*BY ORDER OF THE COMMANDER*
*30TH SPACE WING*

*30TH SPACE WING INSTRUCTION 91-106*

*30 DECEMBER 1998*

***Safety***

***TOXIC HAZARD ASSESSMENTS***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This publication establishes the criteria, procedures, and responsibilities for development, usage, and control of Toxic Hazard Zones (THZ). This publication applies to all operations that involve toxic propellants or toxic combustion byproducts, and to facilities that store, handle or transfer unconventional propellants. THZ procedures and controls used to support the release of other hazardous materials will be consistent with the policies described in 30th Space Wing (30 SW) Plan 32-4002, ***Hazardous Materials Emergency Response Plan***, Appendix 2, Section B, ***Toxic Hazard Corridor Plan***. The procedures described herein**,** when implemented, will provide the appropriate safety clear areas for storing, handling and transferring of unconventional propellants, and will provide for protecting workers and the general public during vehicle processing and launch operations. See **Attachment 1** for a Glossary of References and Supporting Information.

***SUMMARY OF REVISIONS***

Throughout the publication, changes to office symbols were made. **Table 1.**, Exposure Criteria on which Toxic Hazard Zones are based, has been updated. Paragraph **4.1.**, Cold Spill Responsibilities, has been expanded and roles clarified. Paragraph **4.4.**, Actions Required for Cold Spill PHZs, has been expanded upon and procedures clarified where needed. Paragraph **5.1.**, Hot Spill Responsibilities, has been expanded and roles clarified. Paragraph **5.1.**, Actions to Take After a Catastrophic Abort, roles were clarified where needed. A | indicates changes since last revision.

**1. Responsibilities.** Responsibilities detailed in this instruction vary depending upon the type of operation and the resulting toxic hazard zone. Those responsibilities are described in detail in the appropriate sections. Responsibilities for implementing this instruction are:

1.1. 30 SW Safety Office (30 SW/SE). Ensures procedures described herein meet safety standards for all applicable operations.

1.2. Base Bioenvironmental Engineer (BEE)(30 AMDS/SGPB). Provides guidance on the exposure criteria and protective measures described herein.

1.3. Users (e.g., 2nd Space Launch Squadron (2 SLS), commercial launch contractors, etc.). Incorporates the user requirements described herein into governing operating procedures and provides funding for unique requirements.

1.4. Other Agencies (e.g., Command Post, 30th Security Forces Squadron (30 SFS), 30th Weather Squadron (30 WS), 30th Range Squadron (30 RANS)). Ensures resources are available and procedures are in place to meet their requirements described herein.

**2. Sheltering Requirements.** The following defines acceptable mission essential personnel sheltering for each zone for Cold Spill and Hot Spill Potential Hazard Zones (PHZ). These definitions apply across all propellant types.

2.1. Zone 1. Sheltering is recommended only for individuals especially sensitive to low levels of industrial odors.

2.1.1. Immediately enter any vehicle or structure if breathing discomfort is noticed.

2.1.2. Close all windows.

2.1.3. Close all air intake vents.

2.1.4. Await “all clear” from On-Scene Commander or his/her representative before leaving the site unless an emergency situation requires immediate evacuation.

2.2. Zone 2. If an individual notices breathing discomfort or skin irritation, they are required to take shelter or evacuate. Protective actions would include taking shelter indoors or moving out of the zone.

2.2.1. Shelter must be fully enclosed with no open areas. Motor vehicles with engines off and windows and vents closed do qualify as adequate sheltering.

2.2.2. Close all windows.

2.2.3. Turn off all air recirculating devices.

2.2.4. Close all air intake vents.

2.2.5. If exiting a Zone 2 in a vehicle, emergency egress Personnel Protective Equipment (PPE) should be worn only if safe to do so while driving since PPE can obscure vision and limit motor skills. Also, their limited air supply may necessitate the removal of the hood while in motion. For these reasons, while driving, PPE should only be worn to escape an immediate threat to life (Zone 3) that requires a traverse through noticeable toxic clouds.

2.2.6. If in a vehicle and not in an emergency situation, the vehicle is to be kept stationary to prevent inadvertent transit of a Zone 3.

2.2.7. Await "all clear" from On-Scene Commander or designated representative before leaving the site unless an emergency situation requires immediate evacuation.

2.3. Zone 3. Sheltering, wearing approved PPE, or having PPE readily available is mandatory for persons in Zone 3 PHZ. Sheltering or wear of approved PPE is mandatory for persons in an Operational Hazard Zone (OHZ).

2.3.1. Shelter must be designated as a Vapor Protected Shelter (VPS). Motor vehicles do not qualify as adequate sheltering.

2.3.2. Personnel must wear PPE or have PPE readily available as specified in the governing operation procedure.

2.3.3. Await “all clear” from the On-Scene Commander or designated represenatitive before leaving the site unless in an emergency situation.

## 3. Toxic Hazard Zone (THZ) Development Criteria.

3.1. Exposure Limits. **Table 1.** lists the exposure limit criteria to be used in computing all forms of THZs. These values have been recommended by the Air Force Space Command Surgeon General and/or the National Academy of Sciences National Research Council’s Committee on Toxicology. Any variances to these limits must have the prior approval of 30 AMDS/SGPB and 30 SW/SE before their use in an operational THZ. Where two exposure criteria are listed for one of the tiers, the one producing the longer THZ will be used.

3.2. Potential Hazard Zone (PHZ) Valid Times. The valid time for cold spill PHZs must not exceed two hours.

3.3. Updates. Cold spill Emission Hazard Zone (EHZ), OHZ, and PHZs must be updated as source strengths or meteorological conditions change, at intervals not to exceed 45 minutes for EHZs and 90 minutes for PHZs. OHZs must be updated at intervals not to exceed 15 minutes, or until emergency conditions are terminated by the Disaster Control Group (DCG) or Launch Disaster Control Group (LDCG) for OHZs.

3.4. Toxic Hazard Zone (THZ) Computation Timelines. As a baseline, operation decisions based upon THZs are to be made with cold spill PHZs computed and given to the requester at T-30 minutes; and hot spill PHZ and OHZs at T-4 hours, T-3 hours, T-105 minutes, and T-45 minutes for launch operations. Computations based on T-0 weather data will be made and used as an OHZ if an accidental release occurs. These timelines are specified in the Range Safety Operation Requirements (RSOR) and can change based upon operation requirements.

**Table 1. Exposure Criteria on which Toxic Hazard Zones are Based**

| | | PHZ/OHZ | | EHZ |
|---|---|---|---|---|
| | Tier 1<br>(Zone 1 boundary) | Tier 2<br>(Zone 2 boundary) | Tier 3<br>(Zone 3 boundary) | TLV/PEL |
| HCl(1) | 2 ppm (60 min)<br>or 10 ppm | 10 ppm | 50 ppm | 5 ppm (TLV-STEL 15 min) |
| $N_2H_4$(2) | N/A | 2 ppm (4) | 50 ppm (30 min) | 0.01 ppm (TLV-8 hr) |
| UDMH(2) | N/A | 5 ppm (4) | 15 ppm (30 min) | 0.01 ppm (TLV-8 hr) |
| A-50(2) | N/A | 2 ppm (4) | 15 ppm (30 min) | 0.01 ppm (TLV-8 hr) |
| MMH(2) | N/A | 2 ppm (4) | 20 ppm (30 min) | 0.01 ppm (TLV-8 hr) |
| $HNO_3$ | TBD | TBD | TBD | 2 ppm (TLV-8 hr)<br>4 ppm (STEL15 min) |
| $NO_2$(1)(3) | 0.2 ppm (60 min) or 2 ppm | 2 ppm (60 min )<br>or 4 ppm | 20 ppm (30 min) | 1 ppm (PEL-15 min) |

*All values to be treated as ceiling limits (1 minute or less) unless an averaging time is specified*

*[1]-Governing criteria by Rocket Exhaust Working Group and HQ AFSPC/SG*

*[2]-Governing criteria is NIOSH 1/2 IDLH (Tier 3), SPEGL or EPA LOC (Tier 2)*

*[3]-$NO_2$ is the measurable result and breakdown product in nitrogen tetroxide ($N_2O_4$)*

*[4]-Averaging time of 30 minutes for cold spill computation, 60 minutes for hot spill computation*

**4. Cold Spill THZ (e.g., Propellant Transfer or Handling Operations).**

4.1. Responsibilities.

4.1.1. 30th Weather Squadron (30 WS). The duty forecaster will compute the cold spill THZ for all zones and provide them to the requester, Command Post (30 SW/CP) and all other users by telephone and or the Automated Weather Distribution System (AWDS). THZs will be provided in terms of azimuth and crossrange/downrange dimensions (in feet).

4.1.2. The user is responsible for the following:

4.1.2.1. Requesting cold spill THZs from the 30 WS no later than 30 minutes prior to starting the operation, then plotting THZs on Base Disaster Grid maps or equivalent. The Readiness Flight (30 CES/CEX, Bldg. 11165, ext. 6-4024) is the office of primary responsibility (OPR) for base maps.

4.1.2.2. No later than 24 hours prior to starting the operation the user shall:

4.1.2.2.1. Schedule Missile Operations Support Section (MOS) (30 SFS or contractor MOS (CMOS)), with 30 RANS (via operations directive (OD)) or appropriate scheduling

agency if necessary. Verify scheduled resources and support agencies through Scheduling (30 RANS/DOUS) as needed.

4.1.2.2.2. Review all evacuation instruction and notification procedures.

4.1.2.2.3. Prioritize list of facilities to be evacuated should a mishap occur. Prioritization will be based upon the number of personnel at the facility and the distance between the facility and the operation location. Points of contact for affected facilities can be obtained from Facility Maintenance (30CES/CEOF) as follows: For North Base, ext. 6-1614; for South Base, ext. 5-3073; for the main base cantonment area, ext. 6-3152.

4.1.2.2.4. Notify personnel in potentially affected facilities and areas (i.e., personnel inside PHZs 2 and 3).

4.1.2.3. Ensuring personnel performing MOS duties are fully trained by 30 SW/SFS (or CMOS).

4.1.3. The Command Post (30 SW/CP) is responsible for the following:

4.1.3.1. Monitoring any activity that has any zone over the base cantonment area, outside the base land boundary or over offshore oil platforms.

4.1.3.2. Notifying applicable on-base and non-base agencies of the OHZ/EHZ if a release occurs. Specifically, when 30 SW/CC or his/her official representative directs activating the Vandenberg's Integrated Communication Telephone Evacuation Routes (VICTER) system and the Giant Voice/Public Address system (if available).

4.1.3.3. Notifying 30 OSS/OSA (6-5570) to alert aircraft flying in the local area to remain clear of the OHZ/EHZ.

4.1.3.4. Contacting the trainmaster in Guadalupe ((805)-343-1841 or 1-800-873-3749, ext. 5860) to be apprised of current train schedules if a Zone 2 or 3 encompasses Southern Pacific railroad tracks.

4.1.4. 30 AMDS/SGPB is responsible for the following:

4.1.4.1. Acting as the Wing point of contact on toxic chemical exposure criteria.

4.1.4.2. Coordinating on sheltering requirements and approving designated vapor protected shelters (VPS) requirements.

4.1.4.3. Providing guidance on neutralizing propellants.

4.1.4.4. Approving and/or recommending the use of health related PPE.

4.1.5. The 30 SW Safety Office (30 SW/SE) is responsible for the following:

4.1.5.1. Approving all modifications to and replacements of cold spill and hot spill prediction models for adequacy of personnel protection prior to their operational use.

4.1.5.2. Developing sheltering requirements and approving designated VPSs.

4.1.5.3. Approving the use of safety related PPE.

4.1.5.4. Evaluating and approving user requests for set evacuation distances for EHZs.

4.1.5.5. Updating this instruction as needed.

4.1.6. The 30th Range Tasking (30 RANS/DOUS) is responsible for scheduling resources and support agencies via applicable ODs needed to support those operations for which a planned or potential propellant release may occur.

4.1.7. The Security Forces Squadron (30 SFS) or MOS/CMOS Supervisor is responsible for maintaining control of Zones 2 and 3 by posting MOS/CMOS personnel at directed checkpoints during propellant operations.

4.2. Operations Requiring Cold Spill PHZs. The following operations require cold spill PHZs to be determined (other operations may require PHZs if deemed necessary after analyzing planned operation):

4.2.1. Transferring propellants, where more than 5 gallons may be released, from one storage, missile or spacecraft vessel to another, at tank farms, launch complexes, or servicing or maintenance facilities.

4.2.2. Initial pressurization of propellant systems that contain more than 5 gallons.

4.2.3. Transporting or mechanical handling (e.g., lifting) propellants in quantities exceeding 5 gallons.

4.2.4. Propellant system maintenance (unless engineering analysis confirms PHZ will not exceed local control area or system is leak free).

***NOTE:***

For paragraphs **4.2.3.** and **4.2.4.**, the following requirements do not apply: sheltering requirements in paragraph **2.**; notification requirements in paragraph **4.1.**; responsibility requirements in paragraph **4.4.**

4.3. Cold Spill PHZ Input Data Requirements. 30 WS requires the following data to compute the PHZ:

4.3.1. Time, location and altitude above ground level of potential release location.

4.3.2. Propellant type.

4.3.3. Source strength, in gaseous emissions of pounds per minute, wetted area in square feet, or total pounds or gallons of liquid released if the wetted area is unknown.

4.3.3.1. Source strengths must be determined for all modes of use, storage, transportation and venting of propellants on Vandenberg AFB. They must be based on the worst-case credible cold spill release scenarios or worst-case emission rates for venting.

4.3.3.2. Source strength determinations, assumptions, calculations, and test data must be documented in the Missile System Prelaunch Safety Package (MSPSP), Launch Complex or Facility Safety Plan, or Ground Operations Plan. Each facility will provide worst-case credible release strength information to the 30 WS for planning purposes. This information is subject to 30 SW/SE review and approval.

4.3.3.3. For minor releases, source strengths may be used to determine set evacuation distances in lieu of calculating EHZs if approved by 30 SW/SE and coordinated with 30 AMDS/SGPB. Supporting rationale and determined evacuation distance must be documented in the MSPSP, Launch Complex or Facility Safety Plan, or Ground Operations Plan. Any limitations

(wind speed, wind direction, etc.) which invalidate the determined evacuation distance must be documented in the procedure governing the release operation.

4.4. Actions Required for Cold Spill PHZs. The requester of the cold spill PHZ has the following responsibilities:

4.4.1. Maintain positive control of personnel within Zone 3 during an operation. These personnel must either wear PPE, have emergency egress PPE readily available and be able to safely evacuate outside the Zone 3 or to a VPS, or be housed in an approved vapor-protected shelter with emergency egress PPE available. They must be briefed on the operation in progress and on evacuation routes. The governing operation procedures will specify how the above conditions will be satisfied.

4.4.2. Ensure personnel within Zone 2 have:

4.4.2.1. An emergency evacuation route. If the evacuation route passes through Zone 3 or approaches the source location, PPE must be readily available.

4.4.2.2. The means to be immediately notified of an unplanned propellant release.

4.4.3. Ensure adequate communication is available to all personnel in Zones 2 and 3. Planners may use telephone notification, public address, MOS/CMOS, etc., to comply.

4.4.4. Inform 30 SW/CP if Zone 2 crosses the airfield flight path, railroad right-of-way, or offshore oil platforms, and if Zone 2 extends beyond base land boundary.

4.4.5. Hold the operation if Zone 2 extends, or is predicted to extend, over the base cantonment area, outside the base land boundary or over offshore oil platforms until risk assessment and acceptance (RA) can be performed. If the operation is in progress and updated PHZ extends over these areas, secure the operation at a safe point or perform a RA (see **4.6.**) and obtain 30 SW/CC's or designated representative's acceptance of risk. Notify the Command Post if the operation is in progress and the updated PHZ extends over these areas.

4.4.6. Pre-position MOS/CMOS in the most advantageous location to control access to Zone 3 and evacuate personnel, if necessary. MOS/CMOS will possess emergency egress PPE and will have the ability to be contacted directly by the task supervisor.

4.4.7. Once the operation begins, allow only essential personnel to enter Zone 3. These personnel must be briefed on the operation in progress and evacuation routes. They must proceed directly to a vapor-protected shelter or have emergency egress PPE readily available.

4.4.8. Hold the operation if Zone 3 extends over the Southern Pacific railroad tracks until risk assessment and acceptance (RA) can be performed.

4.4.9. Controls on personnel transiting Zone 1 are not necessary.

4.4.10. Personnel transiting Zone 2 must be informed that they are in a PHZ. This may be accomplished via roadblocks, signs, or other notification procedure as approved by 30 SW/SE.

4.5. Cold Spill EHZ Requirements. The EHZ will be based on the applicable EHZ criteria in **Table 1.**; Tiered exposure criteria are not applicable. The requester of the EHZ is responsible for doing the following:

4.5.1. Hold the operation if the EHZ extends, or is predicted to extend, over the base cantonment area, outside the base land boundary or over offshore oil platforms. If the EHZ encompasses

Southern Pacific railroad tracks, the user will request 30 SW/CP to contact the trainmaster in Guadalupe to determine current train schedules. If railroad traffic inside the EHZ is expected during the operation, the operation will be held until the train has cleared the area.

4.5.2. Only essential personnel may remain within the EHZ. These personnel will be protected as follows:

4.5.2.1. Housed in sealed, vapor-protected shelters with emergency egress PPE available, or

4.5.2.2. Required to wear 30 SW/SE and 30 AMDS/SGPB approved PPE.

4.5.3. Notify 30 SW/CP and 30 WS at least 30 minutes prior to beginning the operation and at the conclusion of the operation.

4.5.4. Inform 30 SW/CP if the EHZ crosses the airfield flight path.

4.5.5. Do not allow personnel to enter or exit the EHZ once the operation begins unless they are in 30 SW/SE and 30 AMDS/SGPB approved SCAPE or other PPE.

4.6. Facility Cold Spill Engineering Controls and Risk Acceptance for PHZs.

4.6.1. If the worst-case credible source strength Zone 2 for a facility extends beyond the base land boundary, over the base cantonment, or over offshore oil platforms, then one of the following must be done:

4.6.1.1. Implement engineering controls (foam suppression system, covered release containment system, etc.) to eliminate or reduce the size of Zone 2.

4.6.1.2. Limit operation to weather conditions which will keep Zone 2 within the base land boundary away from the base cantonment, and away from offshore oil platforms.

4.6.1.3. If mission need dictates and paragraphs **4.6.1.1.** and **4.6.1.2.** cannot be followed, perform a RA. If Zone 2 goes over the base cantonment or off-base and over a populated area (see **Figure 1.** for general locations), 30 SW/CC or his/her designated representative will make a risk assessment and decide whether or not to proceed with the operation. If Zone 2 goes off base but does not overlay a populated area, this RA may be delegated by 30 SW/CC. **NOTE:** The requester must have a database of nearby off-base population areas (houses, ranches, commercial facilities, etc.). 30 SW/SE can provide geographic coordinates of populated areas upon request. **NOTE:** If the user requests delegation of authority to act upon the risk assessment, he or she should request it in writing from 30 SW/CC prior to starting the operation.

4.6.2. Procedures to request RA must be defined in the Launch Complex or Facility Safety Plan, or Ground Operations Plan.

4.6.3. The user must brief all commanders required to make risk acceptance decisions, or their designated representatives, on the following minimum information:

4.6.3.1. Propellant operation requiring THZ.

4.6.3.2. Engineering and operating controls.

4.6.3.3. THZ forecasts.

4.6.3.4. Populated areas at risk. If the Southern Pacific railroad tracks are at risk, the latest train schedule must be briefed.

4.6.3.5. Disaster response procedures.

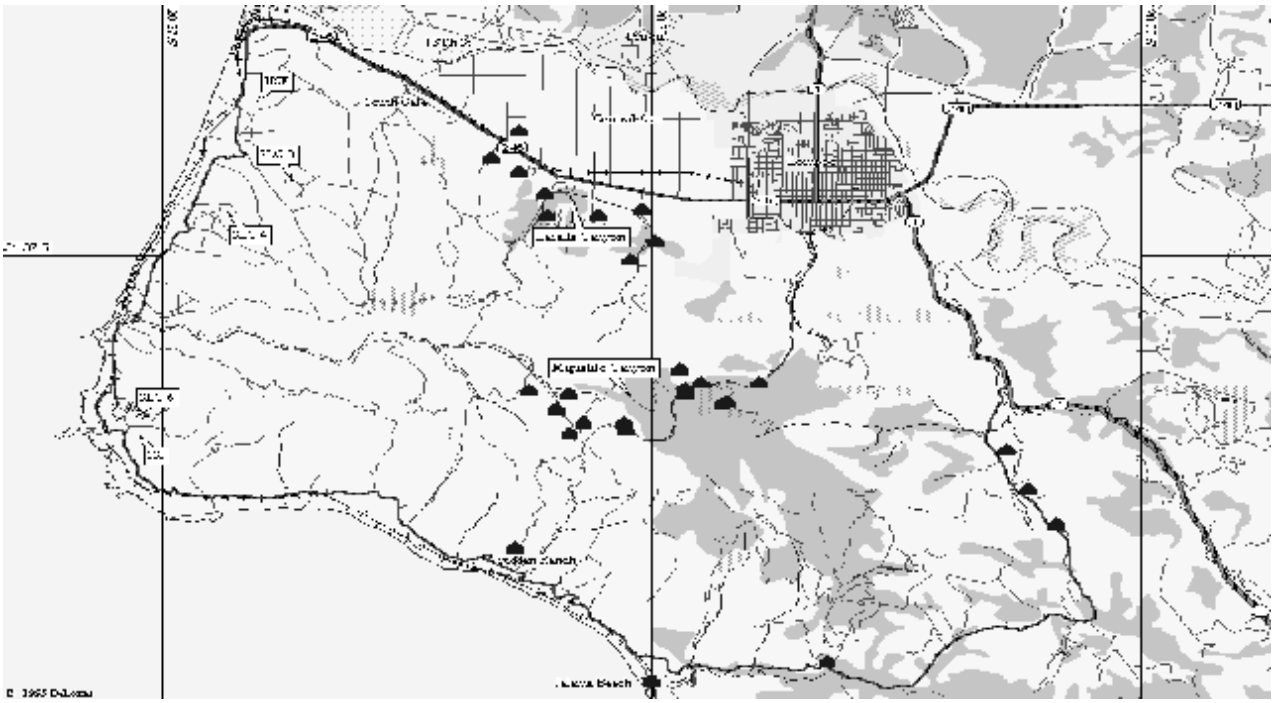
4.6.3.6. Mission impact if the operation is held.

4.6.3.7. Extended meteorological forecast.

4.6.4. New facilities at which unconventional propellants will be stored, processed or used will be designed to meet Eastern and Western Range (EWR) 127-1 requirements. Worst-case credible releases will be evaluated and containment systems will be designed to reduce the source strength values where possible and to prevent Zone 2 from exceeding the base land boundary for specific weather conditions. These values will be updated as project design changes or modifications occur.

4.6.5. Modifications to facilities at which unconventional propellants will be stored, processed or used will be designed to meet EWR 127-1 requirements in addition to the normal approval process. Worst-case credible releases will be evaluated and containment systems will be designed so the original facility design source strength values are reduced where possible, and/or not exceeded by the modification. These values will be updated as project design changes or modifications occur.

**Figure 1. OffbasePopulation Centers**



4.6.6. All facilities where unconventional propellants are processed or stored will develop a THZ Plan (may be contained in the Launch Complex Plan, Facility Safety Plan, or Ground Operations Plan) which will address all applicable portions of this instruction. 30 SW/SE must approve this plan.

4.7. Actions to Take After Accidental Release. If an accidental release were to occur, personnel supervising the operation are responsible for stabilizing the situation as follows:

4.7.1. Initiate evacuation procedures. Acceptable sheltering requirements for each Zone are given in paragraph **2.**.

4.7.1.1. The PHZs will become the OHZs until more timely information is available on the source strength of the actual release or on meteorological conditions. If there is a release when a propellant operation is not taking place, the facility worst-case credible source strength will be used to calculate the OHZ until more specific information is available.

4.7.1.2. Task supervisors will direct security forces evacuation.

4.7.2. Obtain OHZs from 30 WS. 30 WS will disseminate key parameters on the Automated Weather Distribution System (AWDS).

4.7.3. Notify emergency forces (9-1-1) using the "Reporting Upon Release Discovery" procedure outlined in 30 SW Plan 32-4002, ***Hazardous Materials (HAZMAT) Emergency Response Plan***, Chapter 4, Section A, Paragraph 2.

4.7.4. Notify 30 SW/CP of the OHZ Zone 2 and 3 dimensions and specify if either crosses the airfield flight path, offshore oil platforms or railroad tracks.

4.7.5. If the OHZs Zones 2 or 3 extend off base, 30 SW/CP will notify civilian authorities of the release and provide information on the potential public exposure effects and sheltering recommendations.

4.7.6. DCG response will be per 30 SW OPLAN 32-1, ***Disaster Preparation Operation Plan.***

**5. Hot Spill THZ (e.g., Launch Operations).**

5.1. Responsibilities:

5.1.1. 30 WS will be responsible for the following:

5.1.1.1. Scheduling necessary resources required to provide forecast meteorological data to

30 SW/SE.

5.1.1.2. Delivering forecast data at times specified in the Range Safety Operation Requirements (RSOR) vehicle peculiar annex. A forecast delivery timeline may vary depending upon the launch vehicle.

5.1.1.3. Toxics Forecaster products will be made available on Range Safety processors when requested.

5.1.2. 30 SW/SE will be responsible for the following:

5.1.2.1. Determining the need for hot spill THZ.

5.1.2.2. Providing Zone 1, 2, and 3 PHZs and OHZs for both normal flight and catastrophic abort scenarios.

5.1.2.3. Making a GO/NO GO recommendation to Spacelift Commander (SCMDR) based upon the toxic risk assessment.

5.1.2.4. Directing actions to mitigate unacceptable toxic exposure risks. Possible actions

include sheltering or evacuation of personnel.

5.1.2.5. Providing 30 SW/CP the coordinates of the catastrophic abort Zone 1 PHZ if any portion of it lies outside the base boundary.

5.1.2.6. Providing the Launch Disaster Control Group (LDCG) Chief the Catastrophic Abort (PHZ) and Normal Launch (OHZ) Zones 2 and 3 (if applicable) coordinates.

5.1.2.7. Providing the Aerospace Control Officer (ACO) the coordinates of the toxic exclusion areas (PHZ or OHZ) for ship and support aircraft and railroad and oil platform protection requirements, the vertical depths of the areas for aircraft protection, and the length of time during which a Zone 2 exists (operationally referred to as a time-to-clear (TTC)).

5.1.2.8. Developing sheltering requirements and approving designated VPSs.

5.1.2.9. Approving the use of safety related PPE.

5.1.3. 30 SW/CP will monitor the launch progress and notify any applicable non-base agencies of Zone 1 if a catastrophic abort occurs during the first sixty seconds of flight.

5.1.4. The LDCG Chief will do the following:

5.1.4.1. Monitor personnel inside all Zones 2 and 3.

5.1.4.2. Ensure no one is allowed in Zones 2 or 3 unless they are equipped with a proper breathing apparatus or are located inside a VPS.

5.1.5. 30 AMDS/SGPB will be responsible for the following:

5.1.5.1. Recommending tier exposure criteria.

5.1.5.2. Coordinating on sheltering and VPS requirements.

5.1.5.3. Approving the use of health related PPE.

5.1.6. The ACO will be responsible for the following:

5.1.6.1. Clearing Zones 2 and 3, as necessary, over the ocean.

5.1.6.2. Keeping aircraft clear of Zones 2 and 3.

5.1.6.3. Holding trains outside the required railroad protection per 30 SWI91-103, ***Train Hold Criteria***.

5.1.6.4. Notifying and confirming oil platform operators have accomplished personnel protection requirements.

5.2. Actions to Take After a Catastrophic Abort. If there is a catastrophic abort within the first sixty seconds of flight, the following emergency actions will be taken:

5.2.1. 30 SW/CP will relay the location of Zone 1 to the Santa Barbara County Sheriff Dispatcher.

5.2.2. The ACO will, upon request from the Mission Flight Control Officer (MFCO), notify offshore oil platforms within Zone 2 or 3 to take appropriate emergency response actions per 30 SWI91-105, Evacuating or Sheltering of Personnel on Offshore Oil Rigs.

5.2.3. 30 WS will provide the Safety Office immediate weather data, and provide one hour forecast data at 15 minute intervals until notified to discontinue.

5.2.4. The Safety Office is responsible for the following:

5.2.4.1. Requesting the ACO to notify oil platforms.

5.2.4.2. Requesting immediate data from 30 WS.

5.2.4.3. Performing risk assessments on revised weather forecast data and relay the appropriate footprints to the LDCG, ACO and 30 SW/CP.

5.2.4.4. Apprising SCMDR of each risk assessment.

5.2.5. The LDCG will respond per 30 SW OPLAN 32-1.

ALEXANDER CARLISLE, Colonel, USAF
Chief of Safety

**Attachment 1**

**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION**

***References***

Eastern and Western Range 127-1, ***Range Safety Requirements***

30 SW OPLAN 32-1, ***Disaster Preparation Operation Plan***

30 SW Plan 32-4002, ***Hazardous Materials Emergency Response Plan***

***Abbreviations and Acronyms***

**A-50—**Aerozine 50

**ACO—**Aerospace Control Officer

**ACGIH—**American Conference of Governmental Industrial Hygienist

**AFSPC—**Air Force Space Command

**AWDS—**Automated Weather Distribution System

**BEE—**Base Bioenvironmental Engineer

**C—**Ceiling

**DCG—**Disaster Control Group

**DoD—**Department of Defense

**EHZ—**Emission Hazard Zone

**ELSA—**Emergency Life Support Apparatus

**EPA—**Environmental Protection Agency

**EWR—**Eastern and Western Range

**HAZMAT—**Hazardous Materials

**HCl—**Hydrochloric Gas

**IDLH—**Immediately Dangerous to Life or Health

**LOC—**Level of Concern

**LDCG—**Launch Disaster Control Group

**MFCO—**Mission Flight Control Officer

**MMH—**Monomethylhydrazine

**MOS—**Missile Operations Support Section

**MSPSP—**Missile System Prelaunch Safety Package

**N2H4—**Hydrazine

**N2O4—**Nitrogen Tetroxide

**NO2—**Nitrogen Dioxide

**NASA—**National Aeronautical and Space Administration

**NIOSH—**National Institute for Occupational Safety and Health

**OD—**Operations Directive

**OHZ—**Operational Hazard Zone

**OPR—**Office of Primary Responsibility

**OSHA—**Occupational Safety and Health Administration

**PEL—**Permissible Exposure Limits

**PHZ—**Potential Hazard Zone

**PPE—**Personal Protective Equipment

**RA—**Risk Assessment and Acceptance

**RSOR—**Range Safety Operation Requirements

**SCAPE—**Self-Contained Atmospheric Protective Ensemble

**SCMDR—**Spacelift Commander

**STEL—**Short-Term Exposure Limit

**THZ—**Toxic Hazard Zone

**TLV—**Threshold Limit Value

**TWA—**Time Weighted Average

**UDMH—**Unsymmetrical Dimethly1-Hydrazine

**VICTER—**Vandenberg's Integrated Communication Telephone Evacuation Routes

**VPS—**Vapor Protected Shelter

***Terms***

**All Clear—**When the On-Scene Commander, using all necessary resources, including physical monitoring by 30 AMDS/SGPB, ensures that ambient concentrations of the released propellant are below the associated tier value.

**Base Cantonment—**The base cantonment encompasses the areas marked in **Figure A1.1.**.

**Ceiling (C)—**A worker's exposure level which shall not be exceeded for any length of time.

**Cold Spill—**Release of toxic propellants in liquid or vapor form from a propellant transfer or vent operation. Propellant combustion does not occur.

**Disaster Control Group (DCG)—**The responding element under the On-Scene Commander's control which goes to the scene of a major non-launch related accident to provide command and control, and directs accident recovery operations per 30 SW OPLAN 32-1.

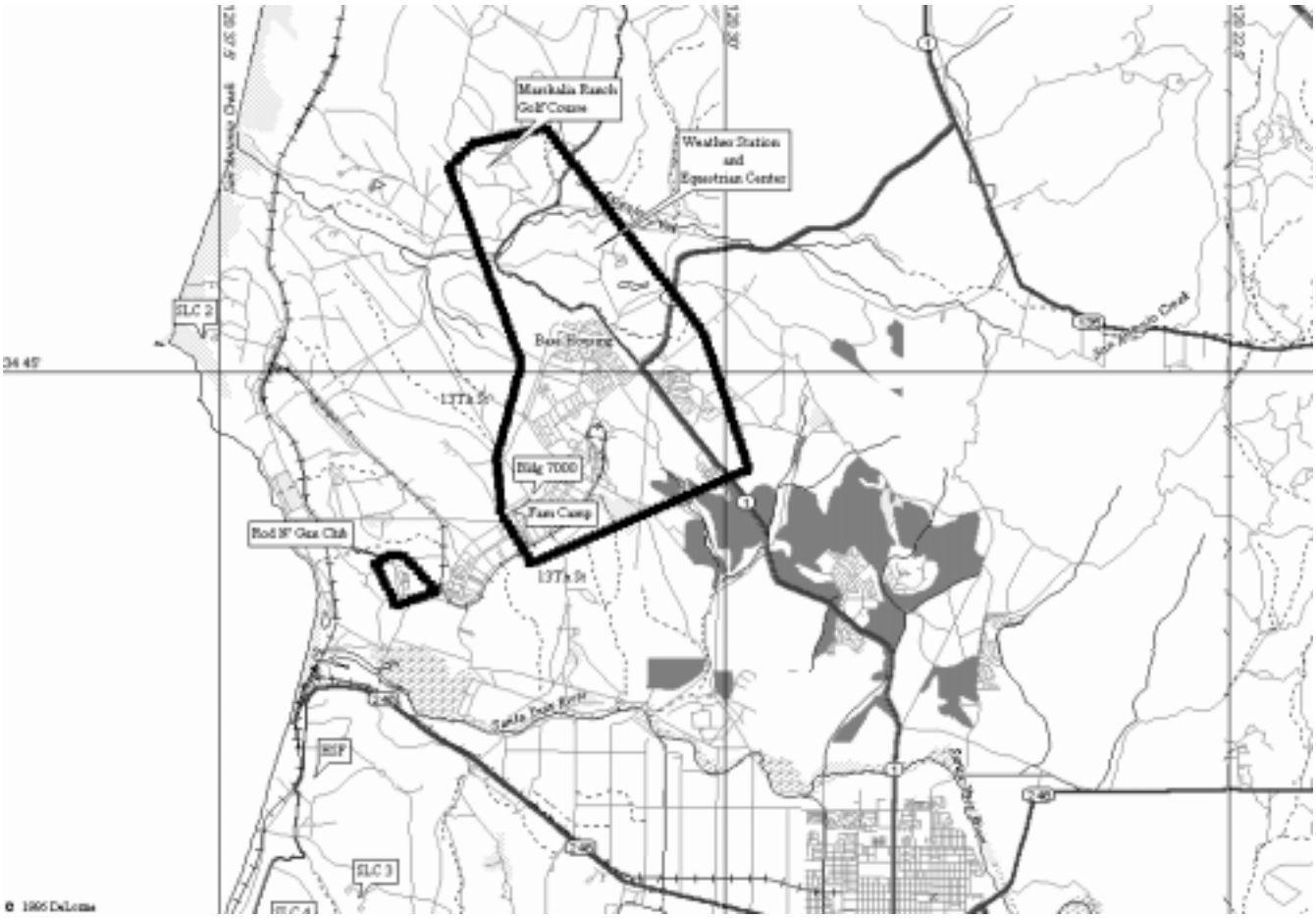
**Environmental Protection Agency Level of Concern (EPA LOC)—**EPA term defining the concentration of an extremely hazardous substance in the air above which there may be serious

irreversible health effects or death as a result of a single exposure for relatively short periods of time.

**Emission Hazard Zone (EHZ)—**The toxic hazard zone established before a planned release of propellants into the atmosphere; e.g., propellant tank venting or scrubber venting. An EHZ is based upon the worst-case credible emission rate or source strength.

**Giant Voice/Public Address System—**Public address system for North and South Vandenberg AFB. Completion date is to be determined.

**Figure A1.1. Base Cantonment**




**Hot Spill—**Release of toxic propellants through propellant combustion, such as a launch operation.

**Immediately Dangerous to Life or Health (IDLH)—**The current National Institute for Occupational Safety and Health (NIOSH) definition for IDLH is "a condition that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." The level of exposure for the IDLH "is to ensure the worker can escape from a given contaminated environment in the event of failure of the respiratory protection equipment." The effects at these levels are based on an exposure time of 30 minutes to add a safety margin. However, this does not mean workers should stay in that environment any longer than necessary. Evacuation should take place immediately.

**Launch Disaster Control Group (LDCG)—**The DCG formed to support launch operations. The LDCG is under the On-Scene Commander's control and responds to a launch related accident to provide

command and control, and direct accident recovery operations per 30 SW OPLAN 32-1.

**Missile Operations Support (MOS)—**Contractor (CMOS) or government personnel charged with providing hazardous propellant operations security support as directed by the Operations Directive (OD).

**Operation-Essential Personnel—**The minimum number of personnel required to accomplish a specific operation.

**Operations Directive (OD)—**The single formal document designed to consolidate host-base support for missile and space operations. The OD serves as a combination of support and notification checklist.

**Operational Hazard Zone (OHZ)—**The toxic hazard zone established following an accidental cold spill, unplanned liquid or gaseous release, or normal launch or catastrophic launch abort, based upon actual or worst-case credible source strength. Zones 1, 2, and 3 are established for an OHZ, as appropriate.

**Permissable Exposure Level (PEL)—**Defined by NIOSH as the time weighted average concentration that must not be exceeded during any 8-hour workshift of a 40-hour workweek.

**Personal Protective Equipment (PPE)—**Breathing apparatus such as Emergency Life Support Apparatus (ELSA) or Self-Contained Atmospheric Protective Ensemble (SCAPE) designed to protect individuals from exposure to hazardous chemicals or provide supplemental sources of oxygen. 30 AMDS/SGPB and 30 SW/SE will determine when PPE is required.

**Potential Hazard Zone (PHZ)—**Planning zone established prior to a specific operation to assess risk should an accidental cold spill or unplanned release, or a hot spill catastrophic abort occur. The zones are based upon the worst-case credible emission rate or source strength for a specific operation. A PHZ may have a Zone 1, 2 or 3 for nitrogen tetroxide/nitrogen dioxide vapor ($N_2O_4/N0_2$) and hydrochloric gas (HCl). A PHZ may have a Zone 2 or 3 for hydrazine-family propellants.

**Short-Term Exposure Limit (STEL)—**A short term exposure limit averaged over a 15-minute period (unless another time limit is specified in a parenthetical notation below the limit).

**Short-Term Public Emergency Guidance Level (SPEGL)—**The exposure limit expressed in parts per million (ppm) related to an unplanned single exposure normally lasting 60 minutes or less and never more than 24 hours, and whose occurrence is expected to be rare.

**Threshold Limit Value (TLV)—**Refers to airborne concentrations of substances and represents conditions under which the American Conference of Governmental Industrial Hygienists (ACGIH) believes nearly all workers may be occupationally exposed day after day without adverse effect. TLVs are published by the ACGIH. The Occupational Safety and Health Administration (OSHA) publishes similar values called Permissible Exposure Limits (PELs). The most conservative of the OSHA or ACGIH values must be used.

**Tier 1—**An airborne exposure level (maximum concentration) which poses no hazard to the general population but which may affect certain sensitive individuals (e.g., asthmatics, individuals with emphysema, and certain other lung diseased people). Tier 1 separates Zone 1 from the area where no controls are required. See **Table 1.** for Tier 1 exposure level values.

**Tier 2—**An airborne exposure level (maximum concentration) which may cause short term symptoms but which most individuals could endure without experiencing or developing irreversible or other serious health effects or symptoms which could impair their ability to take protective action. Tier 2 separates Zone 2 from Zone 1. See **Table 1.** for Tier 2 exposure level values.

**Tier 3—**An airborne exposure level (maximum concentration) based on the NIOSH IDLH values. Tier 3 separates Zone 3 from Zone 2. See **Table 1.** for Tier 3 exposure level values.

**Time Weighted Average (TWA)—**A worker's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

**Toxic Combustion Byproducts—**During a planned burn of a rocket engine or an unplanned combustion of propellants, toxic byproducts can be created and/or released which pose a hazard to downwind areas. The significant toxic byproduct of solid propellant combustion is hydrogen chloride (HCl). Unplanned combustion, such as an explosion of a vehicle burning hypergolic propellants during flight, can release toxic vapors. These vapors include hydrazine ($N_2H_4$), unsymmetrical dimethyl-hydrazine (UDMH), monomethylhydrazine (MMH), and nitrogen dioxide ($NO_2$). The combustion byproducts of aerozine-50 (A-50) released from an explosion of a vehicle fueled by this propellant are $N_2H_4$ and UDMH.

**Toxic Hazard Zone (THZ)—**A generic term which describes an area in which predicted concentration of propellant or toxic byproduct vapors or aerosols may exceed acceptable tier levels. Predictions are based on analyzing potential source strength, applicable exposure limit, and prevailing meteorological conditions. THZs are plotted for potential, planned and unplanned propellant releases, and launch operations. OHZs, PHZs, and EHZs are types of THZs.

**Unconventional Propellants—**A propellant fuel based upon chemical reactions, unlike combustion of fossil or hydrocarbon materials. Typical unconventional propellants at Vandenberg AFB are an oxidizer (e.g., nitrogen tetroxide) and a fuel (e.g., Aerozine-50) which spontaneously ignite when mixed together, which is known as a hypergolic reaction.

**User—**30 SW clients, such as Department of Defense (DoD), National Aeronautical and Space Administration (NASA), civilian commercial companies, etc., that use 30 SW facilities and test equipment, or conduct prelaunch and launch operations on the Western Range.

**Vandenberg's Integrated Communication Telephone Evacuation Routes—(VICTER)—**An emergency telephone notification system the Command Post manages. The system is primarily designed to protect personnel on Vandenberg AFB from unplanned propellant releases. Vandenberg AFB is divided into seven zones based upon building occupancy, proximity to hazardous facilities, prevailing winds, etc. VICTER is a preset tele-conference net (similar to a Secondary Crash Net) that includes certain buildings on Vandenberg AFB. Additions to this list only occur when the owner/user of a facility contacts the Command Post and the 30th Communications Squadron and requests to be added. In case of an emergency, the Command Post will plot THZ information on maps containing numbered buildings, facilities, etc. The net is activated and personnel at risk are directed to a specified evacuation route and a rendezvous location for a Security Forces head count.

**Vapor Protected Shelter (VPS)—**A sealable, self-contained building with sufficient ventilation and oxygen to support personnel for the required isolation period. 30 AMDS/SGPB and 30 SW/SE must approve the building to be used as a vapor-protected shelter. Buildings designed to withstand large blast overpressures (such as blockhouses), with limited entryways, no windows, and controls over ventilation draws, are likely VPS candidates.

**Worst-Case Credible Release Strength—**Used to facilitate prediction of a cold spill THZ. The responsible engineer (user) should determine the worst-case credible failure mode, then determine the associated liquid or vapor release rate (in pounds per minute), or the wetted area (in square feet).

**Zone 1—**An area where the airborne concentrations of any toxic product are equal to or exceed Tier 1

levels, but are less than Tier 2 levels. This zone can result from either a hot or cold spill. See **Figure A1.2.** on next page.

**Zone 2—**An area where the airborne concentrations of any toxic product are equal to or exceed Tier 2 levels, but are less than Tier 3 levels. This zone can result from either a hot or cold spill. See **Figure A1.2.** on next page.

**Zone 3—**An area where the airborne concentrations of any toxic product range from a low defined by Tier 3, to an unknown high. This zone can result from either a hot or cold spill. See **Figure A1.2.** on next page.

**Figure A1.2. Zone Development**