	73.1	85.1	5.280	0.057	0.	0.021	0.036	-0.
	SENECA	O	73.5	85.3	0.525	0.004	0.	0.001	0.003	-0.
	GILLAMCO	O	72.1	84.6	0.074	0.000	0.	0.000	0.000	-0.
	CONDON	O	74.2	85.7			HAZARD LT 1.0E-09			
	RUFUS	O	74.7	85.9			HAZARD LT 1.0E-09			
	WASCO	O	74.9	86.0			HAZARD LT 1.0E-09			
	SHRMANCO	O	73.7	85.4	0.001	0.000	0.	0.000	0.000	-0.
*	WHELR CO	O	73.2	85.2	278.422	0.002	0.	0.000	0.001	-0.
	KINZUA	O	75.3	86.2	0.026	0.000	0.	0.000	0.000	-0.
	FOSSIL	O	75.6	86.4	0.006	0.000	0.	0.000	0.000	-0.
	BURNS	O	75.6	86.4	0.019	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-03, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS

RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
HINES	0	75.7	86.5	0.014	0.000	0.	0.000	0.000	-0.
* HARNEYCO	0	71.1	84.2	1584.157	0.007	0.	0.004	0.003	-0.
THEDALLES	0	76.3	85.8			HAZARD LT 1.0E-09			
CHNOWTH	0	76.4	86.9			HAZARD LT 1.0E-09			
DUFUR	0	76.7	87.0			HAZARD LT 1.0E-09			
HOODRVR	0	77.0	87.2			HAZARD LT 1.0E-09			
WASCO CO	0	75.0	86.1	0.083	0.000	0.	0.000	0.000	-0.
ODELL	0	77.5	87.4			HAZARD LT 1.0E-09			
MAUPIN	0	77.5	87.5			HAZARD LT 1.0E-09			
* CROCK CO	0	75.4	86.3	6524.932	0.152	0.	0.042	0.110	-0.
HOODRVCO	0	77.0	87.2			HAZARD LT 1.0E-09			
CSCADLKS	0	78.5	88.0			HAZARD LT 1.0E-09			
MADRAS	0	79.3	88.5	0.003	0.000	0.	0.000	0.000	-0.
WRM SPRG	0	79.3	88.5			HAZARD LT 1.0E-09			
PRINVLLE	0	79.4	88.5	0.531	0.011	0.	0.002	0.009	-0.
* JEFF CC	0	77.5	87.5	34.459	0.001	0.	0.000	0.001	-0.
RDENDRON	0	79.6	88.6			HAZARD LT 1.0E-09			
WEMME	0	79.7	88.7			HAZARD LT 1.0E-09			
CULVER	0	79.9	88.8	0.004	0.000	0.	0.000	0.000	-0.
TRREBONN	0	80.2	89.0	0.017	0.000	0.	0.000	0.000	-0.
SPRNGDLE	0	80.2	89.0			HAZARD LT 1.0E-09			
RAINIER	0	80.3	89.1			HAZARD LT 1.0E-09			
TROUTDLE	0	80.3	89.1			HAZARD LT 1.0E-09			
HAZELWOC	0	80.4	89.1			HAZARD LT 1.0E-09			
SANDY	0	80.4	89.1			HAZARD LT 1.0E-09			
WOODVLGE	0	80.5	89.2			HAZARD LT 1.0E-09			
DEER ISL	0	80.5	89.2			HAZARD LT 1.0E-09			
FAIRVIEW	0	80.5	89.2			HAZARD LT 1.0E-09			
CCLMBCTY	0	80.5	89.2			HAZARD LT 1.0E-09			
REDMOND	0	80.5	89.2	0.149	0.002	0.	0.000	0.002	-0.
STHELENS	0	80.5	89.2			HAZARD LT 1.0E-09			
GRESHAM	0	80.6	89.2			HAZARD LT 1.0E-09			
MCNULTY	0	80.6	89.3			HAZARD LT 1.0E-09			
MAYWOODPK	0	80.7	89.3			HAZARD LT 1.0E-09			
RKWOOC	0	80.7	89.3			HAZARD LT 1.0E-09			
PWLHRST	0	80.7	89.3			HAZARD LT 1.0E-09			
EPRKRCSE	0	80.8	89.4			HAZARD LT 1.0E-09			
GLNDOVER	0	80.9	89.3			HAZARD LT 1.0E-09			
WARREN	0	80.8	89.4			HAZARD LT 1.0E-09			
PRKROSE	0	80.8	89.4			HAZARD LT 1.0E-09			
ESTACADA	0	80.9	89.4			HAZARD LT 1.0E-09			
CLTSKNF	0	80.9	89.5			HAZARD LT 1.0E-09			
MLTNMFCO	0	80.2	89.0			HAZARD LT 1.0E-09			
WPOWLHRST	0	81.0	89.5			HAZARD LT 1.0E-09			
SCAPOOSE	0	81.0	89.5			HAZARD LT 1.0E-09			
PORTLANC	0	80.7	89.3			HAZARD LT 1.0E-09			
GILBERT	0	81.1	89.5			HAZARD LT 1.0E-09			
CCLMB CO	0	80.2	89.0			HAZARD LT 1.0E-09			
KENDALL	C	81.2	89.6			HAZARD LT 1.0E-09			
ERROLHTS	0	81.2	89.6			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WSTPORT	0	81.4	89.7			HAZARD LT	1.0E-09		
GLDSTCNE	0	81.4	89.7			HAZARD LT	1.0E-09		
CLKMSHTS	0	81.4	89.8			HAZARD LT	1.0E-09		
ORGONCTY	0	81.4	89.8			HAZARD LT	1.0E-09		
WESTLINN	0	81.5	89.8			HAZARD LT	1.0E-09		
* BEND	0	81.5	89.8	1.598	0.063	0.	0.015	0.048	-0.
SISTERS	0	81.5	89.8	0.008	0.000	0.	0.000	0.000	-0.
WSTHAVN	0	81.6	89.9			HAZARD LT	1.0E-09		
CEDARMIL	0	81.6	89.9			HAZARD LT	1.0E-09		
VRNONIA	0	81.6	89.9			HAZARD LT	1.0E-09		
WSTSLOPE	0	81.6	89.9			HAZARD LT	1.0E-09		
CEDRHILL	0	81.6	89.9			HAZARD LT	1.0E-09		
HAPYVALY	0	81.7	89.9			HAZARD LT	1.0E-09		
RALEGHHL	0	81.6	89.9			HAZARD LT	1.0E-09		
GRNNHOME	0	81.6	89.9			HAZARD LT	1.0E-09		
MRLENEVLG	0	81.7	89.9			HAZARD LT	1.0E-09		
METZGER	0	81.7	89.9			HAZARD LT	1.0E-09		
BEVRTON	0	81.7	89.9			HAZARD LT	1.0E-09		
LAKOSWGO	0	81.7	90.0			HAZARD LT	1.0E-09		
ALOHA	0	81.8	90.0			HAZARD LT	1.0E-09		
BATTIN	0	81.8	90.0			HAZARD LT	1.0E-09		
TIGARD	0	81.8	90.0			HAZARD LT	1.0E-09		
CLKMSCO	0	80.1	88.9			HAZARD LT	1.0E-09		
IDANHA	0	81.9	90.0			HAZARD LT	1.0E-09		
CANBY	0	81.9	90.1			HAZARD LT	1.0E-09		
* DSHUTSCO	0	79.7	88.7	1665.451	0.061	0.	0.011	0.050	-0.
WESTWOOD	0	82.0	90.1			HAZARD LT	1.0E-09		
CLAKAMAS	0	82.0	90.1			HAZARD LT	1.0E-09		
KINGCTY	0	82.0	90.1			HAZARD LT	1.0E-09		
MOLALLA	0	82.0	90.1			HAZARD LT	1.0E-09		
SVENSON	0	82.0	90.2			HAZARD LT	1.0E-09		
MWAUKIE	0	82.0	90.1			HAZARD LT	1.0E-09		
HILSBORO	0	82.0	90.2			HAZARD LT	1.0E-09		
CONCORD	0	82.1	90.2			HAZARD LT	1.0E-09		
DETROIT	0	82.1	90.2			HAZARD LT	1.0E-09		
SHRWOOD	0	82.1	90.2			HAZARD LT	1.0E-09		
WLSNVLLE	0	82.1	90.2			HAZARD LT	1.0E-09		
OAKGROVE	0	82.1	90.2			HAZARD LT	1.0E-09		
JNINGSLG	0	82.1	90.2			HAZARD LT	1.0E-09		
WASH CO	0	81.1	89.6			HAZARD LT	1.0E-09		
BANKS	0	82.2	90.3			HAZARD LT	1.0E-09		
AURORA	0	82.3	90.3			HAZARD LT	1.0E-09		
CRABTREE	0	82.4	90.4			HAZARD LT	1.0E-09		
ASTORIA	0	82.4	90.4			HAZARD LT	1.0E-09		
HAMMOND	0	82.5	90.5			HAZARD LT	1.0E-09		
* LAKE CO	0	78.7	88.1	8964.591	0.047	0.	0.014	0.033	-0.
WRRNTON	0	82.6	90.5			HAZARD LT	1.0E-09		
HUBBARD	0	82.6	90.5			HAZARD LT	1.0E-09		
CLTSOPCO	0	81.5	89.8			HAZARD LT	1.0E-09		
NEWBERG	0	82.7	90.6			HAZARD LT	1.0E-09		

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6), TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
GASTON	O	82.8	90.7			HAZARD LT 1.0E-09			
DUNDEE	O	82.8	90.7			HAZARD LT 1.0E-09			
WOODBURN	O	82.8	90.7			HAZARD LT 1.0E-09			
MT.ANGEL	O	82.9	90.7			HAZARD LT 1.0E-09			
STPAUL	O	83.0	90.8			HAZARD LT 1.0E-09			
GERVAIS	O	83.0	90.8			HAZARD LT 1.0E-09			
DAYTON	O	83.1	90.8			HAZARD LT 1.0E-09			
LYONS	O	83.1	90.9			HAZARD LT 1.0E-09			
SLVRTON	O	83.1	90.9			HAZARD LT 1.0E-09			
FORSTGRV	O	83.1	90.9			HAZARD LT 1.0E-09			
YAMHILL	O	83.1	90.9			HAZARD LT 1.0E-09			
LA PINE	O	83.2	90.9	0.413	0.005	0.	0.001	0.004	-0.
LFAYETTE	O	83.2	91.0			HAZARD LT 1.0E-09			
CARLTON	O	83.3	91.0			HAZARD LT 1.0E-09			
MARIONCO	O	82.0	90.1			HAZARD LT 1.0E-09			
BROOKS	O	83.4	91.1			HAZARD LT 1.0E-09			
COBURG	O	83.5	91.1	0.008	0.000	0.	0.000	0.000	-0.
SBLIMITY	O	83.5	91.2			HAZARD LT 1.0E-09			
YMHILLCO	O	82.5	90.5			HAZARD LT 1.0E-09			
MCMNVLLE	O	83.5	91.1			HAZARD LT 1.0E-09			
HAYESVIL	O	83.6	91.2			HAZARD LT 1.0E-09			
STAYTON	O	83.6	91.2			HAZARD LT 1.0E-09			
AUMSVLLE	O	83.7	91.3			HAZARD LT 1.0E-09			
KEIZER	O	83.7	91.3			HAZARD LT 1.0E-09			
4CORNERS	O	83.8	91.4			HAZARD LT 1.0E-09			
CRNELIUS	C	83.9	91.4			HAZARD LT 1.0E-09			
AMITY	O	83.9	91.4			HAZARD LT 1.0E-09			
SALEM	O	83.8	91.3			HAZARD LT 1.0E-09			
TURNER	O	83.9	91.4			HAZARD LT 1.0E-09			
SCIO	O	83.9	91.4			HAZARD LT 1.0E-09			
LAKEVIEW	O	83.9	91.4			HAZARD LT 1.0E-09			
NMZNITA	O	84.1	91.5			HAZARD LT 1.0E-09			
FOSTER	O	84.1	91.5			HAZARD LT 1.0E-09			
TLMOOKCC	O	82.8	90.7			HAZARD LT 1.0E-09			
LRLWDACD	O	84.2	91.6			HAZARD LT 1.0E-09			
SWETHOME	O	84.3	91.7			HAZARD LT 1.0E-09			
BLUERVR	O	84.3	91.7	0.003	0.000	0.	0.000	0.000	-0.
RCKAWAY	O	84.5	91.8			HAZARD LT 1.0E-09			
SHERIDAN	O	84.5	91.8			HAZARD LT 1.0E-09			
TWNROCKS	O	84.5	91.8			HAZARD LT 1.0E-09			
GARIBLDI	O	84.5	91.8			HAZARD LT 1.0E-09			
BAY CTY	O	84.6	91.8			HAZARD LT 1.0E-09			
INDPNDNC	O	84.6	91.9			HAZARD LT 1.0E-09			
LEBANON	O	84.7	91.9			HAZARD LT 1.0E-09			
TLAMOOK	O	84.7	91.9			HAZARD LT 1.0E-09			
MONMOUTH	O	84.7	91.9			HAZARD LT 1.0E-09			
LBNONSOU	O	84.7	92.0			HAZARD LT 1.0E-09			
WILLAMNA	O	84.8	92.0			HAZARD LT 1.0E-09			
DALLAS	O	84.8	92.0			HAZARD LT 1.0E-09			
NETARTS	O	84.9	92.1			HAZARD LT 1.0E-09			

STC/SAI SAFLTE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
POLK CO	0	83.9	91.4			HAZARD LT	1.0E-09		
ALBANY	0	84.9	92.1			HAZARD LT	1.0E-09		
GILCHRST	0	85.0	92.2	0.496	0.005	0.	0.000	0.005	-0.
PCFICCTY	0	85.0	92.2			HAZARD LT	1.0E-09		
LINN CO	0	83.3	91.0	0.251	0.000	0.	0.000	0.000	-0.
FALLCTY	0	85.2	92.3			HAZARD LT	1.0E-09		
GRNDRCNC	0	85.2	92.3			HAZARD LT	1.0E-09		
BRWNSVLE	0	85.3	92.3			HAZARD LT	1.0E-09		
LWISBURG	0	85.4	92.4			HAZARD LT	1.0E-09		
* CHEMULT	0	85.4	92.5	3.748	0.037	0.	0.012	0.025	-0.
CORVALIS	0	85.5	92.6			HAZARD LT	1.0E-09		
OAKRIDGE	0	85.6	92.6	0.101	0.002	0.	0.000	0.002	-0.
HALSEY	0	85.7	92.7			HAZARD LT	1.0E-09		
WESTFIR	0	85.8	92.7	0.030	0.000	0.	0.000	0.000	-0.
BENTONCO	0	84.9	92.1	0.006	0.000	0.	0.000	0.000	-0.
VALSETZ	0	85.9	92.8			HAZARD LT	1.0E-09		
JCT CTY	0	85.9	92.8			HAZARD LT	1.0E-09		
PHILOMTH	0	85.9	92.8			HAZARD LT	1.0E-09		
NSKOWIN	0	86.0	92.9			HAZARD LT	1.0E-09		
LOWELL	0	86.0	92.9	0.005	0.000	0.	0.000	0.000	-0.
HRSBURG	0	86.1	93.0			HAZARD LT	1.0E-09		
GLENWOOD	0	86.2	93.0	0.001	0.000	0.	0.000	0.000	-0.
MONROE	0	86.3	93.1			HAZARD LT	1.0E-09		
SPRNGFLD	0	86.3	93.1	0.009	0.000	0.	0.000	0.000	-0.
GOSHEN	0	86.4	93.2	0.001	0.000	0.	0.000	0.000	-0.
SNTACLRA	0	86.5	93.2	0.002	0.000	0.	0.000	0.000	-0.
LNCLNCTY	0	86.5	93.3			HAZARD LT	1.0E-09		
* KLMTH CO	0	83.6	91.2	9557.442	0.284	0.	0.078	0.206	-0.
RIVERROD	0	86.5	93.3	0.002	0.000	0.	0.000	0.000	-0.
EUGENE	0	86.4	93.2	0.019	0.000	0.	0.000	0.000	-0.
COLGCRSJ	C	86.6	93.4	0.001	0.000	0.	0.000	0.000	-0.
CRSWELL	0	86.7	93.4	0.004	0.000	0.	0.000	0.000	-0.
GLNFDNBH	0	86.8	93.5			HAZARD LT	1.0E-09		
SILETZ	0	86.8	93.5			HAZARD LT	1.0E-09		
DPOE BAY	0	86.9	93.6			HAZARD LT	1.0E-09		
LNCLN CO	0	85.8	92.7			HAZARD LT	1.0E-09		
ALSEA	0	87.0	93.6			HAZARD LT	1.0E-09		
* LANE CO	0	84.6	91.9	38.538	0.003	0.	0.000	0.003	-0.
COTAGGRV	0	87.1	93.7	0.017	0.000	0.	0.000	0.000	-0.
ELMIRA	0	87.2	93.8			HAZARD LT	1.0E-09		
CHILOQUM	0	87.2	93.8	0.466	0.007	0.	0.003	0.005	-0.
VENETA	0	87.2	93.8			HAZARD LT	1.0E-09		
TOLEDO	0	87.2	93.8			HAZARD LT	1.0E-09		
AGTE BCH	0	87.2	93.8			HAZARD LT	1.0E-09		
NEWPORT	0	87.4	93.9			HAZARD LT	1.0E-09		
SOUTHBCH	0	87.4	94.0			HAZARD LT	1.0E-09		
MALIN	0	87.4	94.0	0.002	0.000	0.	0.000	0.000	-0.
NOTI	0	87.5	94.0			HAZARD LT	1.0E-09		
SEAL RCK	0	87.8	94.2			HAZARD LT	1.0E-09		
ALTAMONT	0	87.8	94.2	0.197	0.005	0.	0.000	0.005	-0.

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6), TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
KLMTHFLS O	87.8	94.2	0.291	0.009	0.	0.000	0.009	-0.
MERRILL O	87.9	94.3	0.006	0.000	0.	0.000	0.000	-0.
FALCONRT O	87.9	94.3	0.016	0.000	0.	0.000	0.000	-0.
WALDPORT O	88.0	94.4			HAZARD LT 1.0E-09			
MIDLAND O	88.1	94.4	0.011	0.000	0.	0.000	0.000	-0.
SAISSHOM O	88.1	94.4			HAZARD LT 1.0E-09			
DRAIN O	88.1	94.5	0.008	0.000	0.	0.000	0.000	-0.
YONCALLA O	88.2	94.6	0.011	0.000	0.	0.000	0.000	-0.
* PROSPECT O	88.4	94.7	3.363	0.028	0.	0.009	0.020	-0.
YACHATS O	88.4	94.7			HAZARD LT 1.0E-09			
MAPLETON O	88.5	94.7			HAZARD LT 1.0E-09			
GLIDE O	88.5	94.8	0.194	0.002	0.	0.001	0.002	-0.
KENO O	88.6	94.9	0.026	0.000	0.	0.000	0.000	-0.
OAKLAND O	88.7	94.9	0.038	0.000	0.	0.000	0.000	-0.
SUTHERLN O	88.8	95.0	0.094	0.002	0.	0.000	0.002	-0.
RUTEFALS O	89.1	95.2	0.273	0.001	0.	0.000	0.001	-0.
WILBUR O	89.1	95.2	0.070	0.001	0.	0.000	0.000	-0.
WNCHSTER O	89.2	95.3	0.117	0.002	0.	0.000	0.001	-0.
* DUGLASCO O	86.7	93.4	1652.267	0.107	0.	0.022	0.085	-0.
FLORENCE O	89.3	95.4			HAZARD LT 1.0E-09			
ROSEBURG O	89.3	95.4	0.992	0.055	0.	0.012	0.043	-0.
* SHADYCOV O	89.5	95.6	5.416	0.091	0.	0.033	0.058	-0.
MRTLCREK O	89.8	95.7	0.865	0.022	0.	0.008	0.015	-0.
GREEN O	89.8	95.7	0.592	0.011	0.	0.004	0.008	-0.
WINSTON O	89.8	95.8	0.607	0.015	0.	0.004	0.011	-0.
DILLARD O	89.9	95.8	0.314	0.005	0.	0.001	0.003	-0.
GARDINER O	89.9	95.8			HAZARD LT 1.0E-09			
TRI CITY O	90.0	95.9	0.491	0.008	0.	0.003	0.005	-0.
CNYNVLLE O	90.0	95.9	0.377	0.006	0.	0.002	0.004	-0.
REEDSPRT O	90.0	95.9	0.001	0.000	0.	0.000	0.000	-0.
RIDDLE O	90.1	96.0	0.489	0.008	0.	0.003	0.005	-0.
WHITECTY O	90.1	96.0	0.626	0.007	0.	0.000	0.007	-0.
WNCHSTRBAO	90.2	96.1			HAZARD LT 1.0E-09			
BELVIEW O	90.3	96.1	0.398	0.005	0.	0.002	0.004	-0.
MILO O	90.3	96.1	0.343	0.003	0.	0.001	0.002	-0.
* ASHLAND O	90.3	96.2	1.804	0.073	0.	0.021	0.052	-0.
TALENT O	90.4	96.3	0.477	0.005	0.	0.001	0.004	-0.
* MEDFORD O	90.4	96.2	4.117	0.094	0.	0.002	0.092	-0.
* JKSN CO O	88.6	94.8	6338.866	1.019	0.	0.284	0.735	-0.
CENTRLPT O	90.4	96.3	0.916	0.028	0.	0.000	0.028	-0.
PHOENIX O	90.4	96.3	0.352	0.003	0.	0.000	0.003	-0.
MDFRDWST O	90.5	96.3	0.689	0.013	0.	0.000	0.013	-0.
CNTRLPTW O	90.5	96.3	0.821	0.013	0.	0.000	0.013	-0.
LAKESIDE O	90.5	96.3	0.001	0.000	0.	0.000	0.000	-0.
SOUMDFRD O	90.5	96.3	0.599	0.008	0.	0.000	0.008	-0.
* GOLDHILL O	90.6	96.4	2.978	0.035	0.	0.008	0.027	-0.
JKSNVLLE O	90.7	96.5	0.584	0.007	0.	0.000	0.007	-0.
WOLF CRK O	90.8	96.5	0.226	0.001	0.	0.000	0.001	-0.
* ROGUERVR O	90.9	96.6	4.916	0.086	0.	0.033	0.053	-0.
EASTSIDE O	91.0	96.8	0.007	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-03, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
NORTHBND	0	91.0	96.8	0.010	0.000	0.	0.000	0.000	-0.
COOS BAY	0	91.0	96.8	0.019	0.000	0.	0.000	0.000	-0.
POWERS	0	91.1	96.8	0.004	0.000	0.	0.000	0.000	-0.
BUNKRHLL	0	91.1	96.8	0.005	0.000	0.	0.000	0.000	-0.
LIBBY	0	91.2	96.9	0.004	0.000	0.	0.000	0.000	-0.
MLNGTGN	0	91.2	96.9	0.004	0.000	0.	0.000	0.000	-0.
* COOS CO	0	89.9	95.8	30.571	0.002	0.	0.000	0.002	-0.
* GRANTPAS	0	91.2	96.9	32.343	1.652	0.	0.623	1.029	-0.
MERLIN	0	91.2	97.0	0.777	0.006	0.	0.000	0.006	-0.
* FRUTDALE	0	91.2	97.0	11.075	0.286	0.	0.113	0.173	-0.
BARVIEW	0	91.4	97.1	0.005	0.000	0.	0.000	0.000	-0.
CHRLSTON	0	91.4	97.1	0.004	0.000	0.	0.000	0.000	-0.
* JOSFINCO	0	90.1	96.0	4442.445	0.495	0.	0.136	0.359	-0.
* GRNTPSSW	0	91.4	97.1	11.546	0.388	0.	0.160	0.228	-0.
COQUILLE	0	91.5	97.2	0.035	0.000	0.	0.000	0.000	-0.
MYRTLEPT	0	91.6	97.3	0.065	0.001	0.	0.000	0.001	-0.
BANDON	0	92.1	97.7	0.017	0.000	0.	0.000	0.000	-0.
* APPLGATE	0	92.2	97.7	5.131	0.087	0.	0.035	0.052	-0.
* CAVE JCT	0	92.6	98.1	3.922	0.040	0.	0.015	0.025	-0.
PRTORFRD	0	93.2	98.6	0.136	0.002	0.	0.000	0.002	-0.
* CURRYCO	0	92.9	98.3	3435.329	0.172	0.	0.053	0.118	-0.
* HARBOR	0	94.3	99.6	1.418	0.025	0.	0.002	0.023	-0.
* BROOKNGS	0	94.4	99.7	3.005	0.079	0.	0.006	0.073	-0.
GOLDBCH	0	94.7	99.9	0.878	0.013	0.	0.000	0.013	-0.

3. Hazards to Washington and California

This section contains computer printouts of hazards to Washington and California from the G-3 launch.

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LIRRTYLK	W	52.6	76.0			HAZARD LT	1.0E-09		
OTISORCH	W	52.6	76.0			HAZARD LT	1.0E-09		
TRNTWOOD	W	52.9	76.1			HAZARD LT	1.0E-09		
DERRPARK	W	53.0	76.2			HAZARD LT	1.0E-09		
OPRTUNTY	W	53.0	76.2			HAZARD LT	1.0E-09		
MILLWOOD	W	53.1	76.3			HAZARD LT	1.0E-09		
DISHMAN	W	53.2	76.3			HAZARD LT	1.0E-09		
PARKWTER	W	53.2	76.3			HAZARD LT	1.0E-09		
MORGNACR	N	53.2	76.4			HAZARD LT	1.0E-09		
ROCKFORD	W	53.3	76.4			HAZARD LT	1.0E-09		
CCUNTYHM	W	53.3	76.4			HAZARD LT	1.0E-09		
FAIRFELD	W	53.6	76.6			HAZARD LT	1.0E-09		
TEKOA	W	53.7	76.7			HAZARD LT	1.0E-09		
SPCKNECO	W	52.1	75.6			HAZARD LT	1.0E-09		
AIRWYHTS	W	54.1	76.9			HAZARD LT	1.0E-09		
SPCKANE	W	54.0	76.8			HAZARD LT	1.0E-09		
FAIRCHLD	W	54.2	77.0			HAZARD LT	1.0E-09		
CHENEY	W	54.4	77.1			HAZARD LT	1.0E-09		
OAKSDALE	W	54.4	77.2			HAZARD LT	1.0E-09		
GARFIELD	W	54.5	77.2			HAZARD LT	1.0E-09		
MEDCALLK	W	54.5	77.2			HAZARD LT	1.0E-09		
PALOUSE	W	54.5	77.2			HAZARD LT	1.0E-09		
ROSALIA	W	54.5	77.2			HAZARD LT	1.0E-09		
PULLMAN	W	55.3	77.6			HAZARD LT	1.0E-09		
ALBION	W	55.6	77.8			HAZARD LT	1.0E-09		
COLFAX	W	55.7	77.8			HAZARD LT	1.0E-09		
ST JOHN	W	55.8	77.8			HAZARD LT	1.0E-09		
UNIONTWN	W	55.9	77.8			HAZARD LT	1.0E-09		
WHTMANCO	W	54.1	76.9			HAZARD LT	1.0E-09		
ENDICOTT	W	57.2	78.3			HAZARD LT	1.0E-09		
LINCLNCO	W	54.6	77.2			HAZARD LT	1.0E-09		
CLARKSTN	W	58.0	78.6			HAZARD LT	1.0E-09		
ASOTIN	W	61.2	78.7			HAZARD LT	1.0E-09		
CLRKSTNHT	W	61.5	78.8			HAZARD LT	1.0E-09		
LACROSSE	W	61.5	78.9			HAZARD LT	1.0E-09		
POMEROY	W	61.6	78.9			HAZARD LT	1.0E-09		
GARFLDCO	W	57.0	78.2			HAZARD LT	1.0E-09		
RITZVLLE	W	62.5	79.2			HAZARD LT	1.0E-09		
ASOTINCO	W	61.0	78.7	0.001	0.000	0.	0.000	0.000	-0.
ADAMS CO	W	57.7	78.5			HAZARD LT	1.0E-09		
WSHTUCNA	W	63.8	79.7			HAZARD LT	1.0E-09		
DAYTON	W	64.1	79.8			HAZARD LT	1.0E-09		
COLMBIACO	W	62.4	79.2			HAZARD LT	1.0E-09		
LIND	W	61.3	80.0			HAZARD LT	1.0E-09		
WAITSBRG	W	62.0	80.3			HAZARD LT	1.0E-09		
KAHLOTUS	W	62.3	80.4			HAZARD LT	1.0E-09		
DOUGLASCO	W	63.1	79.5			HAZARD LT	1.0E-09		
EPHRATA	W	62.7	80.5			HAZARD LT	1.0E-09		
MOSESLAK	W	63.3	80.8			HAZARD LT	1.0E-09		
MSLAKNOR	W	63.3	80.8			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
CHFLAN	W	63.4	80.8			HAZARD LT 1.0E-09			
CONNELL	W	63.5	80.9			HAZARD LT 1.0E-09			
WLAWLACO	W	61.4	80.0			HAZARD LT 1.0E-09			
WALLAWLA	W	63.7	80.9			HAZARD LT 1.0E-09			
COLEGEPL	W	64.0	81.1			HAZARD LT 1.0E-09			
GRANT CO	W	64.0	79.8			HAZARD LT 1.0E-09			
OTHELLO	W	64.1	81.1			HAZARD LT 1.0E-09			
FRNKLNCO	W	62.7	80.5			HAZARD LT 1.0E-09			
QUINCY	W	65.1	81.6			HAZARD LT 1.0E-09			
TOUCHET	W	65.2	81.6			HAZARD LT 1.0E-09			
HURBANK	W	66.0	82.0			HAZARD LT 1.0E-09			
PASCO	W	66.1	82.0			HAZARD LT 1.0E-09			
RVRVIEW	W	66.2	82.0			HAZARD LT 1.0E-09			
WENATCHE	W	66.2	82.0			HAZARD LT 1.0E-09			
KENEWICK	W	66.3	82.1			HAZARD LT 1.0E-09			
RICHLAND	W	66.6	82.2			HAZARD LT 1.0E-09			
CHFLANCO	W	63.7	81.0			HAZARD LT 1.0E-09			
WRTCHLND	W	66.9	82.3			HAZARD LT 1.0E-09			
BENTNCTY	W	67.5	82.6			HAZARD LT 1.0E-09			
BENTONCO	W	65.2	81.6			HAZARD LT 1.0E-09			
KITITSCO	W	66.1	82.0			HAZARD LT 1.0E-09			
ELENSBRG	W	69.0	83.2			HAZARD LT 1.0E-09			
PROSSER	W	69.1	83.2			HAZARD LT 1.0E-09			
SUNYSIDE	W	69.5	83.4			HAZARD LT 1.0E-09			
GRNDVIEW	W	69.5	83.4			HAZARD LT 1.0E-09			
SBROOWAY	W	69.6	83.5			HAZARD LT 1.0E-09			
OUTLOCK	W	69.9	83.6			HAZARD LT 1.0E-09			
MOXEECTY	W	69.9	83.6			HAZARD LT 1.0E-09			
MARTON	W	69.9	83.6			HAZARD LT 1.0E-09			
SELAH	W	70.2	83.7			HAZARD LT 1.0E-09			
ZILLAH	W	70.2	83.7			HAZARD LT 1.0E-09			
GRANGER	W	70.2	83.8			HAZARD LT 1.0E-09			
YAKIMACO	W	67.1	82.4			HAZARD LT 1.0E-09			
TRRACEHT	W	70.3	83.8			HAZARD LT 1.0E-09			
RUFNA	W	70.4	83.8			HAZARD LT 1.0E-09			
FAIRVIEW	W	70.4	83.8			HAZARD LT 1.0E-09			
FRUITVLE	W	70.4	83.8			HAZARD LT 1.0E-09			
YAKIMA	W	70.3	83.8			HAZARD LT 1.0E-09			
UNIONGAP	W	70.5	83.9			HAZARD LT 1.0E-09			
NACHES	W	70.6	83.9			HAZARD LT 1.0E-09			
GLEED	W	70.6	83.9			HAZARD LT 1.0E-09			
TOPPNISH	W	70.5	83.9			HAZARD LT 1.0E-09			
PARKER	W	70.6	84.0			HAZARD LT 1.0E-09			
WAPATO	W	70.6	83.9			HAZARD LT 1.0E-09			
TIETON	W	71.0	84.1			HAZARD LT 1.0E-09			
WILEY	W	71.2	84.2			HAZARD LT 1.0E-09			
HARRAH	W	71.4	84.3			HAZARD LT 1.0E-09			
KING CO	W	69.5	83.4			HAZARD LT 1.0E-09			
REDMOND	W	72.0	84.6			HAZARD LT 1.0E-09			
BOTHELL	W	72.1	84.6			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-03, GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
ISSAQUAH W	72.3	84.8			HAZARD LT	1.0E-09		
ROSEHILL W	72.3	84.8			HAZARD LT	1.0E-09		
KENMORE W	72.3	84.8			HAZARD LT	1.0E-09		
INGLWOOD W	72.4	84.8			HAZARD LT	1.0E-09		
JUANITA W	72.4	84.8			HAZARD LT	1.0E-09		
KIRKLAND W	72.4	84.8			HAZARD LT	1.0E-09		
RCHMDHLN W	72.5	84.8			HAZARD LT	1.0E-09		
BELLEVUE W	72.4	84.8			HAZARD LT	1.0E-09		
EASTGATE W	72.6	84.9			HAZARD LT	1.0E-09		
CLYDHILL W	72.6	84.9			HAZARD LT	1.0E-09		
NORTHCTY W	72.6	84.9			HAZARD LT	1.0E-09		
RDGECRST W	72.7	84.9			HAZARD LT	1.0E-09		
RCHMDBCH W	72.7	84.9			HAZARD LT	1.0E-09		
PRTTWNSN W	72.7	85.0			HAZARD LT	1.0E-09		
MRCERISL W	72.8	85.0			HAZARD LT	1.0E-09		
MEDINA W	72.9	85.1			HAZARD LT	1.0E-09		
LAKRIDGE W	73.2	85.2			HAZARD LT	1.0E-09		
RENTON W	73.1	85.1			HAZARD LT	1.0E-09		
SEATTLE W	72.9	85.0			HAZARD LT	1.0E-09		
LAKERSTPKW	73.2	85.2			HAZARD LT	1.0E-09		
TUKWILA W	73.2	85.2			HAZARD LT	1.0E-09		
SKYWAY W	73.3	85.2			HAZARD LT	1.0E-09		
ENUMCLAW W	73.5	85.3			HAZARD LT	1.0E-09		
RVRTNHTS W	73.4	85.3			HAZARD LT	1.0E-09		
WHITECTR W	73.5	85.3			HAZARD LT	1.0E-09		
KENT W	73.6	85.4			HAZARD LT	1.0E-09		
BURIEN W	73.6	85.4			HAZARD LT	1.0E-09		
BUCKLEY W	73.7	85.4			HAZARD LT	1.0E-09		
SEAHURST W	73.8	85.5			HAZARD LT	1.0E-09		
NRMNDYPK W	73.8	85.5			HAZARD LT	1.0E-09		
DESMOINE W	73.8	85.5			HAZARD LT	1.0E-09		
AUBURN W	73.9	85.5			HAZARD LT	1.0E-09		
BRMRTNEA W	74.3	85.7			HAZARD LT	1.0E-09		
FEDRLWAY W	74.2	85.7			HAZARD LT	1.0E-09		
SUMNER W	74.3	85.7			HAZARD LT	1.0E-09		
KITSAPCO W	73.3	85.3			HAZARD LT	1.0E-09		
BONNYLAK W	74.3	85.7			HAZARD LT	1.0E-09		
BREMRTON W	74.2	85.7			HAZARD LT	1.0E-09		
GOLDNDLE W	74.4	85.8			HAZARD LT	1.0E-09		
PRTOCHRD W	74.4	85.8			HAZARD LT	1.0E-09		
NAVYDCTY W	74.4	85.8			HAZARD LT	1.0E-09		
MILTON W	74.5	85.8			HAZARD LT	1.0E-09		
PUYALLUP W	74.6	85.9			HAZARD LT	1.0E-09		
TACOMA W	74.7	85.9			HAZARD LT	1.0E-09		
PIERCECO W	72.9	85.0			HAZARD LT	1.0E-09		
MIDLAND W	75.1	86.1			HAZARD LT	1.0E-09		
FIRCREST W	75.1	86.1			HAZARD LT	1.0E-09		
KLIKTATCOW	72.9	85.0			HAZARD LT	1.0E-09		
PARKLAND W	75.1	86.1			HAZARD LT	1.0E-09		
UNIV.PL W	75.2	86.2			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-0J, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	FC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LAKWDCTR	W	75.2	86.2			HAZARD LT	1.0E-09		
SPANAWAY	W	75.3	86.3			HAZARD LT	1.0F-09		
WISHRAM	W	75.4	86.3			HAZARD LT	1.0E-09		
STEILACM	W	75.6	86.4			HAZARD LT	1.0E-09		
LEWISCO1	W	74.0	85.6			HAZARD LT	1.0E-09		
JEFRSNCO1	W	74.3	85.7			HAZARD LT	1.0E-09		
LYLE	W	76.4	86.8			HAZARD LT	1.0E-09		
LACEY	W	76.7	87.0			HAZARD LT	1.0E-09		
MASON CO	W	75.4	86.3			HAZARD LT	1.0E-09		
BINGEN	W	76.8	87.1			HAZARD LT	1.0E-09		
OLYMPIA	W	76.9	87.2			HAZARD LT	1.0E-09		
THRSTNCO	W	76.0	86.6			HAZARD LT	1.0E-09		
TUMWATER	W	77.2	87.3			HAZARD LT	1.0E-09		
CARSON	W	78.0	87.7			HAZARD LT	1.0E-09		
LEWISCO2	W	76.4	86.9			HAZARD LT	1.0E-09		
JFRSNCO2	W	76.7	87.0			HAZARD LT	1.0E-09		
CNTRALIA	W	78.2	87.9			HAZARD LT	1.0E-09		
STVNSON	W	78.3	87.9			HAZARD LT	1.0E-09		
SKMANIACO	W	76.4	86.9			HAZARD LT	1.0E-09		
CHEHALIS	W	78.5	88.0			HAZARD LT	1.0E-09		
NBONNVLL	W	78.6	88.1			HAZARD LT	1.0E-09		
GRAHBRCO	W	77.2	87.3			HAZARD LT	1.0E-09		
COWLTZCO	W	77.6	87.6			HAZARD LT	1.0E-09		
YACOLT	W	79.4	88.5			HAZARD LT	1.0E-09		
MNTESANO	W	79.4	88.5			HAZARD LT	1.0E-09		
AMBOY	W	79.4	88.5			HAZARD LT	1.0E-09		
CNTRALPK	W	79.7	88.7			HAZARD LT	1.0E-09		
MEDWGLDE	W	80.1	88.9			HAZARD LT	1.0E-09		
KELSO	W	80.0	88.9			HAZARD LT	1.0E-09		
ABERDEEN	W	80.1	88.9			HAZARD LT	1.0E-09		
WSHOUGAL	W	80.1	88.9			HAZARD LT	1.0E-09		
CLARKCO	W	79.0	88.3			HAZARD LT	1.0E-09		
LONGVIEW	W	80.1	88.9			HAZARD LT	1.0E-09		
LACENTER	W	80.2	89.0			HAZARD LT	1.0E-09		
HOQUIAM	W	80.2	89.0			HAZARD LT	1.0E-09		
CAMAS	W	80.3	89.0			HAZARD LT	1.0E-09		
SALMNCRK	W	80.3	89.1			HAZARD LT	1.0E-09		
WOODLAND	W	80.3	89.1			HAZARD LT	1.0E-09		
SIFTON	W	80.4	89.1			HAZARD LT	1.0E-09		
BTTLGRND	W	80.5	89.2			HAZARD LT	1.0E-09		
ORCHARDS	W	80.5	89.2			HAZARD LT	1.0E-09		
RIDGEFLD	W	80.6	89.2			HAZARD LT	1.0E-09		
RAYMOND	W	80.7	89.3			HAZARD LT	1.0E-09		
LAKESHOR	W	80.7	89.3			HAZARD LT	1.0E-09		
HAZLDELL	W	80.7	89.3			HAZARD LT	1.0E-09		
MINEHAHA	W	80.7	89.3			HAZARD LT	1.0E-09		
PACFICCO	W	79.5	88.6			HAZARD LT	1.0E-09		
VANCOUVER	W	80.8	89.4			HAZARD LT	1.0E-09		
WAKAKMCO	W	80.9	89.4			HAZARD LT	1.0E-09		
ALTURAS	C	86.3	93.1			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
MODOC CO C	84.2	91.6	0.332	0.000	0.	0.000	0.000	-0.
TULELAKE C	88.0	94.4			HAZARD LT	1.0E-09		
LASSENCO C	86.1	93.0			HAZARD LT	1.0E-09		
DORRIS C	88.9	95.1	0.001	0.000	0.	0.000	0.000	-0.
SUSANVLL C	89.3	95.4			HAZARD LT	1.0E-09		
PLUMASCC1C	88.9	95.1			HAZARD LT	1.0E-09		
HRNBROOK C	90.8	96.6	0.010	0.000	0.	0.000	0.000	-0.
HILT C	90.9	96.6	0.017	0.000	0.	0.000	0.000	-0.
MONTAGUE C	91.1	96.9	0.006	0.000	0.	0.000	0.000	-0.
PLMASCO2 C	90.0	95.9			HAZARD LT	1.0E-09		
MTSHASTA C	91.2	96.9	0.001	0.000	0.	0.000	0.000	-0.
WEED C	91.2	96.9	0.002	0.000	0.	0.000	0.000	-0.
GRENADA C	91.2	97.0	0.003	0.000	0.	0.000	0.000	-0.
QUINCY C	91.3	97.0			HAZARD LT	1.0E-09		
* SISKYUCO C	88.6	94.8	353.201	0.008	0.	0.002	0.006	-0.
MCLOUD C	91.3	97.0			HAZARD LT	1.0E-09		
YREKA C	91.3	97.0	0.018	0.000	0.	0.000	0.000	-0.
DUNSMUIR C	91.5	97.2			HAZARD LT	1.0E-09		
SHASTACO C	89.8	95.8	0.496	0.000	0.	0.000	0.000	-0.
FTJONES C	91.9	97.5	0.006	0.000	0.	0.000	0.000	-0.
ETNA C	92.2	97.8	0.005	0.000	0.	0.000	0.000	-0.
HAPYCAMP C	92.5	98.0	0.094	0.001	0.	0.000	0.001	-0.
ENTRPRIS C	93.1	98.5			HAZARD LT	1.0E-09		
YUBA CO1 C	92.6	98.1			HAZARD LT	1.0E-09		
REDDING C	93.2	98.6			HAZARD LT	1.0E-09		
BONNYVEW C	93.3	98.7			HAZARD LT	1.0E-09		
PARADISE C	93.3	98.7			HAZARD LT	1.0E-09		
BUTTE CC C	92.1	97.7			HAZARD LT	1.0E-09		
ANDERSON C	93.4	98.8			HAZARD LT	1.0E-09		
TEHAMACO1C	92.2	97.8			HAZARD LT	1.0E-09		
COLUSACO C	92.5	98.1			HAZARD LT	1.0E-09		
OROVILLE C	93.7	99.0			HAZARD LT	1.0E-09		
SCROVLLE C	93.7	99.1			HAZARD LT	1.0E-09		
THRMOLTO C	93.8	99.1			HAZARD LT	1.0E-09		
REDBLUFF C	93.8	99.1			HAZARD LT	1.0E-09		
CHICO C	93.9	99.2			HAZARD LT	1.0E-09		
CHCONRTH C	93.9	99.2			HAZARD LT	1.0E-09		
CHCOVCNO C	93.9	99.2			HAZARD LT	1.0E-09		
LEWISTON C	93.9	99.2			HAZARD LT	1.0E-09		
GASQUET C	94.1	99.4	0.249	0.002	0.	0.000	0.001	-0.
SMITHRVR C	94.2	99.5	0.265	0.002	0.	0.000	0.002	-0.
GRIDLEY C	94.3	99.5			HAZARD LT	1.0E-09		
YUBA CO2 C	93.7	99.1			HAZARD LT	1.0E-09		
CORNING C	94.3	99.6			HAZARD LT	1.0E-09		
WEVRVILL C	94.4	99.6			HAZARD LT	1.0E-09		
* TRINTYCO1C	93.1	98.6	4.609	0.000	0.	0.000	0.000	-0.
ORLEANS C	94.4	99.7	0.110	0.001	0.	0.000	0.001	-0.
* DLNORTCO C	93.4	98.8	517.543	0.043	0.	0.011	0.031	-0.
LIVE OAK C	94.5	99.8			HAZARD LT	1.0E-09		
CRSNTNRTHC	94.6	99.8	0.588	0.012	0.	0.003	0.009	-0.

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
NRTHCRST	C	94.6	99.8	0.315	0.004	0.	0.001	0.003	-0.
CRSNTCTY	C	94.6	99.8	0.576	0.011	0.	0.003	0.008	-0.
MARYSVLL	C	94.6	99.8			HAZARD LT 1.0E-09			
OLIVHRST	C	94.6	99.8			HAZARD LT 1.0E-09			
TEHMACO2	C	93.5	98.8	0.002	0.000	0.	0.000	0.000	-0.
LINDA	C	94.7	99.9			HAZARD LT 1.0E-09			
ORLAND	C	94.7	99.9			HAZARD LT 1.0E-09			
KLAMATH	C	94.7	99.9	0.494	0.008	0.	0.003	0.005	-0.
YUBACITY	C	94.7	99.9			HAZARD LT 1.0E-09			
YBACTYSO	C	94.7	99.9			HAZARD LT 1.0E-09			
* TRINTYCO	C	93.3	98.7	32.631	0.000	0.	0.000	0.000	-0.
SUTTERCO	C	94.4	99.6			HAZARD LT 1.0E-09			
HAYFORK	C	95.2	100.4			HAZARD LT 1.0E-09			
WILLOWS	C	95.2	100.4			HAZARD LT 1.0E-09			
HOOPA	C	95.2	100.4	0.036	0.000	0.	0.000	0.000	-0.
WILLWCRK	C	95.4	100.5	0.018	0.000	0.	0.000	0.000	-0.
SALYER	C	95.4	100.6	0.008	0.000	0.	0.000	0.000	-0.
COLUSA	C	95.5	100.6			HAZARD LT 1.0E-09			
GLENN CO	C	94.4	99.7			HAZARD LT 1.0E-09			
ORICK	C	95.6	100.7	0.381	0.007	0.	0.002	0.004	-0.
WASHNGTN	C	95.6	100.8			HAZARD LT 1.0E-09			
WSCRMNTO	C	95.6	100.8			HAZARD LT 1.0E-09			
BRYTE	C	95.6	100.8			HAZARD LT 1.0E-09			
SACRMNTO	C	95.4	100.6			HAZARD LT 1.0E-09			
TRNTYCO2	C	94.7	99.9	0.797	0.000	0.	0.000	0.000	-0.
STOKTON	C	95.7	100.9			HAZARD LT 1.0E-09			
WOODLAND	C	96.0	101.1			HAZARD LT 1.0E-09			
FIELDBRK	C	96.1	101.3	0.090	0.001	0.	0.000	0.001	-0.
WSTHAVEN	C	96.1	101.3	0.225	0.004	0.	0.001	0.003	-0.
TRINIDAD	C	96.2	101.3	0.209	0.001	0.	0.000	0.001	-0.
BLUELAKE	C	96.2	101.3	0.049	0.001	0.	0.000	0.001	-0.
DAVIS	C	96.1	101.3			HAZARD LT 1.0E-09			
YOLO CO	C	95.3	100.5			HAZARD LT 1.0E-09			
MKNLYVLL	C	96.3	101.4	0.234	0.004	0.	0.001	0.004	-0.
ALLIANCE	C	96.4	101.6	0.062	0.000	0.	0.000	0.000	-0.
ARCATA	C	96.4	101.6	0.280	0.008	0.	0.001	0.007	-0.
SUNNYBRA	C	96.5	101.6	0.061	0.001	0.	0.000	0.001	-0.
MYRTLTWN	C	96.7	101.8	0.121	0.003	0.	0.000	0.002	-0.
ROSEWOOD	C	96.7	101.9	0.044	0.001	0.	0.000	0.001	-0.
PINEHILL	C	96.7	101.9	0.047	0.001	0.	0.000	0.001	-0.
EUREKA	C	96.7	101.9	0.432	0.019	0.	0.002	0.018	-0.
BAYVIEW	C	96.8	101.9	0.067	0.001	0.	0.000	0.001	-0.
CUTTEN	C	96.8	101.9	0.090	0.002	0.	0.000	0.001	-0.
SAMOA	C	96.8	102.0	0.056	0.001	0.	0.000	0.001	-0.
ALDRPOIN	C	96.9	102.1			HAZARD LT 1.0E-09			
CARLOTTA	C	97.0	102.2	0.005	0.000	0.	0.000	0.000	-0.
* HMBOLTCO	C	95.4	100.5	92.677	0.007	0.	0.001	0.006	-0.
FIELDLDG	C	97.0	102.2	0.030	0.000	0.	0.000	0.000	-0.
HYDESVLL	C	97.1	102.3	0.009	0.000	0.	0.000	0.000	-0.
FERNDALE	C	97.1	102.3	0.017	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-03, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LOLETA	C	97.2	102.4	0.021	0.000	0.	0.000	0.000	-0.
FORTUNA	C	97.2	102.4	0.041	0.001	0.	0.000	0.001	-0.
LAKE CO	C	96.2	101.4			HAZARD LT 1.0E-09			
WEOTT	C	97.2	102.4	0.001	0.000	0.	0.000	0.000	-0.
CMPTNHTS	C	97.2	102.4	0.020	0.000	0.	0.000	0.000	-0.
SCOTIA	C	97.3	102.4	0.006	0.000	0.	0.000	0.000	-0.
RIO DELL	C	97.2	102.4	0.015	0.000	0.	0.000	0.000	-0.
CLRLKHLN	C	97.3	102.5			HAZARD LT 1.0E-09			
MNDCNOCO1	C	96.6	101.7	0.006	0.000	0.	0.000	0.000	-0.
MIRANDA	C	97.3	102.5			HAZARD LT 1.0E-09			
GARBRVLL	C	97.4	102.6			HAZARD LT 1.0E-09			
REDWAY	C	97.4	102.6			HAZARD LT 1.0E-09			
HEALDBRG	C	97.5	102.7			HAZARD LT 1.0E-09			
ANGWIN	C	97.6	102.8			HAZARD LT 1.0E-09			
NAPA CO	C	96.9	102.0			HAZARD LT 1.0E-09			
LAKEPORT	C	97.7	103.0			HAZARD LT 1.0E-09			
STHELENA	C	97.8	103.0			HAZARD LT 1.0E-09			
WILLITS	C	97.8	103.1			HAZARD LT 1.0E-09			
NAPA	C	97.8	103.1			HAZARD LT 1.0E-09			
UKIAH	C	98.0	103.3			HAZARD LT 1.0E-09			
BOYSHTSP	C	98.2	103.4			HAZARD LT 1.0E-09			
SONOMA	C	98.2	103.5			HAZARD LT 1.0E-09			
CLOVRCLE	C	98.3	103.6			HAZARD LT 1.0E-09			
MNDCNCCC2	C	97.7	102.9			HAZARD LT 1.0E-09			
SNTAROSA	C	98.4	103.6			HAZARD LT 1.0E-09			
SONOMACO	C	97.4	102.6			HAZARD LT 1.0E-09			
ROHNRTPK	C	98.5	103.8			HAZARD LT 1.0E-09			
ROSELAND	C	98.5	103.8			HAZARD LT 1.0E-09			
BERKELEY	C	98.4	103.7			HAZARD LT 1.0E-09			
PETALUMA	C	98.6	103.9			HAZARD LT 1.0E-09			
SBSTOPOL	C	98.7	104.0			HAZARD LT 1.0E-09			
MARIN CO	C	98.2	103.4			HAZARD LT 1.0E-09			
FRTBRAGG	C	98.8	104.1			HAZARD LT 1.0E-09			
NOVATO	C	98.8	104.1			HAZARD LT 1.0E-09			
OAKLAND	C	98.5	103.8			HAZARD LT 1.0E-09			
FREMONT	C	98.6	103.9			HAZARD LT 1.0E-09			
IGNACIO	C	98.8	104.1			HAZARD LT 1.0E-09			
STAVNTIA	C	98.8	104.1			HAZARD LT 1.0E-09			
TRRALNDA	C	98.9	104.2			HAZARD LT 1.0E-09			
MARINWOD	C	98.9	104.2			HAZARD LT 1.0E-09			
SAN JOSE	C	98.7	104.0			HAZARD LT 1.0E-09			
BLVEDERE	C	99.0	104.3			HAZARD LT 1.0E-09			
TIBURON	C	99.0	104.3			HAZARD LT 1.0E-09			
GRENBRAE	C	99.0	104.3			HAZARD LT 1.0E-09			
SNRAFAEL	C	98.9	104.2			HAZARD LT 1.0E-09			
LARKSPUR	C	99.0	104.4			HAZARD LT 1.0E-09			
CORTMDRA	C	99.0	104.4			HAZARD LT 1.0E-09			
KNTFIELD	C	99.1	104.4			HAZARD LT 1.0E-09			
FAIRFAX	C	99.1	104.4			HAZARD LT 1.0E-09			
ROSS	C	99.1	104.4			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-03. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SNANSLMO C	99.1	104.4			HAZARD LT 1.0E-09			
STRBRYPT C	99.1	104.4			HAZARD LT 1.0E-09			
MILVALLY C	99.1	104.5			HAZARD LT 1.0E-09			
TMLPSVLY C	99.1	104.5			HAZARD LT 1.0E-09			
SNFRNCSCOC	99.0	104.4			HAZARD LT 1.0E-09			
SAUSLITO C	99.4	104.7			HAZARD LT 1.0E-09			

D. HAZARDS FROM G-4 LAUNCH

This section contains computer printouts of the hazards from the G-4 Launch.

1. Hazards to Montana and Idaho

This section contains computer printouts of hazards to Montana and Idaho from the G-4 launch.

...C/SAT ,SAFETY RUN FOR G-04, GFM 90 PCT APRIL WINDS 5/29/74

APRIL 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	EC(X10-6) CLASS 1	FC(X10-6) CLASS 2	FC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SUNBURST M					HAZARD LT 1.0E-09			
TOOLE CO M			0.003	0.000	0.	0.000	0.000	-0.
SHELBY M					HAZARD LT 1.0E-09			
BELT M					HAZARD LT 1.0E-09			
S40 45					HAZARD LT 1.0E-09			
S40 4					HAZARD LT 1.0E-09			
BLAKEGLE M					HAZARD LT 1.0E-09			
S40 3					HAZARD LT 1.0E-09			
S40 5					HAZARD LT 1.0E-09			
S40 6					HAZARD LT 1.0E-09			
S40 46					HAZARD LT 1.0E-09			
S40 42					HAZARD LT 1.0E-09			
S40 41					HAZARD LT 1.0E-09			
S40 40					HAZARD LT 1.0E-09			
S40 7					HAZARD LT 1.0E-09			
S40 2					HAZARD LT 1.0E-09			
S40 1					HAZARD LT 1.0E-09			
S40 39					HAZARD LT 1.0E-09			
S40 47					HAZARD LT 1.0E-09			
S40 38					HAZARD LT 1.0E-09			
STOCKETT M					HAZARD LT 1.0E-09			
S40 8					HAZARD LT 1.0E-09			
S40 10					HAZARD LT 1.0E-09			
S40 9					HAZARD LT 1.0E-09			
S40 37.					HAZARD LT 1.0E-09			
S40 43					HAZARD LT 1.0E-09			
GREATFLL M					HAZARD LT 1.0E-09			
S40 36					HAZARD LT 1.0E-09			
S40 48					HAZARD LT 1.0E-09			
S40 49					HAZARD LT 1.0E-09			
SANDCULE M					HAZARD LT 1.0E-09			
S40 11					HAZARD LT 1.0E-09			
S40 35					HAZARD LT 1.0E-09			
CUT BANK M					HAZARD LT 1.0E-09			
S40 12					HAZARD LT 1.0E-09			
S40 50					HAZARD LT 1.0E-09			
S40 15					HAZARD LT 1.0E-09			
S40 13					HAZARD LT 1.0E-09			
S40 16					HAZARD LT 1.0E-09			
S40 34					HAZARD LT 1.0E-09			
S40 33					HAZARD LT 1.0E-09			
S40 32					HAZARD LT 1.0E-09			
S40 14					HAZARD LT 1.0E-09			
S40 17					HAZARD LT 1.0E-09			
S40 22					HAZARD LT 1.0E-09			
S40 31					HAZARD LT 1.0E-09			
S40 29					HAZARD LT 1.0E-09			
S40 30					HAZARD LT 1.0E-09			
S40 28					HAZARD LT 1.0E-09			
S40 23					HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04, GFM 90 PCT APRIL WINDS) 5/29/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	EC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S40 21					HAZARD LT 1.0E-09			
S40 24					HAZARD LT 1.0E-09			
S40 52					HAZARD LT 1.0E-09			
S40 27					HAZARD LT 1.0E-09			
S40 54					HAZARD LT 1.0E-09			
S40 18					HAZARD LT 1.0E-09			
S40 20					HAZARD LT 1.0E-09			
S40 19					HAZARD LT 1.0E-09			
S40 53					HAZARD LT 1.0E-09			
S40 25					HAZARD LT 1.0E-09			
S40 26					HAZARD LT 1.0E-09			
S40 55					HAZARD LT 1.0E-09			
S40 56					HAZARD LT 1.0E-09			
S40 66					HAZARD LT 1.0E-09			
S40 67					HAZARD LT 1.0E-09			
S40 57					HAZARD LT 1.0E-09			
CONRAD M					HAZARD LT 1.0E-09			
S40 70					HAZARD LT 1.0E-09			
DUTTON M					HAZARD LT 1.0E-09			
S40 68					HAZARD LT 1.0E-09			
CSCADECO M					LAUNCH VICINITY			
S40 61					HAZARD LT 1.0E-09			
GLACIERCOM			0.005	0.000	0.	0.000	0.000	-0.
S40 60					HAZARD LT 1.0E-09			
S40 62					HAZARD LT 1.0E-09			
S40 69					HAZARD LT 1.0E-09			
S40 44					HAZARD LT 1.0E-09			
PONDERACOM			0.007	0.000	0.	0.000	0.000	-0.
S37 47					HAZARD LT 1.0E-09			
MEGHERCO M			0.003	0.000	0.	0.000	0.000	-0.
S37 46					HAZARD LT 1.0E-09			
S37 54					HAZARD LT 1.0E-09			
S37 53					HAZARD LT 1.0E-09			
S37 12					HAZARD LT 1.0E-09			
S37 23					HAZARD LT 1.0E-09			
S37 13					HAZARD LT 1.0E-09			
S37 50					HAZARD LT 1.0E-09			
S37 45					HAZARD LT 1.0E-09			
S37 24					HAZARD LT 1.0E-09			
S37 14					HAZARD LT 1.0E-09			
S37 22					HAZARD LT 1.0E-09			
S37 48					HAZARD LT 1.0E-09			
S37 27					HAZARD LT 1.0E-09			
S37 49					HAZARD LT 1.0E-09			
ULM M					HAZARD LT 1.0E-09			
S37 52					HAZARD LT 1.0E-09			
S37 60					HAZARD LT 1.0E-09			
S37 41					HAZARD LT 1.0E-09			
S37 29					HAZARD LT 1.0E-09			
S37 15					HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	FC(X10-6) CLASS 3	FC(X10-6) CLASS 4
VALIER M					HAZARD LT	1.0E-09		
S37 17					HAZARD LT	1.0E-09		
S37 34					HAZARD LT	1.0E-09		
S37 28					HAZARD LT	1.0E-09		
S37 43					HAZARD LT	1.0E-09		
S37 16					HAZARD LT	1.0E-09		
S37 51					HAZARD LT	1.0E-09		
S37 59					HAZARD LT	1.0E-09		
S37 36					HAZARD LT	1.0E-09		
S37 26					HAZARD LT	1.0E-09		
S37 31					HAZARD LT	1.0E-09		
S37 37					HAZARD LT	1.0E-09		
S37 1					HAZARD LT	1.0E-09		
S37 38					HAZARD LT	1.0E-09		
S37 33					HAZARD LT	1.0E-09		
S37 57					HAZARD LT	1.0E-09		
S37 55					HAZARD LT	1.0E-09		
S37 56					HAZARD LT	1.0E-09		
S37 42					HAZARD LT	1.0E-09		
S37 21					HAZARD LT	1.0E-09		
S37 32					HAZARD LT	1.0E-09		
S37 39					HAZARD LT	1.0E-09		
S37 40					HAZARD LT	1.0E-09		
S37 3					HAZARD LT	1.0E-09		
S37 18					HAZARD LT	1.0E-09		
S37 44					HAZARD LT	1.0E-09		
WITSLFSP M					HAZARD LT	1.0E-09		
S37 4					HAZARD LT	1.0E-09		
S37 9					HAZARD LT	1.0E-09		
S37 2					HAZARD LT	1.0E-09		
S37 10					HAZARD LT	1.0E-09		
S37 11					HAZARD LT	1.0E-09		
S37 19					HAZARD LT	1.0E-09		
S37 6					HAZARD LT	1.0E-09		
S37 7					HAZARD LT	1.0E-09		
S37 8					HAZARD LT	1.0E-09		
S37 20					HAZARD LT	1.0E-09		
S37 5					HAZARD LT	1.0E-09		
S37 30					HAZARD LT	1.0E-09		
S37 58					HAZARD LT	1.0E-09		
G4 13A					HAZARD LT	1.0E-09		
G4 13B					HAZARD LT	1.0E-09		
G3 7					HAZARD LT	1.0E-09		
G3 6					HAZARD LT	1.0E-09		
G3 8					HAZARD LT	1.0E-09		
G3 5					HAZARD LT	1.0E-09		
TETON CO M			0.015	0.000	0.	0.000	0.000	-0.
S37 25					HAZARD LT	1.0E-09		
G3G4 11					HAZARD LT	1.0E-09		
FAIRFLD M					HAZARD LT	1.0E-09		

STC/SAI SAFETF RUN FOR G-04, GFM,90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION . NAME	TMIN (SFCS)	TMAX (SFCS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G3G4 12					HAZARD LT 1.0E-09			
G3 9					HAZARD LT 1.0E-09			
G4 18					HAZARD LT 1.0E-09			
CASCADE M					HAZARD LT 1.0E-09			
G3 4A					HAZARD LT 1.0E-09			
G4 16					HAZARD LT 1.0E-09			
G4 19	5.4	20.1			HAZARD LT 1.0E-09			
G3 4B	7.6	23.1			HAZARD LT 1.0E-09			
CHOTEAU M	5.3	25.6			HAZARD LT 1.0E-09			
G4 20	11.0	27.7			HAZARD LT 1.0E-09			
G3 3	12.8	30.2			HAZARD LT 1.0E-09			
G3G4G514	13.9	31.6	0.005	0.016	0.	0.009	0.007	-0.
G3 2	14.4	32.3			HAZARD LT 1.0E-09			
G3 1	16.6	36.8			HAZARD LT 1.0E-09			
G5 27	25.6	46.4	0.091	0.169	0.	0.002	0.167	-0.
BROWNING M	25.6	46.3			HAZARD LT 1.0E-09			
G5 30	26.6	47.4			HAZARD LT 1.0E-09			
G6 32	27.0	47.9			HAZARD LT 1.0E-09			
G5G6 28	27.9	48.8	0.030	0.059	0.	0.005	0.054	-0.
G6 36	30.7	51.8			HAZARD LT 1.0E-09			
G6 34B	30.8	51.9			HAZARD LT 1.0E-09			
G6 34A	30.9	52.0			HAZARD LT 1.0E-09			
G6 37	31.6	53.0			HAZARD LT 1.0E-09			
G6G7 38	32.2	53.0			HAZARD LT 1.0E-09			
G6 33A	32.3	54.0	0.132	0.137	0.	0.007	0.130	-0.
G6 33B	32.4	54.1	0.021	0.030	0.	0.007	0.023	-0.
G6G7 39	32.5	54.2			HAZARD LT 1.0E-09			
G6G7 40	34.2	56.1	0.002	0.007	0.	0.007	0.000	-0.
AUGUSTA M	34.3	56.1			HAZARD LT 1.0E-09			
G7 44B	34.7	56.5			HAZARD LT 1.0E-09			
G7 44A	34.7	56.5			HAZARD LT 1.0E-09			
TOWNSEND M	34.9	56.6			HAZARD LT 1.0E-09			
BRDWTRCO M	16.5	60.1	0.003	0.000	0.	0.000	0.000	-0.
G7 41A	35.4	57.5	0.043	0.036	0.	0.001	0.035	-0.
G7 42A	35.5	57.7	0.002	0.007	0.	0.006	0.001	-0.
G7 42B	35.6	57.8	0.029	0.066	0.	0.021	0.044	-0.
G7 43	35.7	58.0	0.003	0.014	0.	0.013	0.001	-0.
* LWSCLKCO M	56.5	60.0	17882.662	6.555	0.	0.000	6.555	-0.
HELENA M	37.3	60.9			HAZARD LT 1.0E-09			
BOULDER M	40.7	64.7			HAZARD LT 1.0E-09			
JEFRSNCO M	37.1	60.6	0.003	0.000	0.	0.000	0.000	-0.
* LINCOLN M	41.3	65.4	409.707	2.978	0.	0.037	2.941	-0.
MRTNCTY M	41.3	65.4			HAZARD LT 1.0E-09			
CORAM M	41.5	65.6			HAZARD LT 1.0E-09			
HNGRYHRSEM	41.6	65.7			HAZARD LT 1.0E-09			
WALKRVLL M	41.6	65.7			HAZARD LT 1.0E-09			
SLVRBOCO1M	40.9	64.9	0.001	0.000	0.	0.000	0.000	-0.
CLMBIAFL M	42.1	66.2			HAZARD LT 1.0E-09			
* POWELLCO M	33.4	67.6	67108.040	4.630	0.	0.133	4.497	-0.
WHITEHAL M	42.3	66.4			HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WHITEFSH	M	42.7	66.8			HAZARD LT 1.0E-09			
SLVRBOPK	M	42.9	67.0			HAZARD LT 1.0E-09			
BIGFORK	M	43.0	67.1			HAZARD LT 1.0E-09			
FLATHDCO	M	38.5	67.6	0.003	0.000	0.	0.000	0.000	-0.
DEERLODG	M	43.1	67.2			HAZARD LT 1.0E-09			
EVRGREEN	M	43.2	67.3			HAZARD LT 1.0E-09			
KALISPLL	M	43.3	57.5			HAZARD LT 1.0E-09			
SOMERS	M	43.6	67.7			HAZARD LT 1.0E-09			
FLORALPK	M	43.6	67.8			HAZARD LT 1.0E-09			
BUTTE	M	43.4	67.6			HAZARD LT 1.0E-09			
LAKESIDE	M	43.7	67.9			HAZARD LT 1.0E-09			
DRUMMOND	M	44.1	68.2	0.199	0.002	0.	0.001	0.000	-0.
LAKE CO	M	42.7	56.9	0.001	0.000	0.	0.000	0.000	-0.
POLSON	M	44.7	68.9			HAZARD LT 1.0E-09			
OPORTNTY	M	44.8	69.0			HAZARD LT 1.0E-09			
DEERLDGCO	M	43.9	68.1			HAZARD LT 1.0E-09			
PABLO	M	45.0	69.3			HAZARD LT 1.0E-09			
ANACONDA	M	45.1	69.4			HAZARD LT 1.0E-09			
RONAN	M	45.1	69.4			HAZARD LT 1.0E-09			
SLVRBOCO2	M	45.1	69.4			HAZARD LT 1.0E-09			
PHILPBRG	M	45.6	70.1			HAZARD LT 1.0E-09			
STIGNATS	M	45.5	70.1			HAZARD LT 1.0E-09			
GRANITCO	M	44.0	63.2	1903.991	0.011	0.	0.002	0.010	-0.
MISULACO	M	44.3	68.5	173.981	0.043	0.	0.019	0.024	-0.
MILLTOWN	M	45.9	70.4			HAZARD LT 1.0E-09			
MISSOULA	M	46.1	70.6			HAZARD LT 1.0E-09			
HOTSPRNG	M	46.3	70.8			HAZARD LT 1.0E-09			
PARADISE	M	47.2	71.6			HAZARD LT 1.0E-09			
PLAINS	M	47.3	71.7			HAZARD LT 1.0E-09			
ALBERTON	M	47.3	71.7			HAZARD LT 1.0E-09			
* STVNSVLL	M	47.3	71.7	30.278	0.605	0.	0.227	0.379	-0.
* RAVALICO	M	46.7	71.1	18066.844	2.478	0.	0.443	2.035	-0.
* VICTOR	M	47.6	72.0	30.728	0.343	0.	0.019	0.324	-0.
* CORVALIS	M	47.9	72.3	2.623	0.022	0.	0.003	0.019	-0.
MINERLCO	M	47.0	71.4			HAZARD LT 1.0E-09			
SUPERIOR	M	47.9	72.3			HAZARD LT 1.0E-09			
SANDERCO	M	46.0	70.5	0.001	0.000	0.	0.000	0.000	-0.
* HAMILTON	M	48.1	72.4	4.804	0.086	0.	0.018	0.068	-0.
THOMSNFL	M	49.2	72.5			HAZARD LT 1.0E-09			
* RAVALICO	M	47.5	71.9	108.828	0.008	0.	0.004	0.003	-0.
ST REGIS	M	48.7	73.0			HAZARD LT 1.0E-09			
DARBY	M	48.7	73.0	0.008	0.000	0.	0.000	0.000	-0.
LEMHI CO	I	47.9	72.3	0.001	0.000	0.	0.000	0.000	-0.
MULLAN	I	49.9	74.1			HAZARD LT 1.0E-09			
SHOSHNCO	I	48.1	72.5	0.001	0.000	0.	0.000	0.000	-0.
SALMON	I	50.0	74.2			HAZARD LT 1.0E-09			
WALLACE	I	50.2	74.3			HAZARD LT 1.0E-09			
SILVRTON	I	50.2	74.4			HAZARD LT 1.0E-09			
AVERY	I	50.3	74.4			HAZARD LT 1.0E-09			
OSBURN	I	50.4	74.5			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04. GFM 90 PCT APRIL WINDS 5/29/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SFCS)	TMAX (SFCS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	FC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WORDNER	I	50.6	74.7			HAZARD LT	1.0E-09		
KELLOGG	I	50.7	74.8			HAZARD LT	1.0E-09		
HAYDEN	I	50.9	74.9			HAZARD LT	1.0E-09		
SMLTRVLL	I	50.9	75.0			HAZARD LT	1.0E-09		
PINEHRST	I	51.0	75.1			HAZARD LT	1.0E-09		
SPIRITLK	I	52.0	75.7			HAZARD LT	1.0E-09		
PLUMMER	I	52.1	75.8			HAZARD LT	1.0E-09		
HDQUARTR	I	52.1	75.8			HAZARD LT	1.0E-09		
DALTNGRDN	I	52.3	75.9			HAZARD LT	1.0E-09		
FERNWOOD	I	52.3	75.9			HAZARD LT	1.0E-09		
STMARIES	I	52.3	75.9			HAZARD LT	1.0E-09		
PIERCE	I	52.3	75.9			HAZARD LT	1.0E-09		
CORDALEN	I	52.3	75.9			HAZARD LT	1.0E-09		
RATHDRUM	I	52.4	76.0			HAZARD LT	1.0E-09		
KOOTNICO	I	51.2	75.2			HAZARD LT	1.0E-09		
CLRWTRCO	I	51.6	75.4	0.026	0.000	0.	0.000	0.000	-0.
PORTFALS	I	52.8	76.2			HAZARD LT	1.0E-09		
BENEWACO	I	51.8	75.6			HAZARD LT	1.0E-09		
ELKRIVER	I	53.0	76.3			HAZARD LT	1.0E-09		
WEIPPE	I	53.0	76.4			HAZARD LT	1.0E-09		
BOVILL	I	53.5	76.7			HAZARD LT	1.0E-09		
KOOSKIA	I	53.7	76.8	0.017	0.000	0.	0.000	0.000	-0.
OROFINO	I	53.7	76.8			HAZARD LT	1.0E-09		
DEARY	I	53.9	77.0			HAZARD LT	1.0E-09		
KAMIAH	I	53.9	77.0	0.002	0.000	0.	0.000	0.000	-0.
KENDRICK	I	54.0	77.0			HAZARD LT	1.0E-09		
NEZPERCE	I	54.3	77.2	0.001	0.000	0.	0.000	0.000	-0.
* LEWIS CO	I	53.5	76.7	1.585	0.000	0.	0.000	0.000	-0.
LATAH CO	I	53.1	76.4			HAZARD LT	1.0E-09		
GRANGVLL	I	54.4	77.3	0.396	0.015	0.	0.008	0.007	-0.
TROY	I	54.7	77.4			HAZARD LT	1.0E-09		
POTLATCH	I	54.7	77.5			HAZARD LT	1.0E-09		
JULIAETA	I	54.9	77.6			HAZARD LT	1.0E-09		
CRAIGMONT	I	54.9	77.6			HAZARD LT	1.0E-09		
COTNWOOD	I	55.0	77.6	0.007	0.000	0.	0.000	0.000	-0.
NEZPRCCO	I	54.2	77.1	0.008	0.000	0.	0.000	0.000	-0.
MOSCOW	I	55.6	77.9			HAZARD LT	1.0E-09		
LAPWAI	I	55.8	77.9			HAZARD LT	1.0E-09		
GENESEE	I	55.9	78.0			HAZARD LT	1.0E-09		
LEWISTON	I	56.4	78.2			HAZARD LT	1.0E-09		
* RIGGINS	I	58.1	78.8	3.357	0.093	0.	0.082	0.011	-0.
* IDAHO CO	I	54.9	77.5	14868.754	2.790	0.	2.500	0.290	-0.
MCCALL	I	62.3	79.3			HAZARD LT	1.0E-09		
VALLEYCO	I	59.0	78.7	0.008	0.000	0.	0.000	0.000	-0.
NEWMEDOW	I	63.1	79.6	0.001	0.000	0.	0.000	0.000	-0.
CASCADE	I	63.4	79.7			HAZARD LT	1.0E-09		
COUNCIL	I	61.6	80.2			HAZARD LT	1.0E-09		
* ADAMS CO	I	62.3	79.3	14.707	0.000	0.	0.000	0.000	-0.
CAMBRIDG	I	63.2	80.8			HAZARD LT	1.0E-09		
* WSHNGTNCO	I	61.8	80.3	3.862	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-04, GEM 90 PCT APRIL WINDS 5/29/74

APRIL 90 PERCENT WINDS

RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
BOISE	I	64.1	81.2			HAZARD LT 1.0E-09			
WEISER	I	65.4	81.8			HAZARD LT 1.0E-09			

2. Hazards to Oregon

This section contains computer printouts of hazards to Oregon from the G-5 launch.

STC/SAI SAFETF RUN FOR G-04, GFM 90 PCT APRIL WINDS 5/20/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	G3G4 10A		13.3	31.0			HAZARD LT	1.0E-09		
	G3 10B		15.9	35.8			HAZARD LT	1.0E-09		
	G3G4G521		21.2	42.2	0.001	0.003	0.	0.003	C.000	-0.
	G5 23		23.1	44.0			HAZARD LT	1.0E-09		
	G5 24		23.2	44.1			HAZARD LT	1.CE-09		
	G5 26		25.4	46.1	0.006	0.021	C.	0.020	C.002	-0.
	G5 29		26.4	47.2			HAZARD LT	1.0E-09		
	G5 31		26.6	47.4			HAZARD LT	1.CE-09		
	G3 10C		28.8	49.9			HAZARD LT	1.0E-09		
*	WALOWACO	O	57.0	78.4	14911.729	1.132	C.	0.981	0.151	-0.
*	ENTRPRSE	O	62.0	80.4	2.386	0.048	0.	0.027	C.021	-0.
*	JOSEPH	O	62.2	80.4	1.436	0.C14	0.	0.006	C.008	-0.
	WALLOWA	O	62.5	80.6	0.038	0.C00	C.	C.000	C.00C	-0.
	ELGIN	C	64.1	81.3	C.007	0.000	0.	0.000	C.000	-0.
	MLTNFRWTRO		64.6	81.5			HAZARD LT	1.CE-09		
	COVE	O	64.8	81.5	0.671	0.C06	0.	0.0C3	C.003	-0.
	WESTON	O	65.3	81.8			HAZARD LT	1.CE-09		
*	UNION	O	65.3	81.8	1.899	0.036	C.	C.021	0.015	-0.
	ATHENA	C	65.6	81.9			HAZARD LT	1.0E-09		
*	UNION CO	O	63.1	80.8	3849.147	0.110	C.	0.062	0.048	-0.
	MAY PARK	C	65.7	81.9	0.176	0.C02	C.	0.000	C.001	-0.
	LAGRANDE	O	65.9	82.0	0.643	0.017	0.	0.005	0.012	-0.
	ONTARIO	O	66.0	82.0			HAZARD LT	1.0E-09		
	NO.PWDR	C	66.3	82.2	C.750	0.C04	C.	0.CC1	C.003	-0.
*	BAKER CO	C	63.1	80.3	11866.510	0.265	0.	0.123	C.142	-0.
	NYASSA	O	66.7	82.4			HAZARD LT	1.CE-09		
*	BAKER	C	66.8	82.4	11.845	0.427	C.	0.035	C.391	-0.
*	UMTILACO	O	63.8	81.1	6.373	0.000	C.	0.CC0	C.00C	-0.
	VALE	O	67.4	82.6			HAZARD LT	1.CE-09		
	PNDLTON	O	67.3	82.6			HAZARD LT	1.CE-09		
	ADRIAN	O	67.5	82.7			HAZARD LT	1.0E-09		
	PILOT RK	C	69.4	83.1	0.001	0.C00	C.	C.0C0	C.00C	-0.
	ECHO	O	68.5	83.1			HAZARD LT	1.0E-09		
	MCNARY	O	68.6	83.2			HAZARD LT	1.0E-09		
	UMATILLA	C	68.7	83.2			HAZARD LT	1.0E-09		
	STNFLD	O	68.7	83.2			HAZARD LT	1.CE-09		
	HRMSTON	O	68.8	83.2			HAZARD LT	1.CE-09		
	UKIAH	C	70.3	83.9	0.010	0.000	0.	C.CC0	C.00C	-0.
*	BATES	O	70.5	84.0	6.335	0.C74	C.	0.042	0.032	-0.
	MORROWCO	C	69.2	83.4	0.179	C.000	C.	0.000	0.00C	-0.
*	PEARFCTY	O	71.7	84.6	6.671	0.086	C.	0.016	C.07C	-0.
	HEPPNER	O	71.7	84.6			HAZARD LT	1.0E-09		
*	MALHEURCOC		66.3	82.2	2.177	0.C00	C.	C.0CC	C.00C	-0.
	IONE	O	72.2	84.8			HAZARD LT	1.0E-09		
*	JOHN DAY	O	72.6	85.0	1C.C47	0.139	C.	C.084	0.115	-0.
*	GRANT CO	O	69.0	83.3	9906.934	0.124	C.	0.073	C.051	-0.
	ARLNGTN	O	72.8	85.1			HAZARD LT	1.0F-09		
*	CNYN CTY	O	72.9	85.1	6.338	0.C78	0.	0.025	0.052	-0.
*	MTVERNON	O	73.3	85.3	2.366	0.023	C.	C.008	C.015	-0.
*	SENECA	O	73.7	85.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	GILLAMCO	O	72.3	84.9	0.010	0.000	0.	0.000	0.000	-0.
	CONDON	O	74.5	85.9			HAZARD LT 1.0E-09			
	RUFUS	O	74.9	86.1			HAZARD LT 1.0E-09			
	WASCO	C	75.1	86.3			HAZARD LT 1.0E-09			
	SHRMANCO	C	74.0	85.7			HAZARD LT 1.0E-09			
*	WHELR CO	O	73.4	85.4	76.942	0.000	0.	0.000	0.000	-0.
	KINZUA	O	75.5	86.5	0.007	0.000	0.	0.000	0.000	-0.
	FOSSIL	C	75.8	86.6	0.001	0.000	0.	0.000	0.000	-0.
	BURNS	O	75.8	86.6	0.074	0.001	0.	0.000	0.001	-0.
	HINES	C	75.9	86.7	0.053	0.000	0.	0.000	0.000	-0.
*	HARNEYCO	O	71.3	84.4	3074.122	0.011	0.	0.005	0.007	-0.
	THEDALLES	C	76.5	87.0			HAZARD LT 1.0E-09			
	CHNOWTH	O	76.6	87.1			HAZARD LT 1.0E-09			
	DUFUR	O	76.9	87.3			HAZARD LT 1.0E-09			
	HOODRVR	C	77.3	87.4			HAZARD LT 1.0E-09			
	WASCO CO	O	75.2	86.3	0.012	0.000	0.	0.000	0.000	-0.
	ODELL	C	77.7	87.7			HAZARD LT 1.0E-09			
	MAUPIN	O	77.7	87.7			HAZARD LT 1.0E-09			
*	CROOK CO	O	75.6	86.5	4974.491	0.115	0.	0.039	0.076	-0.
	HOODRVCO	C	77.3	87.4			HAZARD LT 1.0E-09			
	CSCADLKS	C	78.7	88.2			HAZARD LT 1.0E-09			
	MADRAS	O	79.5	88.7	0.001	0.000	0.	0.000	0.000	-0.
	WRM SPRG	C	79.5	88.7			HAZARD LT 1.0E-09			
	PRINVLLE	C	79.6	88.7	0.117	0.002	0.	0.000	0.001	-0.
*	JEFF CO	C	77.7	87.7	8.374	0.000	0.	0.000	0.000	-0.
	ROENDRON	C	79.8	88.8			HAZARD LT 1.0E-09			
	WEMME	O	79.9	88.9			HAZARD LT 1.0E-09			
	CULVER	O	80.1	89.0	0.001	0.000	0.	0.000	0.000	-0.
	TRREPONI	O	80.4	89.2	0.005	0.000	0.	0.000	0.000	-0.
	SPRNGDLE	O	80.4	89.2			HAZARD LT 1.0E-09			
	RAINIER	C	80.5	89.3			HAZARD LT 1.0E-09			
	TROUTDLE	O	80.5	89.3			HAZARD LT 1.0E-09			
	HAZELWOD	O	80.6	89.3			HAZARD LT 1.0E-09			
	SANDY	O	80.6	89.3			HAZARD LT 1.0E-09			
	WOODVLGE	O	80.7	89.4			HAZARD LT 1.0E-09			
	DEER ISL	C	80.7	89.4			HAZARD LT 1.0E-09			
	FAIRVIEW	C	80.7	89.4			HAZARD LT 1.0E-09			
	COLMBCTY	O	80.7	89.4			HAZARD LT 1.0E-09			
	REDMOND	O	80.7	89.4	0.041	0.000	0.	0.000	0.000	-0.
	STHELENS	C	80.7	89.4			HAZARD LT 1.0E-09			
	GRESHAM	C	80.8	89.5			HAZARD LT 1.0E-09			
	MCNULTY	C	80.8	89.5			HAZARD LT 1.0E-09			
	MAYWOODPKO		80.9	89.5			HAZARD LT 1.0E-09			
	RKWOOD	O	80.9	89.5			HAZARD LT 1.0E-09			
	PWLHRST	O	80.9	89.5			HAZARD LT 1.0E-09			
	FRRKRCSE	O	81.0	89.6			HAZARD LT 1.0E-09			
	GLNDOVER	O	81.0	89.6			HAZARD LT 1.0E-09			
	WARREN	C	81.0	89.6			HAZARD LT 1.0E-09			
	PRKROSE	O	81.0	89.6			HAZARD LT 1.0E-09			
	ESTACADA	O	81.1	89.7			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
CLTSKNE	C	81.1	89.7			HAZARD LT 1.0E-09			
MLTNMHCO	O	80.4	89.2			HAZARD LT 1.0E-09			
WPCWLHRST	C	81.2	89.7			HAZARD LT 1.0E-09			
SCAPOCSE	O	81.2	89.8			HAZARD LT 1.0E-09			
PORTLAND	O	80.9	89.5			HAZARD LT 1.0E-09			
GILBERT	O	81.3	89.8			HAZARD LT 1.0E-09			
COLMB CO	O	80.4	89.2			HAZARD LT 1.0E-09			
KENDALL	C	81.4	89.8			HAZARD LT 1.0E-09			
ERRCLHTS	O	81.4	89.9			HAZARD LT 1.0E-09			
WSTPORT	O	81.6	89.9			HAZARD LT 1.0E-09			
GLDSTONE	C	81.6	90.0			HAZARD LT 1.0E-09			
CLKMSHTS	O	81.6	90.0			HAZARD LT 1.0E-09			
ORGONCTY	O	81.6	90.0			HAZARD LT 1.0E-09			
WESTLINN	O	81.7	90.0			HAZARD LT 1.0E-09			
BEND	O	81.7	90.0	0.423	0.013	0.	0.002	0.011	-0.
SISTERS	O	81.7	90.1	0.002	0.000	0.	0.000	0.000	-0.
WSTHAVN	C	81.8	90.1			HAZARD LT 1.0E-09			
CEDARMIL	C	81.8	90.1			HAZARD LT 1.0E-09			
VRNCNIA	O	81.8	90.1			HAZARD LT 1.0E-09			
WSTSLOPE	C	81.8	90.1			HAZARD LT 1.0E-09			
CEDRHILL	O	81.8	90.1			HAZARD LT 1.0E-09			
HAPYVALY	C	81.8	90.1			HAZARD LT 1.0E-09			
RALEGHHL	C	81.8	90.1			HAZARD LT 1.0E-09			
GRDNHOME	O	81.8	90.1			HAZARD LT 1.0E-09			
MRLENEVLG	C	81.9	90.2			HAZARD LT 1.0E-09			
METZGER	O	81.9	90.2			HAZARD LT 1.0E-09			
BEVRTON	O	81.9	90.2			HAZARD LT 1.0E-09			
LAKOSWGO	O	81.9	90.2			HAZARD LT 1.0E-09			
ALOHA	O	82.0	90.2			HAZARD LT 1.0E-09			
BATTIN	O	82.0	90.2			HAZARD LT 1.0E-09			
CLKMSCO	O	80.3	89.1			HAZARD LT 1.0E-09			
TIGARD	O	82.0	90.2			HAZARD LT 1.0E-09			
IDANHA	C	82.1	90.3			HAZARD LT 1.0E-09			
CANBY	O	82.1	90.3			HAZARD LT 1.0E-09			
* DSHUTSCO	O	79.9	88.9	904.268	0.032	0.	0.009	0.024	-0.
WESTWOOD	O	82.1	90.3			HAZARD LT 1.0E-09			
CLAKAMAS	C	82.2	90.3			HAZARD LT 1.0E-09			
KINGCTY	O	82.2	90.4			HAZARD LT 1.0E-09			
MCLALLA	C	82.2	90.4			HAZARD LT 1.0E-09			
SVENSON	O	82.2	90.4			HAZARD LT 1.0E-09			
MWAUKIE	C	82.2	90.4			HAZARD LT 1.0E-09			
HILSBORO	O	82.2	90.4			HAZARD LT 1.0E-09			
CONCORD	O	82.3	90.4			HAZARD LT 1.0E-09			
DETROIT	C	82.3	90.5			HAZARD LT 1.0E-09			
SHRWOOD	C	82.3	90.4			HAZARD LT 1.0E-09			
WLSNVLLE	C	82.3	90.5			HAZARD LT 1.0E-09			
OAKGROVE	C	82.3	90.4			HAZARD LT 1.0E-09			
JNINGSLG	O	82.3	90.5			HAZARD LT 1.0E-09			
WASH CO	O	81.3	89.8			HAZARD LT 1.0E-09			
BANKS	O	82.4	90.5			HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
AURORA	O	82.5	90.6			HAZARD LT 1.0E-09			
CRABTREE	O	82.6	90.7			HAZARD LT 1.0E-09			
ASTORIA	O	82.6	90.6			HAZARD LT 1.0E-09			
HAMMOND	O	82.7	90.7			HAZARD LT 1.0E-09			
* LAKE CO	C	78.9	88.4	10988.570	0.057	0.	0.016	0.041	-0.
WRRNTON	O	82.8	90.7			HAZARD LT 1.0E-09			
HUBBARD	C	82.8	90.8			HAZARD LT 1.0E-09			
CLTSOPCO	C	81.7	90.0			HAZARD LT 1.0E-09			
NEWBERG	O	82.9	90.8			HAZARD LT 1.0E-09			
GASTON	O	83.0	90.9			HAZARD LT 1.0E-09			
DUNDEE	C	83.0	90.9			HAZARD LT 1.0E-09			
WOODBURN	O	83.0	90.9			HAZARD LT 1.0E-09			
MT.ANGEL	O	83.1	91.0			HAZARD LT 1.0E-09			
STPAUL	C	83.2	91.0			HAZARD LT 1.0E-09			
GERVAIS	O	83.2	91.1			HAZARD LT 1.0E-09			
DAYTON	O	83.3	91.1			HAZARD LT 1.0E-09			
LYONS	C	83.3	91.1			HAZARD LT 1.0E-09			
SLVRTON	O	83.3	91.1			HAZARD LT 1.0E-09			
FORSTGRV	C	83.3	91.1			HAZARD LT 1.0E-09			
YAMHILL	O	83.3	91.1			HAZARD LT 1.0E-09			
LA PINE	O	83.4	91.2	0.496	0.008	0.	0.003	0.006	-0.
LFAYETTE	O	83.4	91.2			HAZARD LT 1.0E-09			
CARLTON	O	83.5	91.2			HAZARD LT 1.0E-09			
MARIONCO	C	82.2	90.4			HAZARD LT 1.0E-09			
BROCKS	C	83.6	91.3			HAZARD LT 1.0E-09			
COBURG	O	83.7	91.4	0.002	0.000	0.	0.000	0.000	-0.
SBLIMITY	O	83.7	91.4			HAZARD LT 1.0E-09			
YMHILLCO	C	82.7	90.7			HAZARD LT 1.0E-09			
MCMNVLLE	O	83.7	91.4			HAZARD LT 1.0E-09			
HAYESVIL	C	83.8	91.5			HAZARD LT 1.0E-09			
STAYTON	O	83.8	91.5			HAZARD LT 1.0E-09			
AUMSVLLE	O	83.9	91.5			HAZARD LT 1.0E-09			
KEIZER	C	83.9	91.5			HAZARD LT 1.0E-09			
4CCRNERS	C	84.0	91.6			HAZARD LT 1.0E-09			
CRNELIUS	C	84.1	91.6			HAZARD LT 1.0E-09			
AMITY	C	84.1	91.6			HAZARD LT 1.0E-09			
SALEM	O	84.0	91.6			HAZARD LT 1.0E-09			
TURNER	O	84.1	91.7			HAZARD LT 1.0E-09			
SCIO	O	84.1	91.7			HAZARD LT 1.0E-09			
LAKEVIEW	O	84.1	91.7	0.001	0.000	0.	0.000	0.000	-0.
NMZNITA	C	84.3	91.8			HAZARD LT 1.0E-09			
FOSTER	C	84.3	91.8			HAZARD LT 1.0E-09			
TLMOCKCO	O	83.0	90.0			HAZARD LT 1.0E-09			
LRLWDACD	O	84.4	91.9			HAZARD LT 1.0E-09			
SWETHOME	C	84.5	91.9			HAZARD LT 1.0E-09			
BLUERVR	O	84.5	91.9	0.001	0.000	0.	0.000	0.000	-0.
RCKAWAY	C	84.7	92.0			HAZARD LT 1.0E-09			
SHERIDAN	O	84.7	92.0			HAZARD LT 1.0E-09			
TWNROCKS	C	84.7	92.1			HAZARD LT 1.0E-09			
GARIBLDI	O	84.7	92.1			HAZARD LT 1.0E-09			

SAFETY RUN FOR G-04, GFP, 90 PCT APRIL WINDS (LEFT) 5/30/74

APRIL 90 PERCENT WINDS (LEFT)

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
BAY CTY	O	84.8	92.1			HAZARD LT 1.0E-09			
INDPNDNC	C	84.9	92.1			HAZARD LT 1.0E-09			
LEBANON	C	84.9	92.1			HAZARD LT 1.0E-09			
TLAMOCK	O	84.9	92.1			HAZARD LT 1.0E-09			
MONMOUTH	C	84.9	92.2			HAZARD LT 1.0E-09			
LBNONSOU	O	84.9	92.2			HAZARD LT 1.0E-09			
WILLAMNA	C	85.0	92.3			HAZARD LT 1.0E-09			
DALLAS	C	85.0	92.3			HAZARD LT 1.0E-09			
NETARTS	O	85.1	92.3			HAZARD LT 1.0E-09			
ALBANY	C	85.1	92.3			HAZARD LT 1.0E-09			
POLK CO	O	84.1	91.6			HAZARD LT 1.0E-09			
GILCHRST	C	85.2	92.4	0.245	0.002	0.	0.000	0.001	-0.
PCFICCTY	C	85.2	92.4			HAZARD LT 1.0E-09			
LINN CO	O	83.4	91.2	0.047	0.000	0.	0.000	0.000	-0.
FALLCTY	O	85.4	92.5			HAZARD LT 1.0E-09			
GRNDRCND	C	85.4	92.5			HAZARD LT 1.0E-09			
BRWNSVLE	O	85.4	92.6			HAZARD LT 1.0E-09			
LWISBURG	C	85.5	92.6			HAZARD LT 1.0E-09			
CHEMULT	O	85.6	92.7	0.646	0.005	0.	0.000	0.005	-0.
CORVALIS	C	85.7	92.8			HAZARD LT 1.0E-09			
OAKRIDGE	C	85.8	92.8	0.032	0.000	0.	0.000	0.000	-0.
HALSEY	O	85.9	92.9			HAZARD LT 1.0E-09			
WESTFIR	C	85.9	92.9	0.010	0.000	0.	0.000	0.000	-0.
BENTONCO	O	85.1	92.3	0.001	0.000	0.	0.000	0.000	-0.
VALSETZ	O	86.0	93.0			HAZARD LT 1.0E-09			
JCT CTY	O	86.1	93.0			HAZARD LT 1.0E-09			
PHILOMTH	C	86.1	93.1			HAZARD LT 1.0E-09			
NSKOWIN	O	86.2	93.1			HAZARD LT 1.0E-09			
LOWELL	C	86.2	93.2	0.002	0.000	0.	0.000	0.000	-0.
HRSBURG	O	86.3	93.2			HAZARD LT 1.0E-09			
GLENWOOD	O	86.3	93.2			HAZARD LT 1.0E-09			
MONROE	C	86.5	93.4			HAZARD LT 1.0E-09			
SPRNGFLD	O	86.5	93.3	0.002	0.000	0.	0.000	0.000	-0.
GOSHEN	O	86.6	93.4			HAZARD LT 1.0E-09			
SNTACLRA	C	86.6	93.5			HAZARD LT 1.0E-09			
LNCLNCTY	O	86.7	93.5			HAZARD LT 1.0E-09			
* KLMTH CO	C	83.8	91.4	5508.260	0.292	0.	0.079	0.212	-0.
RIVERROD	O	86.7	93.5	0.001	0.000	0.	0.000	0.000	-0.
EUGENE	O	86.6	93.4	0.005	0.000	0.	0.000	0.000	-0.
COLGCRSJ	C	86.8	93.6			HAZARD LT 1.0E-09			
CRSWELL	C	86.9	93.7	0.001	0.000	0.	0.000	0.000	-0.
CLNEDNHH	O	86.9	93.7			HAZARD LT 1.0E-09			
SILETZ	C	87.0	93.9			HAZARD LT 1.0E-09			
DPOE BAY	C	87.1	93.8			HAZARD LT 1.0E-09			
LNCLN CO	O	86.0	93.0			HAZARD LT 1.0E-09			
ALSEA	C	87.1	93.8			HAZARD LT 1.0E-09			
* LANE CO	O	84.8	92.1	12.690	0.000	0.	0.000	0.000	-0.
COTAGGRV	C	87.3	93.9	0.005	0.000	0.	0.000	0.000	-0.
CHILOQUN	C	87.3	94.0	0.391	0.004	0.	0.001	0.003	-0.
ELMIRA	O	87.3	94.0			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04. GFW 90 PCT APRIL WINDS 5/20/74

APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	VENETA	C	87.4	94.0			HAZARD LT 1.0E-09			
	TOLEDO	O	87.4	94.0			HAZARD LT 1.0E-09			
	AGTE BCH	O	87.4	94.1			HAZARD LT 1.0E-09			
	MALIN	C	87.6	94.2	0.007	0.000	0.	0.000	0.000	-0.
	NEWPORT	O	87.6	94.2			HAZARD LT 1.0E-09			
	SOUTHBCH	O	87.6	94.2			HAZARD LT 1.0E-09			
	NOTI	C	87.7	94.2			HAZARD LT 1.0E-09			
	SEAL RCK	O	88.0	94.5			HAZARD LT 1.0E-09			
	ALTAMONT	O	87.9	94.4	0.680	0.029	0.	0.002	0.028	-0.
*	KLMTHFLS	O	87.9	94.4	1.003	0.043	0.	0.004	0.038	-0.
	MERRILL	O	88.1	94.5	0.015	0.000	0.	0.000	0.000	-0.
	FALCONHT	C	88.1	94.5	0.042	0.000	0.	0.000	0.000	-0.
	WALDPORT	O	88.2	94.6			HAZARD LT 1.0E-09			
	MIDLAND	O	88.2	94.7	0.030	0.000	0.	0.000	0.000	-0.
	SWISSHOM	O	88.2	94.7			HAZARD LT 1.0E-09			
	DRAIN	O	88.3	94.7	0.003	0.000	0.	0.000	0.000	-0.
	YONCALLA	O	88.4	94.8	0.004	0.000	0.	0.000	0.000	-0.
*	PROSPECT	O	88.5	94.9	3.817	0.034	0.	0.015	0.019	-0.
	YACHATS	O	88.6	94.9			HAZARD LT 1.0E-09			
	MAPLETON	O	88.6	95.0			HAZARD LT 1.0E-09			
	GLIDE	O	88.7	95.0	0.068	0.001	0.	0.000	0.001	-0.
	KENO	O	88.8	95.1	0.050	0.001	0.	0.000	0.001	-0.
	OAKLAND	C	88.9	95.1	0.013	0.000	0.	0.000	0.000	-0.
	SUTHERLN	O	89.0	95.2	0.032	0.000	0.	0.000	0.000	-0.
*	BUTEFALS	O	89.2	95.4	1.294	0.013	0.	0.000	0.013	-0.
	WILBUR	O	89.3	95.5	0.022	0.000	0.	0.000	0.000	-0.
	WNCHSTER	C	89.4	95.6	0.036	0.000	0.	0.000	0.000	-0.
*	DUGLASCO	O	86.8	93.6	1141.437	0.077	0.	0.021	0.055	-0.
	FLORENCE	C	89.5	95.6			HAZARD LT 1.0E-09			
	ROSEBURG	O	89.5	95.6	0.338	0.016	0.	0.003	0.013	-0.
*	SHADYCOV	C	89.7	95.8	4.524	0.076	0.	0.031	0.045	-0.
	MRTLCREK	O	89.9	95.9	0.630	0.017	0.	0.006	0.011	-0.
	GREEN	O	90.0	96.0	0.293	0.005	0.	0.002	0.004	-0.
	WINSTON	O	90.0	96.0	0.265	0.006	0.	0.002	0.005	-0.
	DILLARD	O	90.0	96.0	0.140	0.002	0.	0.001	0.002	-0.
	GARDINER	O	90.1	96.1			HAZARD LT 1.0E-09			
	TRI CITY	O	90.1	96.1	0.444	0.008	0.	0.003	0.005	-0.
	CNYNVLLE	O	90.1	96.1	0.416	0.008	0.	0.003	0.005	-0.
	REEDSPRT	C	90.1	96.1			HAZARD LT 1.0E-09			
	RIDDLE	O	90.3	96.2	0.445	0.008	0.	0.003	0.005	-0.
*	WHITECTY	O	90.3	96.2	2.857	0.033	0.	0.005	0.028	-0.
	WNCHSTREAC		90.4	96.3			HAZARD LT 1.0E-09			
	BELVIEW	O	90.4	96.4	0.313	0.003	0.	0.001	0.002	-0.
	MILO	O	90.4	96.4	0.326	0.003	0.	0.001	0.002	-0.
*	ASHLAND	C	90.5	96.4	1.500	0.032	0.	0.007	0.026	-0.
	TALENT	O	90.6	96.5	0.563	0.006	0.	0.000	0.005	-0.
*	MEDFORD	O	90.5	96.4	18.430	0.891	0.	0.015	0.875	-0.
*	JKSN CO	O	88.7	95.0	6326.554	1.002	0.	0.279	0.723	-0.
*	CENTRLPT	O	90.6	96.5	5.345	0.210	0.	0.018	0.192	-0.
	PHOENIX	C	90.6	96.5	0.611	0.010	0.	0.000	0.010	-0.

STC/SAI SAFETF RUN FOR G-04. GFW 90 FCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SFCS)	TMAX (SFCS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
* MCFRDWST	O	90.6	96.5	3.198	0.123	0.	0.002	0.121	-0.
* CNTRLPTW	O	90.6	96.5	4.596	0.099	0.	0.007	0.091	-0.
LAKESIDE	C	90.6	96.5			HAZARD LT 1.0E-09			
* SCUMDFRD	C	90.6	96.5	1.710	0.059	0.	0.000	0.059	-0.
* GOLDHILL	O	90.8	96.7	5.204	0.067	0.	0.029	0.038	-0.
* JKSNVLLE	C	90.8	96.7	2.987	0.060	0.	0.002	0.058	-0.
WOLF CRK	C	90.9	96.8	0.223	0.002	0.	0.000	0.001	-0.
* POGUEPVR	G	91.0	96.9	3.466	0.060	0.	0.023	0.037	-0.
EASTSIDE	O	91.2	97.0	0.003	0.000	0.	0.000	0.000	-0.
NORTHBND	O	91.2	97.0	0.003	0.000	0.	0.000	0.000	-0.
COOS BAY	C	91.2	97.0	0.008	0.000	0.	0.000	0.000	-0.
POWERS	C	91.2	97.0	0.002	0.000	0.	0.000	0.000	-0.
BUNKRHLL	C	91.3	97.1	0.003	0.000	0.	0.000	0.000	-0.
LIBBY	C	91.3	97.1	0.001	0.000	0.	0.000	0.000	-0.
MLNGTCN	C	91.3	97.1	0.001	0.000	0.	0.000	0.000	-0.
* COOS CO	O	90.1	96.1	10.684	0.000	0.	0.000	0.000	-0.
* GRANTPAS	C	91.3	97.1	7.699	0.332	0.	0.048	0.283	-0.
MERLIN	O	91.4	97.2	0.203	0.001	0.	0.000	0.001	-0.
* FRUTDALE	O	91.4	97.2	2.924	0.064	0.	0.011	0.053	-0.
BARVIEW	C	91.5	97.3	0.001	0.000	0.	0.000	0.000	-0.
CHRLSTON	O	91.6	97.3	0.001	0.000	0.	0.000	0.000	-0.
* JOSFINCO	O	90.3	96.2	4384.550	0.493	0.	0.140	0.353	-0.
* GRNTPSSW	O	91.6	97.4	3.648	0.106	0.	0.023	0.083	-0.
COQUILLE	C	91.7	97.4	0.014	0.000	0.	0.000	0.000	-0.
MYRTLEPT	C	91.8	97.5	0.023	0.000	0.	0.000	0.000	-0.
BANDON	O	92.3	97.9	0.006	0.000	0.	0.000	0.000	-0.
* APPLGATE	C	92.3	98.0	3.029	0.049	0.	0.017	0.031	-0.
* CAVE JCT	C	92.8	98.4	3.037	0.031	0.	0.013	0.019	-0.
PRTOPFRD	O	93.4	98.8	0.046	0.001	0.	0.000	0.001	-0.
* CURRYCO	O	93.0	98.6	1511.287	0.069	0.	0.019	0.050	-0.
HARBOR	C	94.5	99.8	0.283	0.003	0.	0.000	0.003	-0.
BROOKNGS	O	94.6	99.9	0.586	0.008	0.	0.000	0.008	-0.
GOLDBCH	C	94.8	100.1	0.334	0.002	0.	0.000	0.002	-0.

3. Hazards to Washington and California

This section contains computer printouts of hazards to Washington and California from the G-4 launch.

STC/SAI SAFFTF RUN FOR G-04. GFM 90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LIBRTYLK	W	52.8	76.2			HAZARD LT 1.0E-09			
OTISORCH	W	52.8	76.2			HAZARD LT 1.0E-09			
TRNTWOOD	W	53.0	76.4			HAZARD LT 1.0E-09			
DEPRPARK	W	53.1	76.4			HAZARD LT 1.0E-09			
OPRTUNTY	W	53.2	76.5			HAZARD LT 1.0E-09			
MILLWOOD	W	53.3	76.5			HAZARD LT 1.0E-09			
DISHMAN	W	53.3	76.5			HAZARD LT 1.0E-09			
PARKWTER	W	53.4	76.6			HAZARD LT 1.0E-09			
MORGNACF	N	53.4	76.6			HAZARD LT 1.0E-09			
ROCKFORD	W	53.4	76.6			HAZARD LT 1.0E-09			
COUNTYHM	W	53.4	76.6			HAZARD LT 1.0E-09			
FAIRFELD	W	53.7	76.8			HAZARD LT 1.0E-09			
TEKOA	W	53.9	76.9			HAZARD LT 1.0E-09			
SPCKNECO	W	52.2	75.8			HAZARD LT 1.0E-09			
AIRWYHTS	W	54.3	77.2			HAZARD LT 1.0E-09			
SPOKANE	W	54.1	77.1			HAZARD LT 1.0E-09			
FAIRCHLD	W	54.4	77.3			HAZARD LT 1.0E-09			
CHENEY	W	54.5	77.4			HAZARD LT 1.0E-09			
OAKSDALE	W	54.5	77.4			HAZARD LT 1.0E-09			
GARFIELD	W	54.6	77.4			HAZARD LT 1.0E-09			
MEDCALLK	W	54.6	77.4			HAZARD LT 1.0E-09			
PALOUSE	W	54.6	77.4			HAZARD LT 1.0E-09			
ROSALIA	W	54.7	77.4			HAZARD LT 1.0E-09			
PULLMAN	W	55.6	77.9			HAZARD LT 1.0E-09			
ALBION	W	55.9	78.0			HAZARD LT 1.0E-09			
COLFAX	W	56.0	78.0			HAZARD LT 1.0E-09			
ST JOHN	W	56.1	78.1			HAZARD LT 1.0E-09			
UNIONTWN	W	56.1	78.1			HAZARD LT 1.0E-09			
WHTMANCO	W	54.3	77.2			HAZARD LT 1.0E-09			
ENDICOTT	W	57.5	78.5			HAZARD LT 1.0E-09			
LINCLNCO	W	54.7	77.5			HAZARD LT 1.0E-09			
CLARKSTN	W	61.2	78.8			HAZARD LT 1.0E-09			
ASOTIN	W	61.5	79.0			HAZARD LT 1.0E-09			
CLRKSTNHT	W	61.8	79.1			HAZARD LT 1.0E-09			
LACROSSE	W	61.8	79.1			HAZARD LT 1.0E-09			
POMEROY	W	61.9	79.1			HAZARD LT 1.0E-09			
GARFLDCO	W	57.3	78.5			HAZARD LT 1.0E-09			
RITZVLLE	W	62.8	79.4			HAZARD LT 1.0E-09			
ASOTINCO	W	61.4	78.9			HAZARD LT 1.0E-09			
ADAMS CO	W	58.0	78.7			HAZARD LT 1.0E-09			
WSHTUCNA	W	61.9	80.0			HAZARD LT 1.0E-09			
DAYTON	W	61.2	80.1			HAZARD LT 1.0E-09			
COLMBIACO	W	62.7	79.4			HAZARD LT 1.0E-09			
LIND	W	61.6	80.2			HAZARD LT 1.0E-09			
WAITSBRG	W	62.3	80.5			HAZARD LT 1.0E-09			
KAHLOTUS	W	62.6	80.6			HAZARD LT 1.0E-09			
DUGLASCO	W	63.4	79.7			HAZARD LT 1.0E-09			
EPHRATA	W	63.0	80.8			HAZARD LT 1.0E-09			
MOSESLAK	W	63.6	81.0			HAZARD LT 1.0E-09			
MSLAKNOR	W	63.6	81.0			HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
CHELAN	W	63.6	81.0			HAZARD LT 1.0E-09			
CONNELL	W	63.8	81.1			HAZARD LT 1.0E-09			
WLAWLACO	W	61.7	80.3			HAZARD LT 1.0E-09			
WALLAWLA	W	63.9	81.2			HAZARD LT 1.0E-09			
COLEGEPL	W	64.3	81.3			HAZARD LT 1.0E-09			
GRANT CO	W	61.1	80.0			HAZARD LT 1.0E-09			
OTHELLO	W	64.4	81.4			HAZARD LT 1.0E-09			
FRNKLNCO	W	63.0	80.8			HAZARD LT 1.0E-09			
QUINCY	W	65.8	81.8			HAZARD LT 1.0E-09			
TOUCHET	W	65.5	81.8			HAZARD LT 1.0E-09			
BURBANK	W	66.3	82.2			HAZARD LT 1.0E-09			
PASCO	W	66.3	82.2			HAZARD LT 1.0E-09			
RVRVIEW	W	66.4	82.2			HAZARD LT 1.0E-09			
WENATCHE	W	66.5	82.3			HAZARD LT 1.0E-09			
KENEWICK	W	66.6	82.3			HAZARD LT 1.0E-09			
RICHLAND	W	66.9	82.4			HAZARD LT 1.0E-09			
WRICHLND	W	67.1	82.5			HAZARD LT 1.0E-09			
CHELANCO	W	64.0	81.2			HAZARD LT 1.0E-09			
BENTNCTY	W	67.8	82.8			HAZARD LT 1.0E-09			
BENTONCO	W	65.5	81.8			HAZARD LT 1.0E-09			
KITITSCO	W	66.4	82.2			HAZARD LT 1.0E-09			
ELENSBRG	W	69.3	83.4			HAZARD LT 1.0E-09			
PROSSER	W	69.3	83.5			HAZARD LT 1.0E-09			
SUNYSIDE	W	69.7	83.6			HAZARD LT 1.0E-09			
GRNDVIEW	W	69.8	83.7			HAZARD LT 1.0E-09			
SBRODWAY	W	69.9	83.7			HAZARD LT 1.0E-09			
OUTLOOK	W	70.1	83.8			HAZARD LT 1.0E-09			
MOXEECTY	W	70.1	83.8			HAZARD LT 1.0E-09			
MAHTON	W	70.2	83.8			HAZARD LT 1.0E-09			
SELAH	W	70.4	84.0			HAZARD LT 1.0E-09			
ZILLAH	W	70.4	84.0			HAZARD LT 1.0E-09			
GRANGER	W	70.5	84.0			HAZARD LT 1.0E-09			
YAKIMACO	W	67.4	82.7			HAZARD LT 1.0E-09			
TRRACEHT	W	70.5	84.0			HAZARD LT 1.0E-09			
BUENA	W	70.6	84.0			HAZARD LT 1.0E-09			
FAIRVIEW	W	70.6	84.1			HAZARD LT 1.0E-09			
FRUITVLE	W	70.7	84.1			HAZARD LT 1.0E-09			
YAKIMA	W	70.5	84.0			HAZARD LT 1.0E-09			
UNIONGAP	W	70.7	84.1			HAZARD LT 1.0E-09			
NACHES	W	70.9	84.1			HAZARD LT 1.0E-09			
GLEED	W	70.8	84.1			HAZARD LT 1.0E-09			
TOPPNISH	W	70.8	84.1			HAZARD LT 1.0E-09			
PARKER	W	70.9	84.2			HAZARD LT 1.0E-09			
WAPATO	W	70.9	84.2			HAZARD LT 1.0E-09			
TIETON	W	71.2	84.3			HAZARD LT 1.0E-09			
WILEY	W	71.4	84.4			HAZARD LT 1.0E-09			
HARRAH	W	71.6	84.5			HAZARD LT 1.0E-09			
KING CO	W	69.8	83.7			HAZARD LT 1.0E-09			
REDMOND	W	72.3	84.8			HAZARD LT 1.0E-09			
BOTHELL	W	72.3	84.9			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04. GFM 90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
ISSAQUAH	W	72.6	85.0			HAZARD LT	1.0E-09		
ROSEHILL	W	72.6	85.0			HAZARD LT	1.0E-09		
KENMORE	W	72.6	85.0			HAZARD LT	1.0E-09		
INGLWOOD	W	72.6	85.0			HAZARD LT	1.0E-09		
JUANITA	W	72.6	85.0			HAZARD LT	1.0E-09		
KIRKLAND	W	72.6	85.0			HAZARD LT	1.0E-09		
RCHMDHLN	W	72.7	85.1			HAZARD LT	1.0E-09		
BELLEVUE	W	72.7	85.0			HAZARD LT	1.0E-09		
EASTGATE	W	72.8	85.1			HAZARD LT	1.0E-09		
CLYDHILL	W	72.9	85.1			HAZARD LT	1.0E-09		
NORTHCTY	W	72.8	85.1			HAZARD LT	1.0E-09		
RDGECRST	W	72.9	85.2			HAZARD LT	1.0E-09		
RCHMDBCH	W	72.9	85.2			HAZARD LT	1.0E-09		
PRTTWNSN	W	73.0	85.2			HAZARD LT	1.0E-09		
MRCERISL	W	73.1	85.2			HAZARD LT	1.0E-09		
MEDINA	W	73.2	85.3			HAZARD LT	1.0E-09		
LAKRIDGE	W	73.4	85.4			HAZARD LT	1.0E-09		
RENTON	W	73.3	85.4			HAZARD LT	1.0E-09		
SEATTLE	W	73.1	85.3			HAZARD LT	1.0E-09		
LAKFRSTPK	W	73.5	85.4			HAZARD LT	1.0E-09		
TUKWILA	W	73.5	85.4			HAZARD LT	1.0E-09		
SKYWAY	W	73.6	85.5			HAZARD LT	1.0E-09		
ENUMCLAW	W	73.7	85.5			HAZARD LT	1.0E-09		
RVRTNHTS	W	73.7	85.5			HAZARD LT	1.0E-09		
WHITECTR	W	73.8	85.6			HAZARD LT	1.0E-09		
KENT	W	73.9	85.6			HAZARD LT	1.0E-09		
BURIEN	W	73.9	85.6			HAZARD LT	1.0E-09		
BUCKLEY	W	74.0	85.7			HAZARD LT	1.0E-09		
SEAHURST	W	74.0	85.7			HAZARD LT	1.0E-09		
NRMNDYPK	W	74.0	85.7			HAZARD LT	1.0E-09		
DESMOINE	W	74.1	85.7			HAZARD LT	1.0E-09		
AUBURN	W	74.2	85.8			HAZARD LT	1.0E-09		
BRMRTNEA	W	74.5	85.9			HAZARD LT	1.0E-09		
FEDRLWAY	W	74.5	85.9			HAZARD LT	1.0E-09		
SUMNER	W	74.6	86.0			HAZARD LT	1.0E-09		
KITSAPCO	W	73.6	85.5			HAZARD LT	1.0E-09		
BONNYLAK	W	74.6	86.0			HAZARD LT	1.0E-09		
BREMRTON	W	74.5	85.9			HAZARD LT	1.0E-09		
GOLDNDLE	W	74.6	86.0			HAZARD LT	1.0E-09		
PRTOCHRD	W	74.7	86.0			HAZARD LT	1.0E-09		
NAVYDCTY	W	74.7	86.0			HAZARD LT	1.0E-09		
MILTON	W	74.7	86.0			HAZARD LT	1.0E-09		
PUYALLUP	W	74.8	86.1			HAZARD LT	1.0E-09		
TACOMA	W	75.0	86.2			HAZARD LT	1.0E-09		
PIERCECO	W	73.1	85.2			HAZARD LT	1.0E-09		
MIDLAND	W	75.3	86.4			HAZARD LT	1.0E-09		
FIRCREST	W	75.4	86.4			HAZARD LT	1.0E-09		
KLIKTATCO	W	73.2	85.3			HAZARD LT	1.0E-09		
PARKLAND	W	75.4	86.4			HAZARD LT	1.0E-09		
UNIV.PL	W	75.4	86.4			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-04. GFM 90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	EC(X10-6) CLASS 2	FC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LAKWDCTR	W	75.4	86.4			HAZARD LT 1.0E-09			
SPANAWAY	W	75.6	86.5			HAZARD LT 1.0E-09			
WISHRAM	W	75.7	86.5			HAZARD LT 1.0E-09			
STEILACM	W	75.8	86.6			HAZARD LT 1.0E-09			
LEWISCO1	W	74.3	85.8			HAZARD LT 1.0E-09			
JEFRSNCO1	W	74.6	86.0			HAZARD LT 1.0E-09			
LYLE	W	76.6	87.1			HAZARD LT 1.0E-09			
LACEY	W	76.9	87.3			HAZARD LT 1.0E-09			
MASON CO	W	75.6	86.5			HAZARD LT 1.0E-09			
BINGEN	W	77.1	87.3			HAZARD LT 1.0E-09			
OLYMPIA	W	77.2	87.4			HAZARD LT 1.0E-09			
THRSTNCO	W	76.2	86.8			HAZARD LT 1.0E-09			
TUMWATER	W	77.4	87.5			HAZARD LT 1.0E-09			
CARSON	W	78.2	88.0			HAZARD LT 1.0E-09			
LEWISCO2	W	76.7	87.1			HAZARD LT 1.0E-09			
JFRSNCO2	W	76.9	87.2			HAZARD LT 1.0E-09			
STVNSON	W	78.5	88.1			HAZARD LT 1.0E-09			
CNTRALIA	W	78.5	88.1			HAZARD LT 1.0E-09			
SKMANIACO	W	76.7	87.1			HAZARD LT 1.0E-09			
CHEHALIS	W	78.7	88.2			HAZARD LT 1.0E-09			
NBONNVIL	W	78.8	88.3			HAZARD LT 1.0E-09			
GRAHBRCO	W	77.4	87.5			HAZARD LT 1.0E-09			
COWLTZCO	W	77.9	87.8			HAZARD LT 1.0E-09			
YACOLT	W	79.6	88.7			HAZARD LT 1.0E-09			
MNTESANO	W	79.6	88.7			HAZARD LT 1.0E-09			
AMBOY	W	79.6	88.8			HAZARD LT 1.0E-09			
CNTRALPK	W	79.9	88.9			HAZARD LT 1.0E-09			
MEDWGLDE	W	80.3	89.1			HAZARD LT 1.0E-09			
KELSO	W	80.2	89.1			HAZARD LT 1.0E-09			
ABERDEEN	W	80.3	89.1			HAZARD LT 1.0E-09			
WSHOUGAL	W	80.3	89.2			HAZARD LT 1.0E-09			
CLARKCO	W	79.2	88.5			HAZARD LT 1.0E-09			
LONGVIEW	W	80.3	89.1			HAZARD LT 1.0E-09			
LACENTER	W	80.4	89.2			HAZARD LT 1.0E-09			
HOQUIAM	W	80.4	89.2			HAZARD LT 1.0E-09			
CAMAS	W	80.5	89.3			HAZARD LT 1.0E-09			
SALMNCRK	W	80.5	89.3			HAZARD LT 1.0E-09			
WOODLAND	W	80.5	89.3			HAZARD LT 1.0E-09			
SIFTON	W	80.6	89.3			HAZARD LT 1.0E-09			
BTTLGRND	W	80.7	89.4			HAZARD LT 1.0E-09			
ORCHARDS	W	80.7	89.4			HAZARD LT 1.0E-09			
RIDGEFLD	W	80.8	89.5			HAZARD LT 1.0E-09			
RAYMOND	W	80.9	89.5			HAZARD LT 1.0E-09			
LAKESHOR	W	80.9	89.5			HAZARD LT 1.0E-09			
HAZLDELL	W	80.9	89.5			HAZARD LT 1.0E-09			
MINEHAHA	W	80.9	89.6			HAZARD LT 1.0E-09			
PACFICCO	W	71.7	80.9			HAZARD LT 1.0E-09			
VANCOUVER	W	81.0	89.6			HAZARD LT 1.0E-09			
WAKAKNCO	W	81.1	89.6			HAZARD LT 1.0E-09			
ALTURAS	C	86.4	93.3			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-04, GFM 90 PCT APRIL WINDS 5/29/74

APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

	LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
*	MODOC CO C	84.4	91.9	1.664	0.000	0.	0.000	0.000	-0.
	TULELAKE C	89.2	94.6	0.001	0.000	0.	0.000	0.000	-0.
	LASSENCO C	86.3	93.2	0.001	0.000	0.	0.000	0.000	-0.
	DORRIS C	89.1	95.7	0.004	0.000	0.	0.000	0.000	-0.
	SUSANVLL C	89.5	95.6			HAZARD LT 1.0E-09			
	PLUMASCO1C	89.0	95.3			HAZARD LT 1.0E-09			
	HRNBROOK C	91.0	96.8	0.026	0.000	0.	0.000	0.000	-0.
	HILT C	91.0	96.9	0.052	0.000	0.	0.000	0.000	-0.
	MONTAGUE C	91.3	97.1	0.014	0.000	0.	0.000	0.000	-0.
	PLMASCO2 C	90.1	96.1			HAZARD LT 1.0E-09			
	MTSHASTA C	91.3	97.1	0.003	0.000	0.	0.000	0.000	-0.
	WEED C	91.4	97.2	0.006	0.000	0.	0.000	0.000	-0.
	GRENADA C	91.4	97.2	0.008	0.000	0.	0.000	0.000	-0.
	QUINCY C	91.4	97.2			HAZARD LT 1.0E-09			
*	SISKYUCO C	89.7	95.0	733.698	0.017	0.	0.004	0.013	-0.
	MCLOUD C	91.4	97.2	0.001	0.000	0.	0.000	0.000	-0.
	YREKA C	91.4	97.2	0.047	0.001	0.	0.000	0.001	-0.
	DUNSMUIR C	91.7	97.4	0.002	0.000	0.	0.000	0.000	-0.
*	SHASTACO C	90.0	96.0	1.951	0.000	0.	0.000	0.000	-0.
	FTJONES C	92.0	97.7	0.016	0.000	0.	0.000	0.000	-0.
	ETNA C	92.4	98.0	0.013	0.000	0.	0.000	0.000	-0.
	HAPYCAMP C	92.6	98.2	0.239	0.004	0.	0.001	0.003	-0.
	ENTRPRIS C	93.2	98.7			HAZARD LT 1.0E-09			
	YUBA CO1 C	92.7	98.3			HAZARD LT 1.0E-09			
	REDDING C	93.3	98.8			HAZARD LT 1.0E-09			
	BONNYVEW C	93.4	98.9			HAZARD LT 1.0E-09			
	PARADISE C	93.5	98.9			HAZARD LT 1.0E-09			
	BUTTE CO C	92.2	97.9			HAZARD LT 1.0E-09			
	ANDERSON C	93.5	99.0			HAZARD LT 1.0E-09			
	TEHAMACO1C	92.3	98.0	0.001	0.000	0.	0.000	0.000	-0.
	COLUSACO C	92.7	98.3			HAZARD LT 1.0E-09			
	OROVILLE C	93.8	99.3			HAZARD LT 1.0E-09			
	SOROVLLE C	93.9	99.3			HAZARD LT 1.0E-09			
	THRMOLTO C	93.9	99.3			HAZARD LT 1.0E-09			
	REDBLUFF C	93.9	99.3			HAZARD LT 1.0E-09			
	CHICO C	94.0	99.4			HAZARD LT 1.0E-09			
	CHCONRTH C	94.0	99.4			HAZARD LT 1.0E-09			
	CHCOVCNO C	94.0	99.4			HAZARD LT 1.0E-09			
	LEWISTON C	94.1	99.5	0.001	0.000	0.	0.000	0.000	-0.
	GASQUET C	94.2	99.6	0.211	0.001	0.	0.000	0.001	-0.
	SMITHRVR C	94.4	99.7	0.376	0.003	0.	0.000	0.003	-0.
	GRIDLEY C	94.4	99.7			HAZARD LT 1.0E-09			
	YUBA CO2 C	93.9	99.3			HAZARD LT 1.0E-09			
	CORNING C	94.5	99.8			HAZARD LT 1.0E-09			
	WEVRVILL C	94.5	99.9	0.001	0.000	0.	0.000	0.000	-0.
*	TRINTYCO1C	93.3	98.8	12.219	0.000	0.	0.000	0.000	-0.
	ORLEANS C	94.6	99.9	0.236	0.003	0.	0.001	0.002	-0.
*	DLNORTCO C	93.6	99.0	789.558	0.071	0.	0.010	0.061	-0.
	LIVE OAK C	94.7	100.0			HAZARD LT 1.0E-09			
	CRSNTNRTHC	94.7	100.0	0.547	0.005	0.	0.001	0.004	-0.

STC/SAI SAFFTE RUN FOR G-04, GEM 90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	NRTHCRST	C	94.7	100.0	0.296	0.002	0.	0.000	0.001	-0.
	MARYSVLL	C	94.7	100.0			HAZARD LT 1.0E-09			
	CRSNTCTY	C	94.8	100.1	0.497	0.005	0.	0.001	0.004	-0.
	OLIVHRST	C	94.8	100.0			HAZARD LT 1.0E-09			
	TEHMACO2	C	93.6	99.1	0.015	0.000	0.	0.000	0.000	-0.
	LINDA	C	94.8	100.1			HAZARD LT 1.0E-09			
	ORLAND	C	94.8	100.1			HAZARD LT 1.0E-09			
	YUBACITY	C	94.8	100.1			HAZARD LT 1.0E-09			
	KLAMATH	C	94.9	100.1	0.499	0.007	0.	0.003	0.005	-0.
	YBACTYSD	C	94.9	100.2			HAZARD LT 1.0E-09			
*	TRINTYCO	C	93.4	98.9	93.278	0.001	0.	0.000	0.001	-0.
	SUTTERCO	C	94.5	99.8			HAZARD LT 1.0E-09			
	HAYFORK	C	95.3	100.6	0.001	0.000	0.	0.000	0.000	-0.
	WILLOWS	C	95.3	100.6			HAZARD LT 1.0E-09			
	HOOPA	C	95.4	100.6	0.108	0.001	0.	0.000	0.001	-0.
	WILLWCRK	C	95.5	100.8	0.052	0.001	0.	0.000	0.001	-0.
	SALYER	C	95.5	100.8	0.019	0.000	0.	0.000	0.000	-0.
	COLUSA	C	95.6	100.8			HAZARD LT 1.0E-09			
	GLENN CO	C	94.5	99.9			HAZARD LT 1.0E-09			
	ORICK	C	95.7	101.0	0.336	0.005	0.	0.002	0.003	-0.
	WASHNGTN	C	95.7	101.0			HAZARD LT 1.0E-09			
	WSCRMNTO	C	95.7	101.0			HAZARD LT 1.0E-09			
	BRYTE	C	95.7	101.0			HAZARD LT 1.0E-09			
	SACRMNTO	C	95.5	100.8			HAZARD LT 1.0E-09			
*	TRNTYCO2	C	94.9	100.2	2.523	0.000	0.	0.000	0.000	-0.
	STOKTON	C	95.9	101.1			HAZARD LT 1.0E-09			
	WOODLAND	C	96.1	101.3			HAZARD LT 1.0E-09			
	FIELDBRK	C	96.3	101.5	0.204	0.002	0.	0.000	0.001	-0.
	WSTHAVEN	C	96.3	101.5	0.358	0.006	0.	0.002	0.004	-0.
	TRINIDAD	C	96.3	101.5	0.307	0.002	0.	0.001	0.001	-0.
	DAVIS	C	96.3	101.5			HAZARD LT 1.0E-09			
	BLUELAKE	C	96.3	101.6	0.139	0.002	0.	0.000	0.002	-0.
	YOLO CO	C	95.5	100.7			HAZARD LT 1.0E-09			
	MKNLYVLL	C	96.4	101.6	0.510	0.010	0.	0.002	0.008	-0.
	ALLIANCE	C	96.5	101.8	0.157	0.001	0.	0.000	0.001	-0.
	ARCATA	C	96.6	101.8	0.751	0.026	0.	0.004	0.022	-0.
	SUNNYBRA	C	96.6	101.9	0.165	0.003	0.	0.000	0.002	-0.
	MYRTLTWN	C	96.9	102.1	0.335	0.009	0.	0.001	0.008	-0.
	ROSEWOOD	C	96.9	102.1	0.123	0.002	0.	0.000	0.002	-0.
	PINEHILL	C	96.9	102.1	0.133	0.002	0.	0.000	0.002	-0.
*	EUREKA	C	95.8	102.1	1.171	0.063	0.	0.009	0.054	-0.
	BAYVIEW	C	95.9	102.2	0.186	0.003	0.	0.000	0.003	-0.
	CUTTEN	C	96.9	102.2	0.248	0.005	0.	0.001	0.005	-0.
	SAMOA	C	96.9	102.2	0.143	0.002	0.	0.000	0.002	-0.
	ALDRPOIN	C	97.0	102.3	0.001	0.000	0.	0.000	0.000	-0.
	CARLOTTA	C	97.1	102.4	0.014	0.000	0.	0.000	0.000	-0.
*	HMBOLTCO	C	95.5	100.7	234.989	0.021	0.	0.003	0.018	-0.
	FIELDLDG	C	97.1	102.4	0.085	0.001	0.	0.000	0.001	-0.
	HYDESVLL	C	97.2	102.5	0.022	0.000	0.	0.000	0.000	-0.
	FERNDALE	C	97.3	102.5	0.042	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-24, GFM 90 PCT APRIL WINDS 5/29/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	FC(X10-6) CLASS 1	FC(X10-6) CLASS 2	EC(X10-6) CLASS 3	FC(X10-6) CLASS 4
LOLETA	C	97.3	102.6	0.058	0.001	0.	0.000	0.001	-0.
FORTUNA	C	97.3	102.6	0.105	0.002	0.	0.000	0.002	-0.
LAKE CO	C	96.4	101.6			HAZARD LT 1.0E-09			
WEOTT	C	97.4	102.7	0.004	0.000	0.	0.000	0.000	-0.
CMPTNHTS	C	97.4	102.7	0.052	0.001	0.	0.000	0.001	-0.
SCOTIA	C	97.4	102.7	0.013	0.000	0.	0.000	0.000	-0.
RIO DELL	C	97.4	102.7	0.034	0.000	0.	0.000	0.000	-0.
CLRLKHLN	C	97.4	102.7			HAZARD LT 1.0E-09			
MNDCNOCO1	C	96.7	102.0	0.022	0.000	0.	0.000	0.000	-0.
MIRANDA	C	97.5	102.8	0.001	0.000	0.	0.000	0.000	-0.
GARBRVLL	C	97.5	102.8	0.001	0.000	0.	0.000	0.000	-0.
REDWAY	C	97.5	102.8	0.001	0.000	0.	0.000	0.000	-0.
HEALDBRG	C	97.6	103.0			HAZARD LT 1.0E-09			
ANGWIN	C	97.7	103.0			HAZARD LT 1.0E-09			
NAPA CO	C	97.0	102.2			HAZARD LT 1.0E-09			
LAKEPORT	C	97.9	103.2			HAZARD LT 1.0E-09			
STHELENA	C	97.9	103.2			HAZARD LT 1.0E-09			
WILLITS	C	98.0	103.3			HAZARD LT 1.0E-09			
NAPA	C	97.9	103.3			HAZARD LT 1.0E-09			
UKIAH	C	98.2	103.5			HAZARD LT 1.0E-09			
BOYSHTSP	C	98.3	103.7			HAZARD LT 1.0E-09			
SONOMA	C	98.3	103.7			HAZARD LT 1.0E-09			
CLOVRDLE	C	98.4	103.8			HAZARD LT 1.0E-09			
MNDCNOCO2	C	97.8	103.1			HAZARD LT 1.0E-09			
SNTAROSA	C	98.5	103.9			HAZARD LT 1.0E-09			
SONOMACO	C	97.5	102.8			HAZARD LT 1.0E-09			
ROHNPTPK	C	98.6	104.0			HAZARD LT 1.0E-09			
ROSELAND	C	98.6	104.0			HAZARD LT 1.0E-09			
BERKELEY	C	98.5	103.9			HAZARD LT 1.0E-09			
PETALUMA	C	98.7	104.1			HAZARD LT 1.0E-09			
SBSTOPOL	C	98.8	104.2			HAZARD LT 1.0E-09			
MARIN CO	C	99.3	103.7			HAZARD LT 1.0E-09			
FRTBRAGG	C	98.9	104.3			HAZARD LT 1.0E-09			
NOVATO	C	98.9	104.3			HAZARD LT 1.0E-09			
OAKLAND	C	98.6	104.0			HAZARD LT 1.0E-09			
FREMONT	C	98.7	104.1			HAZARD LT 1.0E-09			
IGNACIO	C	98.9	104.4			HAZARD LT 1.0E-09			
STAVNTIA	C	98.9	104.4			HAZARD LT 1.0E-09			
TRRALNDA	C	99.0	104.5			HAZARD LT 1.0E-09			
MARINWOD	C	99.0	104.5			HAZARD LT 1.0E-09			
SAN JOSE	C	98.8	104.2			HAZARD LT 1.0E-09			
BLVEDERE	C	99.1	104.5			HAZARD LT 1.0E-09			
TIBURON	C	99.1	104.5			HAZARD LT 1.0E-09			
GRENBRAE	C	99.1	104.5			HAZARD LT 1.0E-09			
SNRAFAEL	C	99.0	104.5			HAZARD LT 1.0E-09			
LARKSPUR	C	99.1	104.6			HAZARD LT 1.0E-09			
CORTMDRA	C	99.2	104.6			HAZARD LT 1.0E-09			
KNTFIELD	C	99.2	104.6			HAZARD LT 1.0E-09			
FAIRFAX	C	99.2	104.6			HAZARD LT 1.0E-09			
ROSS	C	99.2	104.6			HAZARD LT 1.0E-09			

STC/SAI SAFFTF RUN FOR G-04. GEM 90 PCT APRIL WINDS 5/29/74
APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	FC(X10-6) TOTAL	FC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SNANSLMO C	99.2	104.6			HAZARD LT 1.0E-09			
STRBRYPT C	99.2	104.7			HAZARD LT 1.0E-09			
MILVALLY C	99.2	104.7			HAZARD LT 1.0E-09			
TMLPSVLY C	99.3	104.7			HAZARD LT 1.0E-09			
SNFRNCSCOC	99.2	104.5			HAZARD LT 1.0E-09			
SAUSLITO C	99.5	105.0			HAZARD LT 1.0E-09			

E. HAZARDS FROM G-5 LAUNCH

This section contains computer printouts of hazards from G-5 launch.

1. Hazards to Montana and Idaho

This section contains computer printouts of hazards to Montana and Idaho from G-5 launch.

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SUNBURST M					HAZARD LT 1.0E-09			
TOOLE CO M			0.003	0.000	C.	0.000	0.000	-0.
SHELBY M					HAZARD LT 1.0E-09			
BELT M					HAZARD LT 1.0E-09			
S40 45					HAZARD LT 1.0E-09			
S40 4					HAZARD LT 1.0E-09			
S40 3					HAZARD LT 1.0E-09			
BLAKEGLE M					HAZARD LT 1.0E-09			
S40 5					HAZARD LT 1.0E-09			
S40 6					HAZARD LT 1.0E-09			
S40 46					HAZARD LT 1.0E-09			
S40 42					HAZARD LT 1.0E-09			
S40 41					HAZARD LT 1.0E-09			
S40 40					HAZARD LT 1.0E-09			
S40 7					HAZARD LT 1.0E-09			
S40 2					HAZARD LT 1.0E-09			
S40 1					HAZARD LT 1.0E-09			
S40 39					HAZARD LT 1.0E-09			
S40 47					HAZARD LT 1.0E-09			
S40 38					HAZARD LT 1.0E-09			
STOCKETT M					HAZARD LT 1.0E-09			
S40 8					HAZARD LT 1.0E-09			
S40 10					HAZARD LT 1.0E-09			
S40 9					HAZARD LT 1.0E-09			
S40 37					HAZARD LT 1.0E-09			
S40 43					HAZARD LT 1.0E-09			
GREATFLL M					HAZARD LT 1.0E-09			
S40 36					HAZARD LT 1.0E-09			
S40 48					HAZARD LT 1.0E-09			
S40 49					HAZARD LT 1.0E-09			
SANDCULF M					HAZARD LT 1.0E-09			
S40 11					HAZARD LT 1.0E-09			
S40 35					HAZARD LT 1.0E-09			
CUT BANK M					HAZARD LT 1.0E-09			
S40 12					HAZARD LT 1.0E-09			
S40 50					HAZARD LT 1.0E-09			
S40 15					HAZARD LT 1.0E-09			
S40 13					HAZARD LT 1.0E-09			
S40 16					HAZARD LT 1.0E-09			
S40 34					HAZARD LT 1.0E-09			
S40 63					HAZARD LT 1.0E-09			
S40 33					HAZARD LT 1.0E-09			
S40 32					HAZARD LT 1.0E-09			
S40 14					HAZARD LT 1.0E-09			
S40 17					HAZARD LT 1.0E-09			
S40 22					HAZARD LT 1.0E-09			
S40 31					HAZARD LT 1.0E-09			
S40 29					HAZARD LT 1.0E-09			
S40 64					HAZARD LT 1.0E-09			

STC/SAI SAFETF RUN FOR G-05. GFW 90 PCT APRIL WINDS 5/20/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S40 28					HAZARD LT 1.0E-09			
S40 23					HAZARD LT 1.0E-09			
S40 51					HAZARD LT 1.0E-09			
S40 21					HAZARD LT 1.0E-09			
S40 24					HAZARD LT 1.0E-09			
S40 52					HAZARD LT 1.0E-09			
S40 27					HAZARD LT 1.0E-09			
S40 65					HAZARD LT 1.0E-09			
S40 54					HAZARD LT 1.0E-09			
S40 18					HAZARD LT 1.0E-09			
S40 20					HAZARD LT 1.0E-09			
S40 19					HAZARD LT 1.0E-09			
S40 53					HAZARD LT 1.0E-09			
S40 25					HAZARD LT 1.0E-09			
S40 26					HAZARD LT 1.0E-09			
S40 55					HAZARD LT 1.0E-09			
S40 56					HAZARD LT 1.0E-09			
S40 66					HAZARD LT 1.0E-09			
S40 67					HAZARD LT 1.0E-09			
S40 57					HAZARD LT 1.0E-09			
S40 72					HAZARD LT 1.0E-09			
S40 71					HAZARD LT 1.0E-09			
CONRAD M					HAZARD LT 1.0E-09			
S40 70					HAZARD LT 1.0E-09			
S40 58					HAZARD LT 1.0E-09			
S40 59					HAZARD LT 1.0E-09			
DUTTON M					HAZARD LT 1.0E-09			
S40 68					HAZARD LT 1.0E-09			
CSCADECO M					LAUNCH VICINITY			
S40 61					HAZARD LT 1.0E-09			
GLACIERCOM			0.005	0.000	0.	0.000	0.000	-0.
S40 60					HAZARD LT 1.0E-09			
S40 62					HAZARD LT 1.0E-09			
S40 69					HAZARD LT 1.0E-09			
S40 44					HAZARD LT 1.0E-09			
PONDERACOM			0.006	0.000	0.	0.000	0.000	-0.
S37 47					HAZARD LT 1.0E-09			
MEGHERCO M			0.002	0.000	0.	0.000	0.000	-0.
S37 46					HAZARD LT 1.0E-09			
S37 54					HAZARD LT 1.0E-09			
S37 53					HAZARD LT 1.0E-09			
S37 12					HAZARD LT 1.0E-09			
S37 23					HAZARD LT 1.0E-09			
S37 13					HAZARD LT 1.0E-09			
S37 50					HAZARD LT 1.0E-09			
S37 45					HAZARD LT 1.0E-09			
S37 24					HAZARD LT 1.0E-09			
S37 14					HAZARD LT 1.0E-09			
S37 22					HAZARD LT 1.0E-09			
S37 48					HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-05. GFW 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN TMAX (SECS)(SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
S37 27				HAZARD LT 1.0E-09			
S37 49				HAZARD LT 1.0E-09			
ULM M				HAZARD LT 1.0E-09			
S37 52				HAZARD LT 1.0E-09			
S37 60				HAZARD LT 1.0E-09			
S37 41				HAZARD LT 1.0E-09			
S37 29				HAZARD LT 1.0E-09			
S37 15				HAZARD LT 1.0E-09			
VALTIER M				HAZARD LT 1.0E-09			
S37 17				HAZARD LT 1.0E-09			
S37 34				HAZARD LT 1.0E-09			
S37 28				HAZARD LT 1.0E-09			
S37 43				HAZARD LT 1.0E-09			
S37 16				HAZARD LT 1.0E-09			
S37 51				HAZARD LT 1.0E-09			
S37 59				HAZARD LT 1.0E-09			
S37 36				HAZARD LT 1.0E-09			
S37 26				HAZARD LT 1.0E-09			
S37 31				HAZARD LT 1.0E-09			
S37 37				HAZARD LT 1.0E-09			
S37 1				HAZARD LT 1.0E-09			
S37 38				HAZARD LT 1.0E-09			
S37 33				HAZARD LT 1.0E-09			
S37 57				HAZARD LT 1.0E-09			
S37 56				HAZARD LT 1.0E-09			
S37 55				HAZARD LT 1.0E-09			
S37 42				HAZARD LT 1.0E-09			
S37 21				HAZARD LT 1.0E-09			
S37 32				HAZARD LT 1.0E-09			
S37 39				HAZARD LT 1.0E-09			
S37 40				HAZARD LT 1.0E-09			
S37 3				HAZARD LT 1.0E-09			
S37 18				HAZARD LT 1.0E-09			
S37 44				HAZARD LT 1.0E-09			
WITSLFSP M				HAZARD LT 1.0E-09			
S37 4				HAZARD LT 1.0E-09			
S37 9				HAZARD LT 1.0E-09			
S37 2				HAZARD LT 1.0E-09			
S37 10				HAZARD LT 1.0E-09			
S37 11				HAZARD LT 1.0E-09			
S37 19				HAZARD LT 1.0E-09			
S37 6				HAZARD LT 1.0E-09			
S37 7				HAZARD LT 1.0E-09			
S37 8				HAZARD LT 1.0E-09			
S37 20				HAZARD LT 1.0E-09			
S37 5				HAZARD LT 1.0E-09			
S37 30				HAZARD LT 1.0E-09			
S37 58				HAZARD LT 1.0E-09			
G4 13A				HAZARD LT 1.0E-09			
G4 13B				HAZARD LT 1.0E-09			

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
G3 7					HAZARD LT	1.0E-09		
G3 6					HAZARD LT	1.0E-09		
G3 8					HAZARD LT	1.0E-09		
G3 5					HAZARD LT	1.0E-09		
TETON CO M			0.015	0.000	0.	0.000	0.000	-0.
S37 25					HAZARD LT	1.0E-09		
G3G4 11					HAZARD LT	1.0E-09		
FAIRFLD M					HAZARD LT	1.0E-09		
G3G4 12					HAZARD LT	1.0E-09		
G3 9					HAZARD LT	1.0E-09		
G4 18					HAZARD LT	1.0E-09		
CASCADE M					HAZARD LT	1.0E-09		
G3 4A					HAZARD LT	1.0E-09		
G4 16					HAZARD LT	1.0E-09		
G4 15					HAZARD LT	1.0E-09		
G4 19					HAZARD LT	1.0E-09		
CHOTEAU M					HAZARD LT	1.0E-09		
G3 4B					HAZARD LT	1.0E-09		
G4 20					HAZARD LT	1.0E-09		
G3 3					HAZARD LT	1.0E-09		
G3G4 10A					HAZARD LT	1.0E-09		
G3G4G51A					HAZARD LT	1.0E-09		
G3 2					HAZARD LT	1.0E-09		
G3 10B					HAZARD LT	1.0E-09		
G3 1					HAZARD LT	1.0E-09		
G5 27	15.0	34.3	0.162	0.003	0.	0.003	0.000	-0.
BROWNING M	15.0	34.4			HAZARD LT	1.0E-09		
G5 30	16.9	37.3	0.001	0.002	0.	0.002	0.000	-0.
G6 32	17.7	38.4			HAZARD LT	1.0E-09		
G5G6 28	19.5	40.5	0.019	0.083	0.	0.010	0.073	-0.
G3 10C	21.2	42.1			HAZARD LT	1.0E-09		
G6 36	25.3	46.0			HAZARD LT	1.0E-09		
G6 34B	25.5	46.2			HAZARD LT	1.0E-09		
G6 34A	25.6	46.3			HAZARD LT	1.0E-09		
G6 37	27.0	47.9			HAZARD LT	1.0E-09		
G6G7 38	28.2	49.2			HAZARD LT	1.0E-09		
G6 33A	28.4	49.4	0.091	0.016	0.	0.001	0.016	-0.
G6 33B	28.6	49.6	0.047	0.060	0.	0.001	0.059	-0.
G6G7 39	28.7	49.7			HAZARD LT	1.0E-09		
G6G7 40	31.1	52.2	0.005	0.016	0.	0.015	0.001	-0.
AUGUSTA M	31.1	52.3			HAZARD LT	1.0E-09		
G7 44B	31.5	52.8			HAZARD LT	1.0E-09		
G7 44A	31.5	52.9			HAZARD LT	1.0E-09		
TOWNSEND M	31.7	53.1			HAZARD LT	1.0E-09		
BRDWTRCO M	56.5	60.0	0.003	0.000	0.	0.000	0.000	-0.
G7 41A	32.6	54.4	0.038	0.029	0.	0.000	0.029	-0.
G7 42A	32.9	54.7	0.006	0.013	0.	0.010	0.003	-0.
G7 42B	33.0	54.9	0.025	0.051	0.	0.011	0.040	-0.
G7 43	33.2	55.1	0.006	0.024	0.	0.021	0.003	-0.
LWSCLKCO M					LAUNCH	VICINITY		

STC/SAI SAFETE RUN FOR G-05, GFW 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	HELENA	M	35.8	58.3			HAZARD LT 1.0E-09			
	BOULDER	M	40.0	63.5			HAZARD LT 1.0E-09			
	JEFRSNCO	M	35.6	60.1	0.003	0.000	0.	0.000	0.000	-0.
*	LINCOLN	M	40.6	64.4	371.194	11.994	0.	0.008	11.985	-0.
	MRTNCTY	M	40.6	64.5			HAZARD LT 1.0E-09			
	CORAM	M	40.8	64.7			HAZARD LT 1.0E-09			
	HNGRYHRSE	M	40.8	64.9			HAZARD LT 1.0E-09			
	WALKRVLL	M	40.9	64.9			HAZARD LT 1.0E-09			
	SLVRBOCO1	M	40.2	63.7	0.001	0.000	0.	0.000	0.000	-0.
	CLMBIAFL	M	41.4	65.4			HAZARD LT 1.0E-09			
*	POWELLCO	M	37.9	67.6	70248.132	4.587	0.	0.132	4.455	-0.
	WHITEHAL	M	41.5	65.6			HAZARD LT 1.0E-09			
	WHITEFSH	M	42.0	66.1			HAZARD LT 1.0E-09			
	SLVRBCPK	M	42.2	66.3			HAZARD LT 1.0E-09			
	BIGFORK	M	42.3	66.4			HAZARD LT 1.0E-09			
	FLATHDCO	M	37.0	60.4	0.002	0.000	0.	0.000	0.000	-0.
	DEERLODG	M	42.4	66.5			HAZARD LT 1.0E-09			
	EVRGREEN	M	42.4	66.5			HAZARD LT 1.0E-09			
	KALISPLL	M	42.6	66.7			HAZARD LT 1.0E-09			
	SOMERS	M	42.8	67.0			HAZARD LT 1.0E-09			
	FLORALPK	M	42.9	67.0			HAZARD LT 1.0E-09			
	BUTTE	M	42.7	66.8			HAZARD LT 1.0E-09			
	LAKESIDE	M	43.0	67.1			HAZARD LT 1.0E-09			
	DRUMMOND	M	43.3	67.5	0.068	0.001	0.	0.001	0.000	-0.
	LAKE CO	M	42.0	66.1	0.001	0.000	0.	0.000	0.000	-0.
	POLSON	M	44.0	68.1			HAZARD LT 1.0E-09			
	OPORTNTY	M	44.0	68.2			HAZARD LT 1.0E-09			
	DERLDGCO	M	43.2	67.3			HAZARD LT 1.0E-09			
	PABLO	M	44.3	68.5			HAZARD LT 1.0E-09			
	ANACONDA	M	44.4	68.6			HAZARD LT 1.0E-09			
	RONAN	M	44.5	68.7			HAZARD LT 1.0E-09			
	SLVRBOCO2	M	44.4	68.6			HAZARD LT 1.0E-09			
	PHILPBRG	M	45.2	69.5			HAZARD LT 1.0E-09			
	STIGNATS	M	45.2	69.5			HAZARD LT 1.0E-09			
*	GRANITCO	M	43.3	67.4	1444.806	0.007	0.	0.002	0.005	-0.
*	MISULACO	M	43.6	67.7	179.786	0.045	0.	0.020	0.025	-0.
	MILLTOWN	M	45.5	70.0			HAZARD LT 1.0E-09			
	MISSOULA	M	45.7	70.2			HAZARD LT 1.0E-09			
	HOTSPRNG	M	45.8	70.3			HAZARD LT 1.0E-09			
	PARADISE	M	46.8	71.2			HAZARD LT 1.0E-09			
	PLAINS	M	46.8	71.2			HAZARD LT 1.0E-09			
	ALBERTON	M	46.9	71.3			HAZARD LT 1.0E-09			
*	STVNSVLL	M	46.9	71.3	37.515	0.782	0.	0.311	0.471	-0.
*	RAVALICO	M	46.2	70.7	18727.710	2.464	0.	0.441	2.024	-0.
*	VICTOR	M	47.1	71.5	18.323	0.210	0.	0.009	0.200	-0.
*	CORVALIS	M	47.4	71.8	1.909	0.016	0.	0.003	0.013	-0.
	MINERLCO	M	46.6	71.0			HAZARD LT 1.0E-09			
	SUPERIOR	M	47.5	71.8			HAZARD LT 1.0E-09			
	SANDERCO	M	45.6	70.1	0.002	0.000	0.	0.000	0.000	-0.
*	HAMILTON	M	47.7	72.0	3.422	0.058	0.	0.018	0.040	-0.

STC/SAI SAFETE RUN FOR G-05, GFW 90 PCT APRIL WINDS 5/20/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	FI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
THOMSNFL	M	47.7	72.1			HAZARD LT 1.0E-09			
* RAVALICO	M	47.1	71.5	71.133	0.004	0.	0.003	0.001	-0.
ST REGIS	M	49.3	72.6			HAZARD LT 1.0E-09			
DARBY	M	49.3	72.6	0.004	0.000	0.	0.000	0.000	-0.
LEMHI CO	I	47.5	71.8	0.001	0.000	0.	0.000	0.000	-0.
MULLAN	I	49.4	73.6			HAZARD LT 1.0E-09			
SHUSHNCO	I	47.7	72.0	0.001	0.000	0.	0.000	0.000	-0.
SALMON	I	49.6	73.7			HAZARD LT 1.0E-09			
WALLACE	I	49.7	73.9			HAZARD LT 1.0E-09			
SILVRTON	I	49.7	73.9			HAZARD LT 1.0E-09			
AVERY	I	49.8	74.0			HAZARD LT 1.0E-09			
OSHURN	I	49.9	74.1			HAZARD LT 1.0E-09			
WORDNER	I	50.1	74.2			HAZARD LT 1.0E-09			
KELLOGG	I	50.2	74.3			HAZARD LT 1.0E-09			
HAYDEN	I	50.4	74.5			HAZARD LT 1.0E-09			
SMLTRVLL	I	50.4	74.5			HAZARD LT 1.0E-09			
FINEHRST	I	50.5	74.6			HAZARD LT 1.0E-09			
SPIRITLK	I	51.5	75.3			HAZARD LT 1.0E-09			
PLUMMER	I	51.6	75.4			HAZARD LT 1.0E-09			
HOCUARTR	I	51.6	75.4			HAZARD LT 1.0E-09			
DALTNGREN	I	51.8	75.5			HAZARD LT 1.0E-09			
FERNWOOD	I	51.8	75.5			HAZARD LT 1.0E-09			
STMARIES	I	51.8	75.5			HAZARD LT 1.0E-09			
PIERCE	I	51.8	75.6			HAZARD LT 1.0E-09			
CCRDALEN	I	51.6	75.5			HAZARD LT 1.0E-09			
RATHDRUM	I	51.9	75.6			HAZARD LT 1.0E-09			
KOOTNICO	I	50.7	76.5			HAZARD LT 1.0E-09			
CLRWTRCO	I	51.1	75.1	0.017	0.000	0.	0.000	0.000	-0.
PCPTFALS	I	52.3	75.8			HAZARD LT 1.0E-09			
BENEWACO	I	51.3	75.2			HAZARD LT 1.0E-09			
ELKRIVER	I	52.5	76.0			HAZARD LT 1.0E-09			
WEIPPE	I	52.5	76.0			HAZARD LT 1.0E-09			
HCVILL	I	53.0	76.3			HAZARD LT 1.0E-09			
KOOSKIA	I	53.2	76.4	0.017	0.000	0.	0.000	0.000	-0.
OROFINO	I	53.2	76.4			HAZARD LT 1.0E-09			
DEARY	I	53.4	76.6			HAZARD LT 1.0E-09			
KAMIAH	I	53.4	76.6	0.002	0.000	0.	0.000	0.000	-0.
KENDRICK	I	53.5	76.6			HAZARD LT 1.0E-09			
NEZPERCE	I	53.7	76.8	0.001	0.000	0.	0.000	0.000	-0.
LEWIS CO	I	53.0	76.3	1.491	0.000	0.	0.000	0.000	-0.
LATAH CO	I	52.6	76.1			HAZARD LT 1.0E-09			
GRANGVLL	I	53.9	76.9	0.383	0.016	0.	0.010	0.006	-0.
TROY	I	54.1	77.1			HAZARD LT 1.0E-09			
POTLATCH	I	54.2	77.1			HAZARD LT 1.0E-09			
JULAIETA	I	54.3	77.2			HAZARD LT 1.0E-09			
CRAIGMONT	I	54.4	77.3			HAZARD LT 1.0E-09			
COTNWOOD	I	54.4	77.3	0.006	0.000	0.	0.000	0.000	-0.
NEZPRCCO	I	53.7	76.8	0.005	0.000	0.	0.000	0.000	-0.
MOSCOW	I	54.8	77.5			HAZARD LT 1.0E-09			
LAPWAI	I	54.9	77.6			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-05. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 1

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	CENESEE	I	55.0	77.6			HAZARD LT 1.0E-09			
	LEWISTON	I	55.5	77.8			HAZARD LT 1.0E-09			
*	RIGGINS	I	57.1	78.4	1.565	0.015	0.	0.004	0.011	-0.
*	IDAHO CO	I	54.3	77.1	14998.445	2.783	0.	2.496	0.287	-0.
	MCCALL	I	61.3	78.9			HAZARD LT 1.0E-09			
	VALLEYCO	I	57.0	78.3	0.005	0.000	0.	0.	0.000	-0.
	NEWMEDOW	I	62.2	79.2	0.001	0.000	0.	0.000	0.000	-0.
	CASCADE	I	62.5	79.3			HAZARD LT 1.0E-09			
	COUNCIL	I	63.9	79.8			HAZARD LT 1.0E-09			
*	ADAMS CO	I	61.4	78.9	12.033	0.000	0.	0.000	0.000	-0.
	CAMBRIDG	I	62.4	80.5			HAZARD LT 1.0E-09			
*	WSHNGTNCO	I	64.1	79.9	3.082	0.000	0.	0.000	0.000	-0.
	BOISE	I	63.4	80.9			HAZARD LT 1.0E-09			
	WEISER	I	64.6	81.4			HAZARD LT 1.0E-09			

2. Hazards to Oregon

This section contains computer printouts of hazards to Oregon from the G-5 launch.

STC/SAI SAFETE RUN FOR G-05, GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
*	WALCWACO	O	56.0	78.0	15551.439	1.116	0.	1.002	0.114	-0.
*	ENTRPRSE	O	61.2	80.0	2.496	0.048	0.	0.027	0.021	-0.
*	JOSEPH	O	61.3	80.1	1.556	0.016	0.	0.007	0.009	-0.
	WALLCWA	O	61.6	80.2	0.036	0.000	0.	0.000	0.000	-0.
	ELGIN	O	63.4	80.9	0.007	0.000	0.	0.000	0.000	-0.
	MLTNFRWTR	O	63.9	81.1			HAZARD LT 1.0E-09			
	COVE	O	64.0	81.2	0.686	0.006	0.	0.003	0.003	-0.
	WESTON	O	64.5	81.4			HAZARD LT 1.0E-09			
*	UNION	O	64.6	81.4	1.568	0.041	0.	0.022	0.019	-0.
	ATHENA	O	64.9	81.5			HAZARD LT 1.0E-09			
*	UNION CO	O	62.2	80.4	4169.633	0.119	0.	0.068	0.051	-0.
	MAY PARK	O	65.0	81.6	0.163	0.002	0.	0.000	0.001	-0.
	LAGRANDE	O	65.1	81.6	0.598	0.015	0.	0.004	0.011	-0.
	ONTARIO	O	65.2	81.7			HAZARD LT 1.0E-09			
	NO.PWDR	O	65.5	81.8	0.808	0.005	0.	0.001	0.003	-0.
*	BAKER CO	O	62.3	80.4	12034.277	0.262	0.	0.123	0.138	-0.
	NYASSA	O	65.9	82.0			HAZARD LT 1.0E-09			
*	BAKER	O	66.0	82.0	10.483	0.379	0.	0.029	0.350	-0.
*	UMTILACO	O	63.1	80.7	5.959	0.000	0.	0.000	0.000	-0.
	VALE	O	66.6	82.3			HAZARD LT 1.0E-09			
	PNDLTCN	O	66.6	82.3			HAZARD LT 1.0E-09			
	ADRIAN	O	66.8	82.3			HAZARD LT 1.0E-09			
	PILCT RK	O	67.7	82.7			HAZARD LT 1.0E-09			
	ECHO	O	67.8	82.8			HAZARD LT 1.0E-09			
	MCNARY	O	67.8	82.8			HAZARD LT 1.0E-09			
	UMATILLA	O	68.0	82.8			HAZARD LT 1.0E-09			
	STNFLD	O	68.0	82.9			HAZARD LT 1.0E-09			
	HRMSTCN	O	68.0	82.9			HAZARD LT 1.0E-09			
	UKIAH	O	69.6	83.5	0.010	0.000	0.	0.000	0.000	-0.
*	RATES	O	69.8	83.6	5.981	0.067	0.	0.036	0.032	-0.
	MCRROWCO	O	68.4	83.0	0.156	0.000	0.	0.000	0.000	-0.
*	PRARECTY	O	71.0	84.2	7.332	0.118	0.	0.048	0.070	-0.
	HEPPNER	O	71.0	84.2			HAZARD LT 1.0E-09			
*	MALHEURCO	O	65.6	81.8	1.715	0.000	0.	0.000	0.000	-0.
	IONE	O	71.5	84.5			HAZARD LT 1.0E-09			
*	JOHN DAY	O	72.0	84.6	10.415	0.206	0.	0.085	0.121	-0.
*	GRANT CO	O	68.3	83.0	10254.794	0.125	0.	0.073	0.052	-0.
	ARLNGTN	O	72.1	84.7			HAZARD LT 1.0E-09			
*	CNYN CTY	O	72.2	84.8	6.245	0.076	0.	0.023	0.053	-0.
*	MTVERNON	O	72.6	85.0	2.627	0.026	0.	0.010	0.016	-0.
	SENECA	O	73.0	85.2	0.524	0.004	0.	0.000	0.003	-0.
	GILLAMCO	O	71.6	84.5	0.008	0.000	0.	0.000	0.000	-0.
	CONDON	O	73.8	85.5			HAZARD LT 1.0E-09			
	RUFUS	O	74.3	85.9			HAZARD LT 1.0E-09			
	WASCO	O	74.5	85.9			HAZARD LT 1.0E-09			
	SHRMANCO	O	73.3	85.3			HAZARD LT 1.0E-09			
*	WHELR CO	O	72.7	85.0	76.299	0.000	0.	0.000	0.000	-0.
	KINZUA	O	74.9	86.1	0.007	0.000	0.	0.000	0.000	-0.
	FOSSIL	O	75.2	86.2	0.001	0.000	0.	0.000	0.000	-0.
	BURNS	O	75.2	86.2	0.066	0.001	0.	0.000	0.001	-0.

STC/SAI SAFETE RUN FOR G-05, GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS)

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
HINES C	75.3	86.3	0.048	0.000	0.	0.000	0.000	-0.
* HARNEYCO O	70.6	84.0	2921.988	0.011	0.	0.004	0.006	-0.
THEDALLESC	75.9	86.6			HAZARD LT 1.0E-09			
CHNGWTH O	76.0	86.7			HAZARD LT 1.0E-09			
DUFUR O	76.3	86.9			HAZARD LT 1.0E-09			
HOODRVR C	76.7	87.1			HAZARD LT 1.0E-09			
WASCO CO O	74.6	85.9	0.011	0.000	0.	0.000	0.000	-0.
ODELL O	77.1	87.3			HAZARD LT 1.0E-09			
MAUPIN C	77.1	87.3			HAZARD LT 1.0E-09			
* CROOK CO C	75.0	86.1	5117.524	0.119	0.	0.040	0.079	-0.
HOODRVCO O	76.7	87.1			HAZARD LT 1.0E-09			
CSCADLKS C	78.1	87.9			HAZARD LT 1.0E-09			
MADRAS O	78.9	88.3	0.001	0.000	0.	0.000	0.000	-0.
WRM SPRG O	78.9	86.7			HAZARD LT 1.0E-09			
PRINVLLE C	79.0	88.4	0.115	0.002	0.	0.000	0.001	-0.
* JEFF CO C	77.1	87.3	8.169	0.000	0.	0.000	0.000	-0.
RDENDRON C	79.2	88.5			HAZARD LT 1.0E-09			
WEMME C	79.3	88.6			HAZARD LT 1.0E-09			
CULVER O	79.5	88.6	0.001	0.000	0.	0.000	0.000	-0.
TRRFBENN O	79.9	88.9	0.005	0.000	0.	0.000	0.000	-0.
SPRNGDLE O	79.9	88.9			HAZARD LT 1.0E-09			
RAINIER O	80.0	88.9			HAZARD LT 1.0E-09			
TRCUTDLE C	80.0	88.9			HAZARD LT 1.0E-09			
HAZELWOD C	80.0	88.9			HAZARD LT 1.0E-09			
SANDY C	80.0	89.0			HAZARD LT 1.0E-09			
WOODVLGE O	80.1	89.0			HAZARD LT 1.0E-09			
DEER ISL O	80.2	89.0			HAZARD LT 1.0E-09			
FAIRVIEW O	80.2	89.0			HAZARD LT 1.0E-09			
COLMBCTY C	80.2	89.1			HAZARD LT 1.0E-09			
REDMOND O	80.2	89.0	0.039	0.000	0.	0.000	0.000	-0.
STHELENS O	80.2	89.1			HAZARD LT 1.0E-09			
GRESHAM O	80.2	89.1			HAZARD LT 1.0E-09			
MCNULTY O	80.3	89.1			HAZARD LT 1.0E-09			
MAYWOODPKO	80.4	89.2			HAZARD LT 1.0E-09			
RKWOOD O	80.3	89.2			HAZARD LT 1.0E-09			
PWLHRST O	80.4	89.2			HAZARD LT 1.0E-09			
EPRKROSE O	80.4	89.2			HAZARD LT 1.0E-09			
GLNDOVER O	80.4	89.2			HAZARD LT 1.0E-09			
WARREN C	80.5	89.2			HAZARD LT 1.0E-09			
PRKROSE O	80.4	89.2			HAZARD LT 1.0E-09			
ESTACADA O	80.6	89.3			HAZARD LT 1.0E-09			
CLTSKNE O	80.6	89.3			HAZARD LT 1.0E-09			
MLTNMHCO O	79.9	88.9			HAZARD LT 1.0E-09			
WPOWLHRSTO	80.7	89.4			HAZARD LT 1.0E-09			
SCAPOOSE O	80.7	89.4			HAZARD LT 1.0E-09			
PORTLAND O	80.3	89.1			HAZARD LT 1.0E-09			
GILBERT C	80.7	89.4			HAZARD LT 1.0E-09			
COLMB CO O	79.8	88.8			HAZARD LT 1.0E-09			
KENDALL O	80.8	89.5			HAZARD LT 1.0E-09			
ERROLHTS O	80.9	89.5			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-05, GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS

RUN NO. 3

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
WSTPORT	O	81.0	89.6			HAZARD LT 1.0E-09			
GLDSTONE	O	81.0	89.6			HAZARD LT 1.0E-09			
CLKMSHTS	O	81.1	89.6			HAZARD LT 1.0E-09			
ORGONCTY	O	81.1	89.6			HAZARD LT 1.0E-09			
BEND	O	81.1	89.6	0.415	0.013	0.	0.002	0.010	-0.
WESTLINN	O	81.2	89.7			HAZARD LT 1.0E-09			
SISTERS	O	81.2	89.7	0.002	0.000	0.	0.000	0.000	-0.
WSTHAVN	O	81.2	89.7			HAZARD LT 1.0E-09			
CEDARMIL	C	81.3	89.7			HAZARD LT 1.0E-09			
VERNONIA	O	81.3	89.7			HAZARD LT 1.0E-09			
WSTSLOPE	O	81.2	89.7			HAZARD LT 1.0E-09			
CEDRHILL	O	81.3	89.7			HAZARD LT 1.0E-09			
HAPYVALY	O	81.3	89.8			HAZARD LT 1.0E-09			
RALEGHHL	C	81.3	89.7			HAZARD LT 1.0E-09			
CRONHOME	O	81.3	89.7			HAZARD LT 1.0E-09			
MRLENEVLG	O	81.3	89.8			HAZARD LT 1.0E-09			
METZGER	O	81.3	89.8			HAZARD LT 1.0E-09			
BEVRTON	O	81.3	89.8			HAZARD LT 1.0E-09			
LAKOSWGO	C	81.4	89.8			HAZARD LT 1.0E-09			
ALOHA	O	81.4	89.9			HAZARD LT 1.0E-09			
BATTIN	O	81.5	89.9			HAZARD LT 1.0E-09			
CLKMSCO	C	79.7	88.8			HAZARD LT 1.0E-09			
TIGARD	O	81.4	89.9			HAZARD LT 1.0E-09			
IDANHA	O	81.5	89.9			HAZARD LT 1.0E-09			
CANBY	O	81.6	89.9			HAZARD LT 1.0E-09			
* DSHUTSCO	O	79.3	88.5	911.116	0.033	0.	0.009	0.024	-0.
WESTWOOD	O	81.6	89.9			HAZARD LT 1.0E-09			
CLAKAMAS	C	81.6	90.0			HAZARD LT 1.0E-09			
KINGCTY	O	81.6	90.0			HAZARD LT 1.0E-09			
MOLALLA	C	81.6	90.0			HAZARD LT 1.0E-09			
SVENSON	O	81.7	90.0			HAZARD LT 1.0E-09			
MWAUKIE	O	81.7	90.0			HAZARD LT 1.0E-09			
HILSBORO	O	81.7	90.0			HAZARD LT 1.0E-09			
CONCORD	O	81.7	90.0			HAZARD LT 1.0E-09			
DETROIT	O	81.8	90.1			HAZARD LT 1.0E-09			
SHRWOOD	O	81.8	90.1			HAZARD LT 1.0E-09			
WLSNVLLE	O	81.8	90.1			HAZARD LT 1.0E-09			
OAKGROVE	C	81.8	90.0			HAZARD LT 1.0E-09			
JNINGSLG	C	81.8	90.1			HAZARD LT 1.0E-09			
WASH CO	O	80.8	89.4			HAZARD LT 1.0E-09			
BANKS	O	81.9	90.1			HAZARD LT 1.0E-09			
AURORA	O	82.0	90.2			HAZARD LT 1.0E-09			
CRABTREE	O	82.1	90.3			HAZARD LT 1.0E-09			
ASTORIA	O	82.1	90.2			HAZARD LT 1.0E-09			
HAMMOND	O	82.1	90.3			HAZARD LT 1.0E-09			
* LAKE CO	O	78.3	88.0	10953.041	0.057	0.	0.016	0.041	-0.
WRRNTON	O	82.2	90.3			HAZARD LT 1.0E-09			
HUBBARD	O	82.2	90.4			HAZARD LT 1.0E-09			
CLTSCFCO	O	81.1	89.7			HAZARD LT 1.0E-09			
NEWBERG	O	82.3	90.4			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-05, GFW 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
GASTON	O	82.4	90.5			HAZARD LT	1.0E-09		
DUNDEE	O	82.5	90.5			HAZARD LT	1.0E-09		
WOODBURN	O	82.5	90.5			HAZARD LT	1.0E-09		
MT.ANGEL	O	82.6	90.6			HAZARD LT	1.0E-09		
STPAUL	O	82.6	90.6			HAZARD LT	1.0E-09		
GERVAIS	O	82.7	90.7			HAZARD LT	1.0E-09		
DAYTON	O	82.7	90.7			HAZARD LT	1.0E-09		
LYONS	O	82.7	90.7			HAZARD LT	1.0E-09		
SLVRTON	O	82.7	90.7			HAZARD LT	1.0E-09		
FORSTGRV	O	82.7	90.7			HAZARD LT	1.0E-09		
YAMHILL	O	82.8	90.7			HAZARD LT	1.0E-09		
LA PINE	O	82.8	90.8	0.502	0.008	0.	0.003	0.006	-0.
LFAYETTE	O	82.9	90.8			HAZARD LT	1.0E-09		
CARLTON	O	82.9	90.8			HAZARD LT	1.0E-09		
MARIONCO	O	81.6	90.0			HAZARD LT	1.0E-09		
BROOKS	O	83.1	90.9			HAZARD LT	1.0E-09		
COBURG	O	83.2	91.0	0.002	0.000	0.	0.000	0.000	-0.
SBLIMITY	O	83.2	91.0			HAZARD LT	1.0E-09		
YMHILLCO	O	82.1	90.3			HAZARD LT	1.0E-09		
MCMNVLLE	O	83.2	91.0			HAZARD LT	1.0E-09		
HAYESVIL	O	83.3	91.1			HAZARD LT	1.0E-09		
STAYTON	O	83.3	91.1			HAZARD LT	1.0E-09		
AUMSVLLE	O	83.3	91.1			HAZARD LT	1.0E-09		
KEIZER	O	83.4	91.1			HAZARD LT	1.0E-09		
4CORNERS	O	83.5	91.2			HAZARD LT	1.0E-09		
CRNELIUS	O	83.5	91.2			HAZARD LT	1.0E-09		
AMITY	O	83.5	91.2			HAZARD LT	1.0E-09		
SALEM	O	83.4	91.2			HAZARD LT	1.0E-09		
TURNER	O	83.6	91.3			HAZARD LT	1.0E-09		
SCIO	O	83.6	91.3			HAZARD LT	1.0E-09		
LAKEVIEW	O	83.6	91.3	0.001	0.000	0.	0.000	0.000	-0.
NMZNITA	O	83.7	91.4			HAZARD LT	1.0E-09		
FOSTER	O	83.8	91.4			HAZARD LT	1.0E-09		
TLMOCKCO	O	82.5	90.5			HAZARD LT	1.0E-09		
LPLKDACD	O	83.9	91.5			HAZARD LT	1.0E-09		
SWETHOME	O	83.9	91.5			HAZARD LT	1.0E-09		
BLUERVR	O	83.9	91.5	0.001	0.000	0.	0.000	0.000	-0.
ROCKAWAY	O	84.1	91.6			HAZARD LT	1.0E-09		
SHERIDAN	O	84.1	91.6			HAZARD LT	1.0E-09		
TWNROCKS	O	84.2	91.7			HAZARD LT	1.0E-09		
GARIBLDI	O	84.2	91.7			HAZARD LT	1.0E-09		
BAY CTY	O	84.2	91.7			HAZARD LT	1.0E-09		
INDPNDNC	O	84.2	91.7			HAZARD LT	1.0E-09		
LEBANON	O	84.3	91.8			HAZARD LT	1.0E-09		
TLAMOOK	O	84.3	91.8			HAZARD LT	1.0E-09		
MONMOUTH	O	84.3	91.8			HAZARD LT	1.0E-09		
LBNONSOU	O	84.4	91.8			HAZARD LT	1.0E-09		
WILLAMNA	O	84.5	91.9			HAZARD LT	1.0E-09		
DALLAS	O	84.5	91.9			HAZARD LT	1.0E-09		
NETARTS	O	84.5	91.9			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-05, GFW 90 FCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	ALBANY	C	84.5	91.9			HAZARD LT 1.0E-09			
	POLK CO	O	83.5	91.2			HAZARD LT 1.0E-09			
	GILCHRST	O	84.7	92.0	0.250	0.002	0.	0.000	0.002	-0.
	PCFICCTY	O	84.7	92.0			HAZARD LT 1.0E-09			
	LINN CO	O	82.9	90.8	0.043	0.000	0.	0.000	0.000	-0.
	FALLCTY	C	84.8	92.1			HAZARD LT 1.0E-09			
	GRNDRCND	C	84.9	92.1			HAZARD LT 1.0E-09			
	BRWNSVLE	O	84.9	92.2			HAZARD LT 1.0E-09			
	LWISBURG	O	85.0	92.2			HAZARD LT 1.0E-09			
	CHEMULT	O	85.1	92.3	0.717	0.006	0.	0.001	0.005	-0.
	CORVALIS	O	85.2	92.4			HAZARD LT 1.0E-09			
	OAKRIDGE	C	85.3	92.4	0.031	0.000	0.	0.000	0.000	-0.
	HALSEY	O	85.4	92.5			HAZARD LT 1.0E-09			
	WESTFIR	O	85.4	92.6	0.010	0.000	0.	0.000	0.000	-0.
	BENTONCO	O	84.6	91.9	0.001	0.000	0.	0.000	0.000	-0.
	VALSETZ	O	85.5	92.6			HAZARD LT 1.0E-09			
	JCT CTY	C	85.6	92.6			HAZARD LT 1.0E-09			
	PHILOMTH	C	85.6	92.7			HAZARD LT 1.0E-09			
	NSKOWIN	O	85.7	92.7			HAZARD LT 1.0E-09			
	LOWELL	O	85.7	92.8	0.002	0.000	0.	0.000	0.000	-0.
	HRSBURG	O	85.8	92.8			HAZARD LT 1.0E-09			
	GLENWOOD	O	85.8	92.8			HAZARD LT 1.0E-09			
	MONROE	C	86.0	93.0			HAZARD LT 1.0E-09			
	SPRNGFLD	O	86.0	92.9	0.002	0.000	0.	0.000	0.000	-0.
	GOSHEN	O	86.1	93.1			HAZARD LT 1.0E-09			
	SNTACLRA	O	86.1	93.1			HAZARD LT 1.0E-09			
	LNCLNCTY	O	86.2	93.1			HAZARD LT 1.0E-09			
*	KLMTH CO	C	83.2	91.0	9896.620	0.291	0.	0.079	0.212	-0.
	RIVERROD	O	86.2	93.1	0.001	0.000	0.	0.000	0.000	-0.
	EUGENE	O	86.1	93.1	0.004	0.000	0.	0.000	0.000	-0.
	COLGCRSJ	C	86.3	93.2			HAZARD LT 1.0E-09			
	CRSWELL	O	86.4	93.3	0.001	0.000	0.	0.000	0.000	-0.
	GLNEDNRH	O	86.4	93.3			HAZARD LT 1.0E-09			
	SILETZ	C	86.5	93.4			HAZARD LT 1.0E-09			
	DPOE BAY	O	86.6	93.4			HAZARD LT 1.0E-09			
	LNCLN CO	O	85.5	92.6			HAZARD LT 1.0E-09			
	ALSEA	O	86.6	93.4			HAZARD LT 1.0E-09			
*	LANE CO	O	84.2	91.7	12.255	0.000	0.	0.000	0.000	-0.
	COTAGGRV	C	86.8	93.5	0.005	0.000	0.	0.000	0.000	-0.
	CHILOQUM	O	86.8	93.6	0.410	0.005	0.	0.002	0.003	-0.
	ELMIRA	O	86.8	93.6			HAZARD LT 1.0E-09			
	VENETA	O	86.9	93.6			HAZARD LT 1.0E-09			
	TOLEDO	O	86.9	93.6			HAZARD LT 1.0E-09			
	AGTE BCH	O	86.9	93.7			HAZARD LT 1.0E-09			
	MALIN	C	87.1	93.8	0.006	0.000	0.	0.000	0.000	-0.
	NEWPORT	O	87.1	93.8			HAZARD LT 1.0E-09			
	SOUTHBCH	O	87.1	93.8			HAZARD LT 1.0E-09			
	NOTI	O	87.2	93.8			HAZARD LT 1.0E-09			
	SEAL RCK	O	87.5	94.1			HAZARD LT 1.0E-09			
	ALTAMONT	C	87.4	94.0	0.595	0.025	0.	0.001	0.024	-0.

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	PC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	KLMTHFLS	0	87.4	94.0	0.838	0.039	0.	0.003	0.035	-0.
	MERRILL	0	87.6	94.1	0.013	0.000	0.	0.000	0.000	-0.
	FALCONHT	0	87.6	94.1	0.035	0.000	0.	0.000	0.000	-0.
	WALDPORT	0	87.7	94.2			HAZARD LT 1.0E-09			
	MIDLAND	0	87.7	94.3	0.027	0.000	0.	0.000	0.000	-0.
	SWISSHOM	0	87.7	94.3			HAZARD LT 1.0E-09			
	DRAIN	0	87.8	94.3	0.002	0.000	0.	0.000	0.000	-0.
	YONCALLA	0	87.9	94.4	0.004	0.000	0.	0.000	0.000	-0.
*	PROSPECT	0	88.0	94.5	3.985	0.036	0.	0.016	0.020	-0.
	YACHATS	0	88.1	94.5			HAZARD LT 1.0E-09			
	MAPLETON	0	88.1	94.6			HAZARD LT 1.0E-09			
	GLIDE	0	88.2	94.6	0.067	0.001	0.	0.000	0.001	-0.
	KENO	0	88.3	94.7	0.081	0.001	0.	0.000	0.001	-0.
	OAKLAND	0	88.4	94.7	0.013	0.000	0.	0.000	0.000	-0.
	SUTHERLN	0	88.5	94.8	0.032	0.000	0.	0.000	0.000	-0.
*	BUTFFALS	0	88.7	95.0	1.214	0.012	0.	0.000	0.012	-0.
	WILBUR	0	88.8	95.1	0.022	0.000	0.	0.000	0.000	-0.
	WNCHSTER	0	88.9	95.2	0.036	0.000	0.	0.000	0.000	-0.
*	DUGLASCO	0	86.3	93.2	1146.745	0.077	0.	0.021	0.055	-0.
	FLORENCE	0	89.0	95.2			HAZARD LT 1.0E-09			
	ROSEBURG	0	89.0	95.2	0.331	0.016	0.	0.003	0.013	-0.
*	SHADYCOV	0	89.2	95.4	4.816	0.082	0.	0.034	0.048	-0.
	MRTLCREK	0	89.4	95.6	0.630	0.017	0.	0.006	0.011	-0.
	GREEN	0	89.5	95.6	0.291	0.005	0.	0.001	0.004	-0.
	WINSTON	0	89.5	95.6	0.262	0.006	0.	0.002	0.005	-0.
	DILLARD	0	89.5	95.6	0.138	0.002	0.	0.001	0.002	-0.
	GARDINER	0	89.6	95.7			HAZARD LT 1.0E-09			
	TRI CITY	0	89.7	95.7	0.447	0.008	0.	0.003	0.005	-0.
	CNYNVLLE	0	89.7	95.7	0.420	0.008	0.	0.003	0.005	-0.
	RELDSPRT	0	89.7	95.7			HAZARD LT 1.0E-09			
	RIDDLE	0	89.8	95.8	0.448	0.008	0.	0.003	0.005	-0.
*	WHITECTY	0	89.8	95.8	2.689	0.031	0.	0.004	0.027	-0.
	WNCHSTRBAD		89.9	95.9			HAZARD LT 1.0E-09			
	BELVIEW	0	90.0	96.0	0.329	0.003	0.	0.001	0.002	-0.
	MILO	0	90.0	96.0	0.328	0.003	0.	0.001	0.002	-0.
*	ASHLAND	0	90.0	96.0	1.540	0.035	0.	0.008	0.027	-0.
	TALENT	0	90.1	96.1	0.557	0.005	0.	0.000	0.005	-0.
*	MEDFORD	0	90.1	96.0	18.152	0.880	0.	0.014	0.866	-0.
*	JKSN CO	0	88.2	94.6	6341.282	1.004	0.	0.280	0.725	-0.
*	CENTRLPT	0	90.1	96.1	5.019	0.199	0.	0.014	0.185	-0.
	PHOENIX	0	90.2	96.1	0.584	0.009	0.	0.000	0.009	-0.
*	MDFRDWST	0	90.2	96.1	3.020	0.117	0.	0.002	0.115	-0.
*	CNTRLPTW	0	90.2	96.1	4.302	0.093	0.	0.006	0.088	-0.
	LAKESIDE	0	90.2	96.2			HAZARD LT 1.0E-09			
*	SCUMDFRD	0	90.2	96.1	1.588	0.054	0.	0.000	0.054	-0.
*	GOLDHILL	0	90.3	96.3	5.297	0.068	0.	0.029	0.038	-0.
*	JKSNVLLE	0	90.4	96.3	2.724	0.055	0.	0.001	0.054	-0.
	WOLF CRK	0	90.5	96.4	0.224	0.002	0.	0.000	0.001	-0.
*	RCGUERVR	0	90.6	96.5	3.711	0.064	0.	0.026	0.038	-0.
	EASTSIDE	0	90.7	96.6	0.003	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-05, GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 3

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
	NORTHBND	0	90.7	96.6	0.003	0.000	0.	0.000	0.000	-0.
	COOS BAY	0	90.7	96.6	0.007	0.000	0.	0.000	0.000	-0.
	POWERS	0	90.8	96.6	0.002	0.000	0.	0.000	0.000	-0.
	BUNKRHLL	0	90.8	96.7	0.003	0.000	0.	0.000	0.000	-0.
	LIBBY	0	90.9	96.7	0.001	0.000	0.	0.000	0.000	-0.
	MLNGTON	0	90.9	96.7	0.001	0.000	0.	0.000	0.000	-0.
*	COOS CO	0	89.6	95.7	10.461	0.000	0.	0.000	0.000	-0.
*	GRANTPAS	0	90.9	96.7	8.471	0.369	0.	0.061	0.309	-0.
	MERLIN	0	91.0	96.8	0.210	0.001	0.	0.000	0.001	-0.
*	FRUTDALE	0	90.9	96.8	3.202	0.071	0.	0.014	0.057	-0.
	HARVIEW	0	91.1	96.9	0.001	0.000	0.	0.000	0.000	-0.
	CHRLSTON	0	91.1	97.0	0.001	0.000	0.	0.000	0.000	-0.
*	JOSFINCO	0	89.8	95.9	396.787	0.495	0.	0.140	0.355	-0.
*	GRNTPSSW	0	91.2	97.0	4.005	0.118	0.	0.029	0.090	-0.
	COQUILLE	0	91.2	97.0	0.014	0.000	0.	0.000	0.000	-0.
	MYRTLEPT	0	91.4	97.1	0.023	0.000	0.	0.000	0.000	-0.
	BANDON	0	91.8	97.5	0.006	0.000	0.	0.000	0.000	-0.
*	APPLGATE	0	91.9	97.6	3.226	0.052	0.	0.020	0.033	-0.
*	CAVE JCT	0	92.3	98.0	3.226	0.033	0.	0.014	0.020	-0.
	PRTORFRD	0	92.9	98.5	0.046	0.001	0.	0.000	0.001	-0.
*	CURRYCO	0	92.6	98.2	1508.256	0.073	0.	0.020	0.052	-0.
	HARBOR	0	94.0	99.4	0.299	0.003	0.	0.000	0.003	-0.
	BROOKNGS	0	94.1	99.5	0.616	0.009	0.	0.000	0.009	-0.
	GOLDBCH	0	94.4	99.7	0.343	0.002	0.	0.000	0.002	-0.

3. Hazards to Washington and California

This section contains computer printouts of hazards to Washington and California from the G-5 launch.

STC/SAI SAFETE RUN FOR G-05, GFW 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LIBRTYLK	W	52.3	75.8			HAZARD LT 1.0E-09			
OTISORCH	W	52.3	75.9			HAZARD LT 1.0E-09			
TRNTWOOD	W	52.5	76.0			HAZARD LT 1.0E-09			
DEERPARK	W	52.6	76.1			HAZARD LT 1.0E-09			
OPRTUNTY	W	52.6	76.1			HAZARD LT 1.0E-09			
MILLWOOD	W	52.7	76.1			HAZARD LT 1.0E-09			
DISHMAN	W	52.8	76.2			HAZARD LT 1.0E-09			
PARKWTER	W	52.8	76.2			HAZARD LT 1.0E-09			
MORGNACR	N	52.9	76.2			HAZARD LT 1.0E-09			
ROCKFORD	W	52.9	76.2			HAZARD LT 1.0E-09			
COUNTYHM	W	52.9	76.3			HAZARD LT 1.0E-09			
FAIRFELD	W	53.2	76.5			HAZARD LT 1.0E-09			
TEKOA	W	53.4	76.6			HAZARD LT 1.0E-09			
SPOKNFCO	W	51.7	76.6			HAZARD LT 1.0E-09			
AIRWYHTS	W	53.8	76.8			HAZARD LT 1.0E-09			
SPOKANE	W	53.6	76.7			HAZARD LT 1.0E-09			
FAIRCHLD	W	53.9	76.9			HAZARD LT 1.0E-09			
CHENEY	W	54.0	77.0			HAZARD LT 1.0E-09			
OAKSDALE	W	54.1	77.0			HAZARD LT 1.0E-09			
GARFIELD	W	54.1	77.0			HAZARD LT 1.0E-09			
MEDCALLK	W	54.1	77.0			HAZARD LT 1.0E-09			
PALOUSE	W	54.1	77.1			HAZARD LT 1.0E-09			
ROSALIA	W	54.2	77.1			HAZARD LT 1.0E-09			
PULLMAN	W	54.8	77.5			HAZARD LT 1.0E-09			
ALBION	W	55.0	77.6			HAZARD LT 1.0E-09			
COLFAX	W	55.0	77.6			HAZARD LT 1.0E-09			
ST JOHN	W	55.2	77.7			HAZARD LT 1.0E-09			
UNIONTWN	W	55.2	77.7			HAZARD LT 1.0E-09			
WHTMANCO	W	53.8	76.8			HAZARD LT 1.0E-09			
ENDICOTT	W	56.5	78.2			HAZARD LT 1.0E-09			
LINCLNCO	W	54.2	77.1			HAZARD LT 1.0E-09			
CLARKSTN	W	57.4	78.5			HAZARD LT 1.0E-09			
ASOTIN	W	57.8	78.6			HAZARD LT 1.0E-09			
CLRKSTNHT	W	58.1	78.7			HAZARD LT 1.0E-09			
LACROSSE	W	58.1	78.7			HAZARD LT 1.0E-09			
POMEROY	W	61.0	78.8			HAZARD LT 1.0E-09			
GARFLDCO	W	56.4	78.1			HAZARD LT 1.0E-09			
RITZVLLE	W	61.9	79.1			HAZARD LT 1.0E-09			
ASOTINCO	W	57.6	78.5			HAZARD LT 1.0E-09			
ADAMS CO	W	57.1	78.4			HAZARD LT 1.0E-09			
WSHTUCNA	W	63.3	79.6			HAZARD LT 1.0E-09			
DAYTON	W	63.5	79.7			HAZARD LT 1.0E-09			
COLMBIACO	W	61.8	79.0			HAZARD LT 1.0E-09			
LIND	W	63.9	79.8			HAZARD LT 1.0E-09			
WAITSBRG	W	61.4	80.1			HAZARD LT 1.0E-09			
KAHLOTUS	W	61.8	80.2			HAZARD LT 1.0E-09			
DUGLASCO	W	62.6	79.3			HAZARD LT 1.0E-09			
EPHRATA	W	62.2	80.4			HAZARD LT 1.0E-09			
MOSESLAK	W	62.8	80.6			HAZARD LT 1.0E-09			
MSLAKNOR	W	62.8	80.7			HAZARD LT 1.0E-09			

STC/SAI SAFETF RUN FOR G-05, GFM 90 FCT APRIL WINDS 5/30/74 RUN NO. 2

APRIL 90 PERCENT WINDS

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	FI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
CHELAN	W	62.9	80.7			HAZARD LT 1.0E-09			
CONNELL	W	63.0	80.7			HAZARD LT 1.0E-09			
WLAWLACO	W	64.1	79.9			HAZARD LT 1.0E-09			
WALLAWLA	W	63.2	80.8			HAZARD LT 1.0E-09			
COLEGFPL	W	63.5	80.9			HAZARD LT 1.0E-09			
GRANT CO	W	63.4	79.7			HAZARD LT 1.0E-09			
OTHELLO	W	63.6	81.0			HAZARD LT 1.0E-09			
FRNKLNCO	W	62.1	80.4			HAZARD LT 1.0E-09			
QUINCY	W	64.6	81.4			HAZARD LT 1.0E-09			
TOUCHET	W	64.7	81.5			HAZARD LT 1.0E-09			
BURBANK	W	65.5	81.8			HAZARD LT 1.0E-09			
PASCO	W	65.6	81.8			HAZARD LT 1.0E-09			
RVRVIEW	W	65.7	81.9			HAZARD LT 1.0E-09			
WENATCHE	W	65.7	81.9			HAZARD LT 1.0E-09			
KENEWICK	W	65.8	81.9			HAZARD LT 1.0E-09			
RICHLAND	W	66.1	82.1			HAZARD LT 1.0E-09			
WRICHLND	W	66.4	82.2			HAZARD LT 1.0E-09			
CHELANCO	W	63.2	80.8			HAZARD LT 1.0E-09			
BENTNCTY	W	67.0	82.4			HAZARD LT 1.0E-09			
BENTONCO	W	64.8	81.5			HAZARD LT 1.0E-09			
KITITSCO	W	65.6	81.9			HAZARD LT 1.0E-09			
ELENSBRG	W	68.5	83.1			HAZARD LT 1.0E-09			
PROSSER	W	68.6	83.1			HAZARD LT 1.0E-09			
SUNYSIDE	W	69.0	83.3			HAZARD LT 1.0E-09			
GRNDVIEW	W	69.0	83.3			HAZARD LT 1.0E-09			
SPRCDWAY	W	69.1	83.3			HAZARD LT 1.0E-09			
OUTLOOK	W	69.4	83.4			HAZARD LT 1.0E-09			
MCXEFCTY	W	69.4	83.4			HAZARD LT 1.0E-09			
MABTON	W	69.4	83.5			HAZARD LT 1.0E-09			
SELAH	W	69.7	83.6			HAZARD LT 1.0E-09			
ZILLAH	W	69.7	83.6			HAZARD LT 1.0E-09			
GRANGER	W	69.8	83.6			HAZARD LT 1.0E-09			
YAKIMACO	W	66.6	82.3			HAZARD LT 1.0E-09			
TRPACEHT	W	69.8	83.6			HAZARD LT 1.0E-09			
BUENA	W	69.9	83.7			HAZARD LT 1.0E-09			
FAIRVIEW	W	69.9	83.7			HAZARD LT 1.0E-09			
FRUITVLE	W	70.0	83.7			HAZARD LT 1.0E-09			
YAKIMA	W	69.8	83.6			HAZARD LT 1.0E-09			
UNIONGAP	W	70.0	83.7			HAZARD LT 1.0E-09			
NACHES	W	70.1	83.8			HAZARD LT 1.0E-09			
GLEED	W	70.1	83.8			HAZARD LT 1.0E-09			
TOPPNISH	W	70.1	83.8			HAZARD LT 1.0E-09			
PARKER	W	70.2	83.8			HAZARD LT 1.0E-09			
WAPATO	W	70.2	83.8			HAZARD LT 1.0E-09			
TIETON	W	70.5	84.0			HAZARD LT 1.0E-09			
WILEY	W	70.8	84.1			HAZARD LT 1.0E-09			
HARRAH	W	70.9	84.2			HAZARD LT 1.0E-09			
KING CO	W	69.0	83.3			HAZARD LT 1.0E-09			
REDMOND	W	71.6	84.5			HAZARD LT 1.0E-09			
[illegible]	W	71.6	84.5			HAZARD LT 1.0E-09			

STC/SAI SAFETE RUN FOR G-05, GFW 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
ISSAQUAH	W	71.9	84.6			HAZARD LT 1.0E-09			
ROSEHILL	W	71.9	84.6			HAZARD LT 1.0E-09			
KENMORE	W	71.9	84.6			HAZARD LT 1.0E-09			
INGLWOOD	W	71.9	84.6			HAZARD LT 1.0E-09			
JUANITA	W	71.9	84.6			HAZARD LT 1.0E-09			
KIRKLAND	W	71.9	84.6			HAZARD LT 1.0E-09			
RCHMDHLN	W	72.0	84.7			HAZARD LT 1.0E-09			
BELLEVUE	W	72.0	84.7			HAZARD LT 1.0E-09			
EASTGATE	W	72.1	84.7			HAZARD LT 1.0E-09			
CLYDHILL	W	72.2	84.8			HAZARD LT 1.0E-09			
NORTHCTY	W	72.2	84.7			HAZARD LT 1.0E-09			
RDGECRST	W	72.2	84.8			HAZARD LT 1.0E-09			
RCHMDBCH	W	72.3	84.8			HAZARD LT 1.0E-09			
PRTTWNSN	W	72.3	84.8			HAZARD LT 1.0E-09			
MRCERISL	W	72.4	84.9			HAZARD LT 1.0E-09			
MEDINA	W	72.5	84.9			HAZARD LT 1.0E-09			
LAKRIDGE	W	72.7	85.0			HAZARD LT 1.0E-09			
RENTON	W	72.7	85.0			HAZARD LT 1.0E-09			
SEATTLE	W	72.5	84.9			HAZARD LT 1.0E-09			
LAKFRSTPK	W	72.8	85.0			HAZARD LT 1.0E-09			
TUKWILA	W	72.8	85.1			HAZARD LT 1.0E-09			
SKYWAY	W	72.9	85.1			HAZARD LT 1.0E-09			
ENUMCLAW	W	73.0	85.2			HAZARD LT 1.0E-09			
RVRTNHTS	W	73.0	85.2			HAZARD LT 1.0E-09			
WHITECTR	W	73.1	85.2			HAZARD LT 1.0E-09			
KENT	W	73.2	85.2			HAZARD LT 1.0E-09			
BURIEN	W	73.2	85.3			HAZARD LT 1.0E-09			
BUCKLEY	W	73.3	85.3			HAZARD LT 1.0E-09			
SEAHURST	W	73.3	85.3			HAZARD LT 1.0E-09			
NRMNDYPK	W	73.4	85.3			HAZARD LT 1.0E-09			
DESMOINE	W	73.4	85.4			HAZARD LT 1.0E-09			
AUBURN	W	73.5	85.4			HAZARD LT 1.0E-09			
BRMRTNEA	W	73.8	85.6			HAZARD LT 1.0E-09			
FEDRLWAY	W	73.8	85.5			HAZARD LT 1.0E-09			
SUMNER	W	73.9	85.6			HAZARD LT 1.0E-09			
KITSAPCO	W	72.9	85.1			HAZARD LT 1.0E-09			
BONNYLAK	W	73.9	85.6			HAZARD LT 1.0E-09			
BREMRTON	W	73.8	85.5			HAZARD LT 1.0E-09			
GOLDNDLE	W	73.9	85.6			HAZARD LT 1.0E-09			
PRTOCHRD	W	74.0	85.6			HAZARD LT 1.0E-09			
NAVYDCTY	W	74.0	85.6			HAZARD LT 1.0E-09			
MILTON	W	74.1	85.7			HAZARD LT 1.0E-09			
PUYALLUP	W	74.1	85.7			HAZARD LT 1.0E-09			
TACOMA	W	74.3	85.8			HAZARD LT 1.0E-09			
PIERCECO	W	72.4	84.9			HAZARD LT 1.0E-09			
MIDLAND	W	74.7	86.0			HAZARD LT 1.0E-09			
FIRCREST	W	74.7	86.0			HAZARD LT 1.0E-09			
KLIKTATCO	W	72.5	84.9			HAZARD LT 1.0E-09			
PARKLAND	W	74.7	86.0			HAZARD LT 1.0E-09			
UNIV.PL	W	74.8	86.0			HAZARD LT 1.0E-09			

STC/SAI SAFETF RUN FOR G-05, GFM 90 PCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS

RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LAKWDCTR W	74.8	86.0			HAZARD LT	1.0E-09		
SPANAWAY W	75.0	86.1			HAZARD LT	1.0E-09		
WISHRAM W	75.1	86.2			HAZARD LT	1.0E-09		
STEILACM W	75.2	86.3			HAZARD LT	1.0E-09		
LEWISCO1 W	73.6	85.4			HAZARD LT	1.0E-09		
JEFFSNCO1W	73.9	85.6			HAZARD LT	1.0E-09		
LYLE W	76.0	86.7			HAZARD LT	1.0E-09		
LACEY W	76.3	86.9			HAZARD LT	1.0E-09		
MASON CO W	75.0	86.2			HAZARD LT	1.0E-09		
BINGEN W	76.5	86.9			HAZARD LT	1.0E-09		
OLYMPIA W	76.6	87.0			HAZARD LT	1.0E-09		
THRSTNCO W	75.6	86.5			HAZARD LT	1.0E-09		
TUMWATER W	76.8	87.1			HAZARD LT	1.0E-09		
CARSON W	77.6	87.6			HAZARD LT	1.0E-09		
LEWISCO2 W	76.1	86.7			HAZARD LT	1.0E-09		
JFFSNCO2 W	76.3	86.9			HAZARD LT	1.0E-09		
STVNSON W	77.9	87.8			HAZARD LT	1.0E-09		
CNTRALIA W	77.9	87.7			HAZARD LT	1.0E-09		
SKMANIACOW	76.1	86.7			HAZARD LT	1.0E-09		
CHEHALIS W	78.1	87.9			HAZARD LT	1.0E-09		
NBONNVLL W	78.2	87.9			HAZARD LT	1.0E-09		
GRAHBRCO W	76.8	87.1			HAZARD LT	1.0E-09		
COWLTZCO W	77.3	87.4			HAZARD LT	1.0E-09		
YACOLT W	79.0	88.4			HAZARD LT	1.0E-09		
MNTESANO W	79.0	88.4			HAZARD LT	1.0E-09		
AMBOY W	79.0	88.4			HAZARD LT	1.0E-09		
CNTRALPK W	79.3	88.5			HAZARD LT	1.0E-09		
MEDWGLDE W	79.7	88.8			HAZARD LT	1.0E-09		
KELSO W	79.7	88.7			HAZARD LT	1.0E-09		
ABERDEEN W	79.7	88.8			HAZARD LT	1.0E-09		
WSHOUGAL W	79.7	88.8			HAZARD LT	1.0E-09		
CLARKCO W	78.6	88.2			HAZARD LT	1.0E-09		
LONGVIEW W	79.7	88.8			HAZARD LT	1.0E-09		
LACENTER W	79.9	86.9			HAZARD LT	1.0E-09		
HOQUIAM W	79.9	88.8			HAZARD LT	1.0E-09		
CAMAS W	79.9	88.9			HAZARD LT	1.0E-09		
SALMNCRK W	80.0	88.9			HAZARD LT	1.0E-09		
WOODLAND W	80.0	88.9			HAZARD LT	1.0E-09		
SIFTON W	80.0	88.9			HAZARD LT	1.0E-09		
BTTLGRND W	80.1	89.0			HAZARD LT	1.0E-09		
ORCHARDS W	80.1	89.0			HAZARD LT	1.0E-09		
RIDGEFLD W	80.2	89.1			HAZARD LT	1.0E-09		
RAYMOND W	80.3	89.1			HAZARD LT	1.0E-09		
LAKESHOR W	80.4	89.2			HAZARD LT	1.0E-09		
HAZLDELL W	80.4	89.2			HAZARD LT	1.0E-09		
MINEHAHA W	80.4	89.2			HAZARD LT	1.0E-09		
PACFICCO W	79.1	88.4			HAZARD LT	1.0E-09		
VANCOUVERW	80.5	89.2			HAZARD LT	1.0E-09		
WAKAKMCO W	80.5	89.3			HAZARD LT	1.0E-09		
ALTURAS C	85.9	92.9			HAZARD LT	1.0E-09		

STC/SAI SAFETE RUN FOR G-05, GFN 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

	LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
*	MODOC CO	C	83.9	91.5	1.393	0.000	0.	0.000	0.000	-0.
	TULELAKE	C	87.7	94.2	0.001	0.000	0.	0.000	0.000	-0.
	LASSENCO	C	85.8	92.8			HAZARD LT 1.0E-09			
	DORRIS	C	88.6	94.9	0.004	0.000	0.	0.000	0.000	-0.
	SUSANVLL	C	89.0	95.2			HAZARD LT 1.0E-09			
	PLUMASCO1	C	88.5	94.9			HAZARD LT 1.0E-09			
	HRNBROOK	C	90.5	96.4	0.025	0.000	0.	0.000	0.000	-0.
	HILT	C	90.6	96.5	0.046	0.000	0.	0.000	0.000	-0.
	MONTAGUE	C	90.8	96.7	0.013	0.000	0.	0.000	0.000	-0.
	PLMASCO2	C	89.7	95.7			HAZARD LT 1.0E-09			
	MTSHASTA	C	90.9	96.7	0.002	0.000	0.	0.000	0.000	-0.
	WEED	C	90.9	96.8	0.005	0.000	0.	0.000	0.000	-0.
	GRENADA	C	90.9	96.8	0.007	0.000	0.	0.000	0.000	-0.
	QUINCY	C	91.0	96.8			HAZARD LT 1.0E-09			
*	SISKYUCO	C	88.2	94.6	694.222	0.016	0.	0.004	0.012	-0.
	MCLOUD	C	91.0	96.8	0.001	0.000	0.	0.000	0.000	-0.
	YREKA	C	91.0	96.8	0.042	0.000	0.	0.000	0.000	-0.
	DUNSMUIR	C	91.2	97.0	0.002	0.000	0.	0.000	0.000	-0.
*	SHASTACO	C	89.5	95.6	1.723	0.000	0.	0.000	0.000	-0.
	FTJONES	C	91.6	97.3	0.015	0.000	0.	0.000	0.000	-0.
	ETNA	C	91.9	97.6	0.012	0.000	0.	0.000	0.000	-0.
	HAPYCAMP	C	92.2	97.8	0.222	0.003	0.	0.001	0.003	-0.
	ENTRPRIS	C	92.8	98.3			HAZARD LT 1.0E-09			
	YUBA CO1	C	92.3	97.9			HAZARD LT 1.0E-09			
	REDDING	C	92.9	98.5			HAZARD LT 1.0E-09			
	BONNYVEW	C	93.0	98.5			HAZARD LT 1.0E-09			
	PARADISE	C	93.0	98.6			HAZARD LT 1.0E-09			
	BUTTE CO	C	91.8	97.5			HAZARD LT 1.0E-09			
	ANDERSON	C	93.1	98.6			HAZARD LT 1.0E-09			
	TEHAMACO1	C	91.9	97.6			HAZARD LT 1.0E-09			
	COLUSACO	C	92.2	97.9			HAZARD LT 1.0E-09			
	OROVILLE	C	93.4	98.9			HAZARD LT 1.0E-09			
	SOROVLLE	C	93.4	98.9			HAZARD LT 1.0E-09			
	THRMOLTO	C	93.5	98.9			HAZARD LT 1.0E-09			
	REDBLUFF	C	93.5	98.9			HAZARD LT 1.0E-09			
	CHICO	C	93.6	99.0			HAZARD LT 1.0E-09			
	CHCONRTH	C	93.6	99.0			HAZARD LT 1.0E-09			
	CHCOVCND	C	93.6	99.1			HAZARD LT 1.0E-09			
	LEWISTON	C	93.6	99.1	0.001	0.000	0.	0.000	0.000	-0.
	GASQUET	C	93.9	99.2	0.218	0.001	0.	0.000	0.001	-0.
	SMITHRVR	C	93.9	99.3	0.365	0.003	0.	0.000	0.003	-0.
	GRIDLEY	C	93.9	99.4			HAZARD LT 1.0E-09			
	YUBA CO2	C	93.4	98.9			HAZARD LT 1.0E-09			
	CORNING	C	94.0	99.4			HAZARD LT 1.0E-09			
	WEVRVILL	C	94.1	99.5	0.001	0.000	0.	0.000	0.000	-0.
*	TRINTYCO1	C	92.8	98.4	11.300	0.000	0.	0.000	0.000	-0.
	ORLEANS	C	94.1	99.5	0.222	0.003	0.	0.001	0.002	-0.
*	DLNCRTCO	C	93.1	98.6	767.022	0.069	0.	0.010	0.059	-0.
	LIVE OAK	C	94.2	99.6			HAZARD LT 1.0E-09			
	CRSNTNRTH	C	94.3	99.6	0.545	0.006	0.	0.001	0.005	-0.

STC/SAI SAFETE RUN FOR G-05, GFM 90 FCT APRIL WINDS 5/30/74
APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
NRTHCRST	C	94.3	99.6	0.297	0.002	0.	0.000	0.001	-0.
MARYSVLL	C	94.3	99.6			HAZARD LT 1.0E-09			
CRSNTCTY	C	94.3	99.7	0.510	0.005	0.	0.001	0.004	-0.
OLIVHRST	C	94.3	99.7			HAZARD LT 1.0E-09			
TEHMACO2	C	93.1	98.7	0.014	0.000	0.	0.000	0.000	-0.
LINDA	C	94.4	99.7			HAZARD LT 1.0E-09			
ORLAND	C	94.4	99.7			HAZARD LT 1.0E-09			
YUBACITY	C	94.4	99.7			HAZARD LT 1.0E-09			
KLAMATH	C	94.4	99.7	0.511	0.008	0.	0.003	0.005	-0.
YRACTYSD	C	94.4	99.8			HAZARD LT 1.0E-09			
* TRINTYCO	C	93.0	98.5	84.309	0.001	0.	0.000	0.001	-0.
SUTTERCO	C	94.0	99.4			HAZARD LT 1.0E-09			
HAYFORK	C	94.9	100.2	0.001	0.000	0.	0.000	0.000	-0.
WILLOWS	C	94.9	100.2			HAZARD LT 1.0E-09			
HOOPA	C	95.0	100.2	0.098	0.001	0.	0.000	0.001	-0.
WILLWCRK	C	95.1	100.4	0.048	0.001	0.	0.000	0.001	-0.
SALYER	C	95.1	100.4	0.018	0.000	0.	0.000	0.000	-0.
COLUSA	C	95.2	100.4			HAZARD LT 1.0E-09			
GLENN CO	C	94.1	99.5			HAZARD LT 1.0E-09			
ORICK	C	95.3	100.6	0.342	0.005	0.	0.002	0.003	-0.
WASHNGTN	C	95.3	100.6			HAZARD LT 1.0E-09			
WSCRMNTO	C	95.3	100.6			HAZARD LT 1.0E-09			
BRYTE	C	95.3	100.6			HAZARD LT 1.0E-09			
SACRMNTO	C	95.1	100.4			HAZARD LT 1.0E-09			
* TRNTYCO2	C	94.4	99.8	2.295	0.000	0.	0.000	0.000	-0.
STCKTON	C	95.5	100.7			HAZARD LT 1.0E-09			
WOODLAND	C	95.7	101.0			HAZARD LT 1.0E-09			
FIELDBRK	C	95.9	101.1	0.192	0.002	0.	0.000	0.001	-0.
WSTHAVEN	C	95.9	101.1	0.348	0.005	0.	0.002	0.004	-0.
TRINIDAD	C	95.9	101.2	0.304	0.002	0.	0.001	0.001	-0.
DAVIS	C	95.9	101.1			HAZARD LT 1.0E-09			
BLUELAKE	C	95.9	101.2	0.125	0.002	0.	0.000	0.002	-0.
YOLO CO	C	95.1	100.3			HAZARD LT 1.0E-09			
MKNLYVLL	C	96.0	101.2	0.482	0.009	0.	0.002	0.007	-0.
ALLIANCE	C	96.1	101.4	0.146	0.001	0.	0.000	0.001	-0.
ARCATA	C	96.2	101.4	0.692	0.024	0.	0.003	0.020	-0.
SUNNYBRA	C	96.2	101.5	0.152	0.002	0.	0.000	0.002	-0.
MYRTLTWN	C	96.4	101.7	0.306	0.008	0.	0.001	0.007	-0.
ROSEWOOD	C	96.5	101.7	0.111	0.002	0.	0.000	0.002	-0.
PINEHILL	C	96.5	101.7	0.121	0.002	0.	0.000	0.002	-0.
* EUREKA	C	96.4	101.7	1.077	0.057	0.	0.007	0.050	-0.
BAYVIEW	C	96.5	101.8	0.170	0.003	0.	0.000	0.002	-0.
CUTTEN	C	96.5	101.8	0.227	0.005	0.	0.001	0.004	-0.
SAMOA	C	96.5	101.8	0.133	0.002	0.	0.000	0.002	-0.
ALDRPOIN	C	96.6	101.9	0.001	0.000	0.	0.000	0.000	-0.
CARLOTTA	C	96.7	102.0	0.012	0.000	0.	0.000	0.000	-0.
* HMBLTCO	C	95.1	100.4	217.745	0.019	0.	0.003	0.016	-0.
FIELDLDG	C	96.8	102.0	0.077	0.001	0.	0.000	0.000	-0.
HYDESVLL	C	96.8	102.1	0.022	0.000	0.	0.000	0.000	-0.
FERNDALE	C	96.9	102.1	0.040	0.000	0.	0.000	0.000	-0.

STC/SAI SAFETE RUN FOR G-05. GFM 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME		TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
LOLETA	C	96.9	102.2	0.054	0.001	0.	0.000	0.001	-0.
FORTUNA	C	96.9	102.2	0.096	0.002	0.	0.000	0.002	-0.
LAKE CO	C	96.0	101.2			HAZARD LT 1.0E-09			
WEOTT	C	97.0	102.2	0.003	0.000	0.	0.000	0.000	-0.
CHPTNHTS	C	97.0	102.2	0.047	0.001	0.	0.000	0.001	-0.
SCOTIA	C	97.0	102.3	0.013	0.000	0.	0.000	0.000	-0.
RIO DELL	C	97.0	102.3	0.032	0.000	0.	0.000	0.000	-0.
CLRLKHLN	C	97.0	102.3			HAZARD LT 1.0E-09			
MNDCNOCO1	C	96.3	101.6	0.019	0.000	0.	0.000	0.000	-0.
MIRANDA	C	97.1	102.4	0.001	0.000	0.	0.000	0.000	-0.
GARBRVLL	C	97.1	102.4	0.001	0.000	0.	0.000	0.000	-0.
REDWAY	C	97.1	102.4	0.001	0.000	0.	0.000	0.000	-0.
HEALDBRG	C	97.2	102.5			HAZARD LT 1.0E-09			
ANGWIN	C	97.3	102.6			HAZARD LT 1.0E-09			
NAPA CO	C	96.6	101.8			HAZARD LT 1.0E-09			
LAKEPORT	C	97.5	102.8			HAZARD LT 1.0E-09			
STHELENA	C	97.5	102.8			HAZARD LT 1.0E-09			
WILLITS	C	97.6	102.9			HAZARD LT 1.0E-09			
NAPA	C	97.5	102.9			HAZARD LT 1.0E-09			
UKIAH	C	97.8	103.1			HAZARD LT 1.0E-09			
BCYSHTSP	C	97.9	103.2			HAZARD LT 1.0E-09			
SONOMA	C	97.9	103.3			HAZARD LT 1.0E-09			
CLOVRDLE	C	98.0	103.4			HAZARD LT 1.0E-09			
MNDCNOCO2	C	97.4	102.7			HAZARD LT 1.0E-09			
SNTAROSA	C	98.1	103.4			HAZARD LT 1.0E-09			
SONOMACO	C	97.1	102.4			HAZARD LT 1.0E-09			
RCHNRTPK	C	98.2	103.6			HAZARD LT 1.0E-09			
RCSELAND	C	98.2	103.6			HAZARD LT 1.0E-09			
BERKELEY	C	98.1	103.5			HAZARD LT 1.0E-09			
PETALUMA	C	98.3	103.7			HAZARD LT 1.0E-09			
SBSTOPOL	C	98.4	103.8			HAZARD LT 1.0E-09			
MARIN CO	C	97.9	103.2			HAZARD LT 1.0E-09			
FRTBRAGG	C	98.5	103.9			HAZARD LT 1.0E-09			
NOVATO	C	98.5	103.9			HAZARD LT 1.0E-09			
OAKLAND	C	98.2	103.6			HAZARD LT 1.0E-09			
FREMONT	C	98.3	103.7			HAZARD LT 1.0E-09			
IGNACIO	C	98.5	103.9			HAZARD LT 1.0E-09			
STAVNTIA	C	98.6	103.9			HAZARD LT 1.0E-09			
TRRALNDA	C	98.6	104.0			HAZARD LT 1.0E-09			
MARINWOD	C	98.6	104.0			HAZARD LT 1.0E-09			
SAN JOSE	C	98.4	103.8			HAZARD LT 1.0E-09			
BLVEDERE	C	98.7	104.1			HAZARD LT 1.0E-09			
TIBURON	C	98.7	104.1			HAZARD LT 1.0E-09			
GRENBRAE	C	98.7	104.1			HAZARD LT 1.0E-09			
SNRAFAEL	C	98.6	104.0			HAZARD LT 1.0E-09			
LARKSPUR	C	98.7	104.2			HAZARD LT 1.0E-09			
CORTMDRA	C	98.8	104.2			HAZARD LT 1.0E-09			
KNTFIELD	C	98.8	104.2			HAZARD LT 1.0E-09			
FAIRFAX	C	98.8	104.2			HAZARD LT 1.0E-09			
ROSS	C	98.9	104.2			HAZARD LT 1.0E-09			

STC/SAI SAFETY RUN FOR C-05, GEN 90 PCT APRIL WINDS 5/30/74

APRIL 90 PERCENT WINDS RUN NO. 2

HAZARD SUMMARY TABLE 2

LOCATION NAME	TMIN (SECS)	TMAX (SECS)	PI(X10-6)	EC(X10-6) TOTAL	EC(X10-6) CLASS 1	EC(X10-6) CLASS 2	EC(X10-6) CLASS 3	EC(X10-6) CLASS 4
SNANSLMO C	98.8	104.2			HAZARD LT 1.0E-09			
STRBRYPT C	98.8	104.2			HAZARD LT 1.0E-09			
MILVALLY C	98.8	104.3			HAZARD LT 1.0E-09			
TMLPSVLY C	98.9	104.3			HAZARD LT 1.0E-09			
SNFRNCSCOC	98.8	104.2			HAZARD LT 1.0E-09			
SAUSLITO C	99.1	104.5			HAZARD LT 1.0E-09			

GLOSSARY

ABORT - To bring to unsuccessful conclusion - destruction of missile in the event of non-normal flight pattern.

AIR FORCE BASE (AFB)

ALUMINUM OXIDE (Al_2O_3) - A particulate dust emitted from the exhaust of the MINUTEMAN rocket motor.

CARBON DIOXIDE (CO_2) - A gas formed from the oxidation of carbon monoxide which is present in the exhaust of MINUTEMAN rocket motors.

CARBON MONOXIDE (CO) - A toxic gas present in the exhaust of MINUTEMAN rocket motors.

CASUALTY EXPECTATION (E_c) - The probability of injury to the population within a given location.

CHERNOZEMS - Soils typical of temperate subhumid grasslands consisting of rich black surface layer overlying a layer of accumulated lime.

CHLORINE (Cl) - A combustion product of the MINUTEMAN rocket motor.

COLLOCATED - Placed together at same location.

COMMAND CONTROL AREA (CCA)

CONTERMINOUS - Contained within the same boundary.

CONUS - CONtinental United States

CYCLES PER SECOND (H_z) - Measure of frequency.

DECIBEL (dB) - Unit for expressing ratio of electrical or acoustical signals which is used for measuring sound pressure levels.

DETERRENT - Serving to prevent an act by arousing fear or uncertainty. The MINUTEMAN missile serves as one portion of the U. S. strategic force aimed toward prevention of an attack on the U. S.

EARLY LAUNCH TERMINATOR (ELT) VAN - Van mounted equipment which monitors missile flight until main site radar is able to track missile.

ECOSYSTEM - Basic unit in ecology including both organisms or nonliving environment.

EMPIRICAL - Related to or based upon observation. experiment or test.

EVAPOTRANSPI RATION - Conversion to vapor by evaporation and exhalation through plant life.

FEDERAL AVIATION AGENCY (FAA)

FIRST STAGE BOOSTER - First and largest propulsion element of the MINUTEMAN missile.

FLIGHT CORRIDOR - That portion of air space through which missile is programmed to fly.

GIANT PATRIOT - Name given to program which has at its objective the launch of MINUTEMAN missiles from operational launch facilities.

HARDENED - Increased capability to survive effects of weapon detonations.

HYDROGEN (H_2) - A gaseous combustion product of MINUTEMAN rocket motors.

HYDROGEN CHLORIDE (HCl) - A toxic gaseous material present in the exhaust of MINUTEMAN rocket motors.

HYDROLOGY - Branch of physical geography that deals with the waters of the earth, their distribution characteristics and effects in relation to human activities.

INFRASONIC - Related to a frequency below the audibility of the human ear.

INSTANTANEOUS IMPACT PREDICTION (IIP) - A system which takes radar data from the missile flight path and via a computer computes every tenth second, the impact point of the missile.

INTER-STAGE PANELS - Structural elements of a missile skin which provides continuity between the individual propulsion elements.

KILOMETER (km) - Unit of measure = 0.62 statute miles.

LAUNCH CONTROL CENTER (LCC) - A facility of a MINUTEMAN squadron which has the capability to receive launch commands from higher authority and issue launch commands to individual missiles in the squadron.

LAUNCH FACILITY (LF) - An underground silo which contains the MINUTEMAN missile and its associated launch equipment.

MARSHALL SPACE FLIGHT CENTER (MSFC)

METER (m) - A unit of measure = 39.37 inches.

MICRON - A unit of measure equals to one thousandth of a millimeter or about 4×10^{-5} inches.

MINUTEMAN - The name given to the missile which is the main arm of the land-based strategic missile force.

GLOSSARY (CONT'D)

MISSILE FLIGHT SAFETY OFFICER (MFSO) - Monitors flight officer after initial launch phase when missile is being tracked by main radars.

MOBILE RANGE SAFETY SYSTEM (MRSS) - All the ground equipment necessary to track missile flight and provide capability to initiate missile destruct commands should deviations from normal occur.

MODULAR AIRBORNE FIRE FIGHTING SYSTEM (MAFFS) - C-130 firefighting air tanker which will be part of the fire watch and prevention team for the OBL launches.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

NAUTICAL MILE (Nmi) - A unit of measure = 6076 feet

NITROGEN (N_2) - A gaseous combustion product of MINUTEMAN rocket motors.

OPERATIONAL BASE LAUNCH (OBL) - A MINUTEMAN launch from an operational silo (LF)

OPERATIONAL BASE LAUNCH SAFETY SYSTEM (OBLSS) - Equipment placed in the missile to insure positive missile destruct in the event of a powered flight failure.

OPERATIONAL TESTING (OT) - Tests conducted on the MINUTEMAN system from Vandenberg AFB to various impact areas in the Pacific.

OVERFLY - The act of flying over a segment of land mass.

PARTS PER MILLION (ppm) - A measure of the impurities contained in a quantity of liquid, gas, or solid.

PHYSIOGRAPH - Physical Geography

PROBABILITY OF IMPACT (P_I) - The probability that one or more missile debris fragments will impact within the land area of a given location.

PSF - Pounds per square foot - A measure of pressure.

PUBLIC EMERGENCY LIMITS (PEL) - The standard of quantities of pollutants which can be imposed on the public during emergency situations.

R & D - Research and development.

RANGE SAFETY OFFICER (RSO) - Air Force officers who monitor the performance of the missile and can initiate destruct action should missile deviate from normal.

RANGE SAFETY VAN (RSV) - Van housing the tracking data display for the missile flight safety officer.

RELICT - Plant or animal species persisting in a given area as a survival from an earlier period.

RELIEF - Elevations and unevenness of land surface.

RIPARIAN - Growing naturally in the sides of river sides or banks of watercourses or ponds.

RV - Reentry Vehicle

SEDIMENTARY - Materials formed from sediment deposited after transportation from its original position.

SHORT TERM PUBLIC LIMITS (STPL) - The standard of non-emergency quantities of pollutants which can be imposed on the public.

SIMULATED ELECTRONIC LAUNCH - MINUTEMAN (SELM) - Test equipment which enables a checkout of critical ground equipment to be performed without a live launch.

SITE SURVEY - Technical & geographical survey to determine location of launch facilities.

SPACE AND MISSILE TEST CENTER (SAMTEC) - The organization which aids in test and evaluation of missiles fired from the western test range.

STATUTE MILE - A unit of measure = 5280 feet.

STRATEGIC AIR COMMAND (SAC) - A major command of the USAF which maintains and operates the AF portion of the strategic air arm one part of which is the MINUTEMAN.

STRATEGIC ARMS LIMITATION TREATY (SALT)

STRATEGIC MISSILE SQUADRON (SMS) - A basic unit level of the MINUTEMAN force.

TEMPERATURE INVERSION - A reversal of the normal atmospheric temperature change with altitude.

THREE SIGMA (3σ) ELLIPSE - The area within which the Stage I casing is expected to fall for 99.7% of launches.

TRAJEC TORY - Path described by missile moving in space.

TROPOSOHERE - Region of atmosphere above earth's surface characterized by turbulance and by decreasing temperature with increasing altitude.

UNITED STATES AIR FORCE (USAF)

VANDENBERG AIR FORCE BASE (VAFB)

VERTICAL WIRE SKY SCREEN (VWSS) VAN - Van mounted equipment which monitors missile flight from an angle different to that of the ELT Van.

1200 Z - Noon at Greenwich Mean Time

$X10^{-6}$ - Mathematical term meaning "in one million" (= 1/1, 000, 000)

$X10^{-9}$ - Mathematical term meaning "in one billion" (= 1/1, 000, 000, 000)

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