

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

**30TH SPACE WING INSTRUCTION
15-101**



18 AUGUST 2016

Weather

WEATHER SUPPORT

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available on the e-Publishing website at www.e-Publishing.af.mil for downloading or ordering

RELEASABILITY: There are no releasability restrictions on this publication

OPR: 30 OSS/DO

Certified by: 30 OG/CC
(Colonel Jennifer L. Grant)

Supersedes: 30 SWI15-101,
15 March 2013

Pages: 51

This instruction implements Air Force Policy Directive (AFPD) 15-1, *Air Force Weather Operations*; Air Force Instruction (AFI) 10-206, *Operational Reporting*; AFI 10-229, *Responding to Severe Weather Events*; AFI 15-114, *Functional Resource and Weather Technical Performance Evaluation*; AFI 15-128, *Air Force Weather Roles and Responsibilities*; Air Force Manual (AFMAN) 15-111, *Surface Weather Observations*; AFMAN 15-124, *Meteorological Codes*; AFMAN 15-129V1, *Air and Space Weather Operations-Characterization* and AFMAN 15-129V2, *Air and Space Weather Operations-Exploitation*. This instruction identifies services, responsibilities, and procedures for weather support on Vandenberg Air Force Base (VAFB). It outlines weather support provided by the 30th Operations Support Squadron Weather Flight (30 OSS/OSW) to VAFB and the Western Range (WR), including support to mission operations, contingency operations, staff support, Department of Defense (DoD) contractor support and training. This instruction applies to all military personnel, civilians and DoD contractors assigned to VAFB. All agencies that receive support from, or provide support to, 30 OSS/OSW are required to review this instruction annually during the anniversary month. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using AF Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the field through the appropriate functional's chain of command. Ensure that all records created as a result of the processes prescribed in this publication are maintained in accordance with AFMAN 33363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at <https://www.my.af.mil/afrims/afrims/afrims/rims.cfm>.

SUMMARY OF CHANGES

Incorporated the 25 OWS into this instruction, emphasizing their role in forecast production and resource protection for Vandenberg, added two new Observer and Range Weather Forecaster duty priorities, the FMQ-23 observation system addition, updated Risk Management process, added earthquake and tsunami support to Emergency Operations Center, and several formatting updates.

Chapter 1— CAPABILITIES	6
1.1. General.....	6
1.2. Concept of Operation.....	6
1.3. Operational Sensor Suite.....	6
1.4. Duty Priorities.....	7
Table 1.1. Observer Duty Priorities.	7
Table 1.2. Range Weather Forecaster Duty Priorities.....	8
1.5. Assumptions, Shortfalls, and Limitations.....	8
1.6. WF SharePoint Site.....	9
1.7. Release of Weather Information.	9
Chapter 2— ROLES AND RESPONSIBILITIES	10
2.1. Vandenberg Command Post (VCP).....	10
2.2. 30 Space Wing Chief of Safety (30 SW/SE)	10
2.3. 30 Space Wing Chief of Plans and Programs (30 SW/XP) Will	10
2.4. 30 Space Wing Chief of Inspections and Exercises (30 SW/IG).....	10
2.5. 30 Space Communications Squadron (30 SCS).....	11
2.6. 30 Contracting Squadron (30 CONS).....	11
2.7. 30 OSS/CC.....	11
2.8. 30 OSS/DO.	11
2.9. 30 OSS/OSW CC.....	12
2.10. 30 OSS/OSW.....	12
2.11. Air Traffic Systems (30 OSS/OSM).....	14
2.12. 30 Civil Engineer Squadron Readiness Flight (30 CES/CEX)	14

2.13.	Airfield Management (30 OSS/OSAA)	14
2.14.	Vandenberg Control Tower (30 OSS/OSAB).....	15
2.15.	Frontier Control (2 ROPS/DON)	16
2.16.	25 OWS Reciprocal support is documented on the Installation Data Page.	16
Chapter 3— AIRFIELD SERVICES		17
3.1.	WF Availability.	17
3.2.	Terminal Aerodrome Forecasts (TAF).	17
3.3.	Observing Hours of Operation.....	17
3.4.	Basic Weather Watch (BWW).....	17
3.5.	Continuous Weather Watch (CWW).	18
3.6.	Cooperative Weather Watch.	18
3.7.	“Eyes Forward”	18
3.8.	Observation Types.	18
3.9.	Points of Observation.....	18
3.10.	Special and Local Weather Observation Criteria.....	18
3.11.	Limited Observation Support.....	18
3.12.	Dissemination of Observations.	19
3.13.	Backup Dissemination of Observations.....	19
3.14.	Upper-Air Observing.	19
3.15.	PMSV.	19
Chapter 4— PLANNING WEATHER		20
4.1.	Range Operations 5-Day Forecast.	20
Figure 4.1.	Example of Range Operations 5-Day Forecast.....	20
4.2.	Launch-X (L-X) Day Forecasts.	20
Figure 4.2.	Examble of L-X Day Forecast.	21
4.3.	Staff Weather Briefings.	21
4.4.	X-37B 7-Day Forecast.	22
4.5.	Joint Strike Force (JSF) Briefs.....	22

Chapter 5— MISSION WEATHER PRODUCTS	23
5.1. Mission Weather Products (MWPs)	23
Table 5.1. RM 5-Step Process.....	23
5.2. Flight Weather Briefing, DD Form 175-1.	23
Figure 5.1. Flight Weather Briefing.	24
5.3. THZ Forecasts.....	24
5.4. On Console Weather Forecast.	25
Figure 5.2. Lightning.....	26
Figure 5.3. Cumulus Clouds.....	26
Figure 5.4. Attached Anvils.	27
Figure 5.5. Detached Anvils.....	27
Figure 5.6. Debris Clouds.	28
Figure 5.7. Disturbed Weather.	28
Figure 5.8. Thick Clouds Part 1.	29
Figure 5.9. Thick Clouds Part 2.	29
Figure 5.10. Smoke Plumes.....	30
Figure 5.11. Triboelectrification.	30
Chapter 6— LAUNCH/RECOVERY WEATHER SERVICES	31
6.1. Launch/Recovery Support.	31
6.2. Pre-launch/Recovery Weather Support.....	31
6.3. Day of Launch/Recovery Weather Support.	31
Chapter 7— WEATHER WARNINGS, WATCHES, AND ADVISORIES (WWAS)	33
7.1. Customer Requirements.....	33
7.2. Meteorological Watch (METWATCH) Program.	33
7.3. WWA Criteria.....	33
7.4. Weather WWA Customer Thresholds and Actions.	33
Figure 7.1. WWA Notification Chain.	34
Table 7.1. Weather Warning Criteria.....	35
Table 7.2. Weather Watch Criteria.	35

Table 7.3.	Weather Advisory Criteria.....	36
Table 7.4.	Weather Warning and Watch Customer Thresholds and Actions.	36
7.5.	Severe Weather Action Procedures (SWAP).....	37
7.6.	Severe Weather Reporting.	37
Chapter 8—	SPACE WEATHER	38
8.1.	General.....	38
8.2.	WF Responsibility.	38
8.3.	Space Weather Events.....	38
Chapter 9—	DISSEMINATION OF WEATHER INFORMATION	40
9.1.	Weather Data Systems.	40
9.2.	Communication Outages.....	40
9.3.	Telephone Hotlines.	40
9.4.	Closed Circuit Television (CCTV).	40
9.5.	Pilot-to-METRO-Service (PMSV).	40
Chapter 10—	EMERGENCY/CRISIS AND BACK-UP SUPPORT	41
10.1.	General.....	41
10.2.	Alternate Observation Site (AOS).	41
10.3.	Alternate Operating Location (AOL).....	41
Attachment 1—	GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION	42
Attachment 2—	POINTS OF CONTACT	45
Attachment 3—	TAF SPECIFICATION AND AMENDMENT CRITERIA	46
Attachment 4—	SPECIAL OBSERVATION (SPECI) CRITERIA	48
Attachment 5—	LOCAL OBSERVATION CRITERIA	49
Attachment 6—	COLD SPILL TOXIC HAZARD ZONE FORECASTS	50

Chapter 1

CAPABILITIES

1.1. General. The purpose of this instruction is to bring together the services provided by the 30 OSS/OSW to all customers on VAFB. For the purpose of this document, the term Weather Flight (WF) is used synonymously with the 30 OSS/OSW and refers to the entire weather flight. In accordance with AFMAN 15-129V1, the term Exploitation Units (EUs) include WFs. Basic support concepts and procedures are outlined in this instruction along with Air Force and Air Force Space Command directives, the Range Universal Documentation System (UDS) and 30 OSS Operating Instructions for range support.

1.2. Concept of Operation. With support from the 25th Operational Weather Squadron (25 OWS), the WF provides operational and staff weather support to the 30th Space Wing (30 SW) and tenant units; mission weather services for all DoD, civil, and commercial spacelift/ballistic missile/X-37 recovery missions on VAFB; observation and forecasting support for DoD and commercial spacelift, ballistic missile test, and air operations on VAFB and west coast offshore operating area; resource protection for VAFB/30 SW and tenant unit resources and people; trained weather professionals to support contingencies worldwide; weather data and studies for planning. The WF operates weather systems to support operations at VAFB. It cannot be understated that weather support to the 30 SW is not simply confined to day of launch, but is a 24/7/365 joint effort between the WF and the 25 OWS, and therefore demands the same uptime of range weather instrumentation. Agencies requiring weather support will contact the WF with the pertinent details as early as possible. Agencies requiring recurring support not covered in this instruction will contact the WF Commander (see Attachment 2, Point of Contact). Adequate notice is essential for optimum support.

1.2.1. The 25 OWS provides Meteorological Watch (METWATCH), Terminal Aerodrome Forecasts (TAFs) and Watches, Warnings and Advisories (WWAs) for VAFB.

1.2.2. A contract organization provides surface observation data for the Vandenberg airfield and upper-air observation data from the surface to approximately 100,000 feet above the range.

1.2.3. Non-flying missions include all space and ballistic launch/recovery support.

1.2.4. The WF has both an in-place wartime mission and a mobility mission. Active duty members are assigned to Air and Space Expeditionary Force Unit Task Codes. Activated members receive appropriate training prior to deployment.

1.3. Operational Sensor Suite. To fulfill the weather support mission, the WF operates an extensive suite of weather sensors and systems to ingest, process, manage, distribute, and archive meteorological information from local sensors, as well as national, international, and satellite sources. As codified within the 30 OSS Western Range Weather Equipment Manual, this suite consists of 26 wind towers including 87 anemometers, 57 Temp/RH sets, eight radiometers, and eight soil moisture sensors, 12 wind profilers, two Automated Surface Observing Systems (ASOSs), one FMQ-23 for the airfield observation, Automated Real Time Meteorological Processing System (AMPS), and one Doppler Radar to gather weather data across the range. Due to the diversity of specialized systems and number of active sensors, the meteorological

equipment suite represents one of the largest concentrations of meteorological instrumentation in the world. The density of sensors, combined with state of the art technology and 24-hour-a-day collection, provides a multitude of specialized measurements that helps the USAF and its mission customers to successfully complete their missions in a variety of weather conditions. This unique and comprehensive meteorological data is also available to academic and government research scientists, if approved by the WF/CC or designee. The Range Instrumentation Handbook describes WF weather equipment in further detail.

1.4. Duty Priorities. WF operations personnel can become task saturated at times (e.g., sudden onset of severe weather). To assist WF personnel in prioritization of customer support during such times, principal duty priorities are defined below. WF observers (Table 1.1.) and forecasters (Table 1.2) will adhere to these priorities, and supported agencies should have an understanding of these priorities.

Table 1.1. Observer Duty Priorities.

1	Perform Emergency War Orders Taskings (EWO)
2	Execute evacuation
3	Respond to aircraft/missile/ground emergencies
4	Perform mission upper-air observations
5	Disseminate airfield surface observations locally as required
6	Respond to Launch Weather Officer (LWO)/Ops calls during mission operations
7	Collaborate with the 25 OWS
8	Perform synoptic upper-air observations
9	Transmit airfield surface observations longline as required
10	Provide briefings
11	Weather functional training
12	Accomplish administrative tasks

Table 1.2. Range Weather Forecaster Duty Priorities.

1	Perform EWO Taskings
2	Execute evacuation
3	Respond to aircraft/missile/ground emergencies (to include Operational Hazard Zone (OHZ) forecasts)
4	Respond to pilot-to-metro-service (PMSV) calls
5	Issue Weather Warnings, Watches and Advisories (WWAs)
6	Implement Severe Weather Action Procedures (SWAP)
7	Respond to LWO/Western Range Control Center (WRCC)/Ops calls during mission operations
8	Issue Potential Hazard Zone (PHZ) and Emission Hazard Zone (EHZ) forecasts
9	Collaborate with 25 OWS
10	MEFP- Produce and Disseminate Forecasts
11	Perform WSR-88D Unit Control Position (UCP) functions
12	Disseminate Urgent Pilot Reports (PIREPs)
13	Disseminate PIREPs
14	Perform MISSIONWATCH activities
15	Provide Briefings
16	Weather functional training
17	Accomplish administrative tasks

1.5. Assumptions, Shortfalls, and Limitations.

1.5.1. WF Assumptions. Weather support can only be provided if the appropriate facilities, funding, communications, personnel, and indigenous support (e.g., power, water, etc) are available.

1.5.2. WF Shortfalls. Some services may not be available (e.g., out of station briefings) due to other higher priority missions.

1.5.3. WF Limitations. Due to the sensitive nature of a limited number of missions, not all operational missions are reflected in this document as required in AFMAN 15-129V2.

1.5.3.1. Forecasting Limitations. The WF issues operational/mission forecasts valid for periods up to 30 hours. Beyond 30 hours, all forecasts are for planning/information only. Forecasts or outlooks beyond 10 days are largely based on climatology.

1.5.3.2. WWA Limitations. The expanse and topography of the WR requires regional tailoring of forecast support and products. All WWAs will extend out to and include 10 Nautical Miles (NM) from the VAFB boundary. The exception is warnings pertaining to winds, which are issued to cover North VAFB, South VAFB, and/or the airfield. The lightning warning is broken out to cover North VAFB and South VAFB. WWAs are not issued for the airfield during periods of airfield closure. In these cases, North VAFB notices will apply to the airfield environment. Specific WWAs procedures are detailed in Chapter 7.

1.5.3.2.1. Wind warnings above 1,000 ft sea level. Topographic features and lack of representative weather instrumentation make it difficult to forecast winds for sites above 1,000 ft sea level. As a result, sites above 1,000 ft use North and South VAFB wind warnings for below 1,000 ft (Figure 7.2.) for winds > 35 knots but ≤ 50 knots as a precursor for potentially higher winds. Sites above 1,000 ft only receive an official wind warning when winds are forecast ≥ 65 knots.

1.5.3.3. Observing Limitations.

1.5.3.3.1. The observer location is slightly behind Bldg 1765 (balloon shelter), with the airfield complex 1 1/2 miles to the south. The facility does not allow a 360-degree view of the runway complex from the official observation point. There is an obstruction from 150–180 degrees due to Base Operations and Flight Line Fire buildings.

1.5.3.3.2. The Alternate Observing Site is located behind Bldg 1746. Buildings adjacent to the flightline and trees restrict the view from the northeast to southeast, out to approximately 3/8 miles.

1.6. WF SharePoint

Site. <https://eis2.afspc.af.mil/sites/30sw/30OG/30OSS/OSW/SitePages/Home.aspx>. This site provides a link to the 5-day forecast. Upon request, the WF will email data to those who unable to access this site.

1.7. Release of Weather Information. Release of weather information to non-DoD agencies or the public must be approved by the WF/CC or designee. The WF will consult with 30 SW Public Affairs and 30 SW Office of the Staff Judge Advocate before approving release authority.

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. Vandenberg Command Post (VCP).

- 2.1.1. Relay warnings, watches, and advisories to agencies identified in Figure 7.1.
- 2.1.2. When the Joint Environmental Toolkit (JET) is inoperative, relay above information and Toxic Hazard Zones (THZs) to Frontier Control first, then proceed with Figure 7.1 notifications.
- 2.1.3. Notify the WF of accidents, mishaps, incidents, fires, airfield operating hours outside of standard hours or any other changes to normal operations requiring weather support.
- 2.1.4. Inform the WF of any incident or significant event involving weather service or WF personnel.
- 2.1.5. Coordinate, if time permits, with 30 OSS/CC or Operations Officer (DO) before transmitting a significant event message to higher headquarters involving weather events, service, or personnel.
- 2.1.6. Send OPREP-3 reports up-channel when weather occurs on VAFB and causes damage that rises to DoD, AF or MAJCOM interests, IAW AFI 10-229/10-206.
- 2.1.7. Conduct periodic tests of primary and back-up weather watch/warning dissemination systems IAW AFI 10-229, 2.3.7.
- 2.1.8. Inform the WF when the 30 SW/CP JET is inoperative.

2.2. 30 Space Wing Chief of Safety (30 SW/SE)

- 2.2.1. Identify meteorological requirements for hazard assessments to support both Launch Readiness Reviews and mission execution.
- 2.2.2. Include new and modified weather instrument and support requirements for mission operations in the Range Safety Operations Requirements (RSOR) when requested by the WF.
- 2.2.3. Provide required training for WF individuals appointed as Interim Safety Board members or appointed to assist with accident investigations.
- 2.2.4. Coordinate and recommend approval to AFSPC/SE for range safety constraints concerning natural and triggered lightning. These constraints are documented in AFSPCMAN 91-710, *Range Safety User Requirements*, v6.
- 2.2.5. Provide 30 OSS/OSW letters certifying evaluation of all launch vehicles for triboelectrification. Certification enables LWOs to ensure accurate evaluation of the range safety triggered lightning constraint concerning triboelectrification.

2.3. 30 Space Wing Chief of Plans and Programs (30 SW/XP) Will: Ensure that pre and post-severe weather response requirements are included in applicable wing plans IAW guidance established in AFI 10-229.

2.4. 30 Space Wing Chief of Inspections and Exercises (30 SW/IG)

2.4.1. Provide Wing Inspection Team (WIT) training to members assigned as either WIT Lead or WIT members in support of the Commander's Inspection Program (CCIP).

2.4.2. Provide 30 SW/OSS a written notice of intent to inspect to the commander approximately 30 days prior to inspection.

2.4.3. Provide a final written report to the OSS/CC at the conclusion of all unit inspections initiated by the 30 SW

2.5. 30 Space Communications Squadron (30 SCS). Ensure WF primary and back-up communications are available to meet customer specified WWA notification timelines.

2.6. 30 Contracting Squadron (30 CONS)

2.6.1. Review, coordinate, and approve all mission requirements when support is provided by 30 SW mission support contracts.

2.6.2. Ensure additional (new) mission requirement packages include a mission need statement (MNS) signed by the unit commander or authorized representative.

2.6.3. Ensure weather equipment maintenance of weather systems via mission support contracts.

2.6.4. Provide contract maintenance for air conditioning systems and backup power generators at Bldg 1764 and Bldg 21150.

2.7. 30 OSS/CC

2.7.1. Communicate directly with all commanders and staff agencies concerning weather operations and support.

2.7.2. Ensure weather support is provided to all DoD units and contractors on VAFB.

2.7.3. Organize and equip personnel to provide operational weather support for WR activities.

2.7.4. Ensure observation, forecast, and notification of weather phenomena for resource protection of facilities and personnel on the VAFB complex.

2.7.5. Plan for the acquisition, integration, and support of weather sensing and processing systems to meet current and future base/wing mission requirements.

2.7.6. Provide 30 SW/CC an assessment of WF mission capabilities and up-channel requests for assistance, as required.

2.8. 30 OSS/DO. The 30 OSS maintains two Operations Officer (DO) positions. One has a 15W (weather) AFSC and the other has a 13S (space) AFSC. The DO with the 15W AFSC is the senior meteorologist in the 30 OSS, serves as the primary point of contact for all meteorological operations issues for VAFB, and fulfills the following responsibilities:

2.8.1. Participate on boards and committees concerning weather issues.

2.8.2. Provide or arrange weather briefings for: 30 SW Staff Meeting; 30 SW Mission Standup; New Strategic Arms Reduction Treaty (NST); deployment; and other meetings as required.

2.8.3. Serves as the primary Launch Weather Commander (LWC) for DoD, commercial, and privatized spacelift, ballistic missile test, and spacecraft recovery operations from VAFB.

2.9. 30 OSS/OSW CC. The Flight Commander directs operational weather support for DoD, commercial and military, ballistic and spacelift programs, conventional flight operations, senior staff support, and resource protection. Flt/CC will:

2.9.1. Establish and maintain mission/range weather training programs.

2.9.2. Provide trained and certified LWCs, LWOs, range weather forecasters and other mission weather team personnel, as required, in support of all mission and aviation operations.

2.9.3. Ensure back-up support for weather operations is established where needed.

2.9.4. Provide weather scenario inputs to 30 SW/IGI for base-wide exercises.

2.10. 30 OSS/OSW. The Weather Flight develops and provides operational weather support for all WR ballistic missile, spacelift, and recovery missions and will:

2.10.1. Manage unit mobility and exercise evaluation programs to include training, certification, and readiness of personnel subject to deploy in support of DoD worldwide operations.

2.10.2. Provide Launch Weather Team Unit Qualification Training (UQT), Recurring Training (RT), and Supplemental Training (ST). Provide weather instrument refresher course familiarization to all 30 SW mission ready operators, if required.

2.10.3. Evaluate all Universal Document System (UDS) materials, and provide comments and coordinate required changes with Second Range Operations Squadron (2 ROPS) Program Support Manager (PSM). Provide requested responses to customer's Program Requirements and Operations Requirements Documents.

2.10.4. Provide tailored operational weather briefings and mission weather support per launch mission Operation Directives (OD). On the day of mission, weather support typically consists of on console weather briefings, go/no-go weather calls, cold-spill toxic analysis, range weather forecast, upper-air weather observations from weather balloons, surface weather observations, and a specialized T-0 wind and thermodynamic forecast used by 30 SW/SE to conduct safety analyses to include toxic, blast, and debris hazard assessments.

2.10.5. Develop and ensure compliance of Operating Instructions (OIs) and procedures for launch/recovery weather team activities.

2.10.6. Ensure weather instrument and support requirements for mission operations are identified and forwarded to 30 SW/SELF for inclusion in the RSOR.

2.10.7. Consult on improvements to Lightning Launch Commit Criteria in coordination with NASA and the Lightning Advisory Panel.

2.10.8. Ensure issuance of mission forecasts for the local area and flying operations.

2.10.9. Provide a daily 5-day Range Operations Planning Forecast which consists of a stop-light chart forecast based on the weather constraints for range operations scheduled to occur during the 5-day period.

- 2.10.10. Provide meteorological mission watch in support of VAFB aviation and pre-mission operations and cold-spill (only) THZ for protection of personnel and facilities.
- 2.10.11. Operate, monitor, and provide training to appropriate base agencies, as required, on meteorological sensing and dissemination systems.
- 2.10.12. Provide aircrew briefings and monitor PMSV radio.
- 2.10.13. Ensure the contracted weather observers provide initial local weather observation training and certification to all tower personnel (Air Traffic Control) to take limited weather observations.
- 2.10.14. IAW AFI 10-229, *Responding to Severe Weather Events*, provide the following information for OPREP-3 reports to 30 SW/CP, as required:
- 2.10.14.1. The actual severe weather conditions experienced.
 - 2.10.14.2. The forecast valid for the time of the occurrence and any watches or warnings issued.
 - 2.10.14.3. The operational status of meteorological and communication equipment at the time of the event.
- 2.10.15. Provide updated weather operations and sensor information for publication in Notice to Airmen (NOTAM) and Flight Information Publications (FLIP) to Airfield Management (30 OSS/OSAA).
- 2.10.16. Review and ensure all weather information in the FLIP is accurate. All weather related updates will be requested through 30 OSS/OSAA. Updates will fall in one of three categories: revisions, changes, or corrections.
- 2.10.17. Provide tailored weather support for senior staff and Distinguished Visitor activities. Requesting agency will notify the WF, at least two duty days prior, if possible, when requesting a trip forecast. At a minimum, include departure and arrival dates, times, and locations.
- 2.10.18. Upon request, provide Chemical Downwind Messages/current weather conditions and forecast to the Emergency Operations Center.
- 2.10.19. Upon request, provide Effective Downwind Fallout Messages to CE Readiness.
- 2.10.20. Provide pre-deployment planning/training to WF members IAW unit OIs.
- 2.10.21. Serve as the technical lead for submitting Requirement Statements into ReqView to formally request new weather information systems to meet WF and supported customer needs, and develop plans to acquire, integrate, and support these systems.
- 2.10.22. Manage maintenance and modification of WR support weather computer systems, instrumentation systems, and data transfer (primary and back-up communications) equipment.
- 2.10.23. Establish and provide oversight of appropriate contractor-supplied weather systems support. Utilize the Contractor Officer Representative LISC Contract Oversight process when identifying performance concerns relative to contractor-supplied weather system support.

- 2.10.24. Direct/provide/oversee meteorological and climatological research/studies and scientific services in support of DoD/DoD-contracted or unit missions and operations.
- 2.10.25. Coordinate system Operational Employment and Maintenance Evaluation testing and support to Force Development Evaluation of new or modified range weather equipment and writing/advocating for the commissioning package to approve them as operational.
- 2.10.26. Provide weather system updates to 30 SW technical documents such as the Instrumentation Handbook.
- 2.10.27. Identify WR weather support requirements and provide technical user interface into the development of plans for the modification, acquisition, integration, and support of weather data sensing/processing systems to meet current and future needs.
- 2.10.28. Upon request, provide meteorological/climatological services and/or studies affecting WR activities. Agencies requiring such support can contact the WF/CC or NCOIC.
- 2.10.29. Direct weather balloon support for daily operations.
- 2.10.30. Oversee all matters concerning configuration management of weather sensing and processing systems.
- 2.10.31. Act as technical advisor to acquisition program manager and quality assurance specialist (QAS) for the weather system mission support requirements. Provide inputs on “fitness” of performance of all weather related support activities (operations, maintenance, engineering, software development, and operational analysis).
- 2.10.32. Represent the WF at interagency working groups that manage the weather information network; includes providing a 30 SW representative to the Range Commanders’ Council Meteorological Group.
- 2.10.33. Upon request, provide earthquake and tsunamis information/updates to the Emergency Operations Center.

2.11. Air Traffic Systems (30 OSS/OSM)

- 2.11.1. Conduct or arrange maintenance on all airfield weather systems and associated circuits. Restoral priorities are dependent on current airfield, mission operations and requirements.
- 2.11.2. Provide WSR-88D on-site technician support when requested.

2.12. 30 Civil Engineer Squadron Readiness Flight (30 CES/CEX)

- 2.12.1. Hold as required, but not less than annually, a meeting to review the installation weather preparedness, capabilities, requirements, and procedures IAW AFI 10-229.
- 2.12.2. Ensure base personnel are educated on local severe weather threat and applicable protective measures.
- 2.12.3. Collaborate with the WF to provide appropriate mission immersion.

2.13. Airfield Management (30 OSS/OSAA)

- 2.13.1. Provide maximum advanced notice possible to the WF when the airfield will be open or closed outside normal operating hours.

- 2.13.2. Include PMSV outages in Notice to Airmen (NOTAMs).
- 2.13.3. Conduct PMSV radio checks with the Range Weather Forecaster (RWF) within one hour of the airfield opening.
- 2.13.4. When notified, submit weather related NOTAM and FLIP updates.
- 2.13.5. Contact 30 OSS/OSWO when FLIP updates are available.
- 2.13.6. Activate the Secondary Crash Net for Weather Watches, Warnings, and Advisories.

2.14. Vandenberg Control Tower (30 OSS/OSAB)

- 2.14.1. During published airfield hours, ensure the Precision Approach Path Indicator (PAPI) lights are turned on and set to the runway in use. Inform the weather observer whenever the PAPI lights are not turned on (during outages, maintenance etc.), or are not set to the advertised runway in use.
 - 2.14.1.1. The FMQ-23 automatically detects what runway the PAPI lights are set to and then generates observations from the Ceilometer, wind and visibility sensors from the sensor group in that area. If the PAPI lights are on both runways simultaneously or are not on, the FMQ-23 will set itself to the Runway 30 sensor group.
- 2.14.2. Inform the weather observer when the active runway is changed.
- 2.14.3. Inform the RWF when JET is inoperative.
- 2.14.4. Relay all PIREPs to the RWF not later than five minutes after receipt.
- 2.14.5. Perform a cooperative weather watch by notifying the weather observer of any perceived difference between the observed and reported weather conditions which may affect flight safety or be critical to the safety or efficiency of other local operations and resources. The observer will reevaluate the weather conditions whenever a reliable source reports weather conditions different from the last disseminated observation and upon receipt of subsequent reportable changes. These conditions include but are not limited to:
 - 2.14.5.1. Location and movement of thunderstorms.
 - 2.14.5.2. Rapidly deteriorating visibility/tower visibility.
 - 2.14.5.3. Presence of fog that could hinder an approach and landing of arriving aircraft.
 - 2.14.5.4. Beginning and ending of precipitation.
 - 2.14.5.5. Observed lightning.
 - 2.14.5.6. Report changes in prevailing visibility and sector visibility to the weather observer when either prevailing visibility and/or sector visibility is less than 4 statute miles and is different from the surface prevailing visibility.
- 2.14.6. Provide the airfield observer or RWF with a report of any convective activity in the local area.
- 2.14.7. Provide WF personnel indoctrination training on local air traffic control facilities and capabilities when requested.

2.14.8. When the airfield is open notify Santa Barbara Approach and Los Angeles Air Route Traffic Control Center of all weather balloon launches and provide traffic advisories to all affected aircraft IAW JO 7110.65.

2.15. Frontier Control (2 ROPS/DON)

2.15.1. Notify the WF when same day changes occur (both additions and deletions) to scheduled flight operations on the WR, including the West Coast Offshore Operating Area (WCOOA).

2.15.2. Notify the WF when unscheduled flight operations requiring weather support occur on the WR, including the WCOOA.

2.15.3. Direct the weather aircraft as requested by the LWO during all ballistic, spacelift, and recovery mission operations.

2.15.4. Forward all PIREPS to the RWF. During mission operations, forward PIREPS to the LWO on console.

2.16. 25 OWS Reciprocal support is documented on the Installation Data Page. This is a Memorandum of Agreement between the 30 OSS/OSW and the 25 OWS. The Installation Data Page is located at:

https://ows.dm.af.mil/ows_unique/25data/moa/Vandenberg_AFB_Data_Page.pdf

Chapter 3

AIRFIELD SERVICES

3.1. WF Availability. The Weather Operations Center (WOC), located in Bldg 21150, routinely operates Monday through Friday from 0400L to 2000L. WF hours will flex/surge to meet mission requirements. WF personnel may operate with minimal manning during holidays, down days, family days, airfield closures, or upon 30 OSS/CC direction. In this event, the 25 OWS will provide meteorological services. WF personnel will provide support if SWAP conditions are required as detailed in 7.5. The WOC will operate 24-hours per day 72 hours prior to scheduled launch/recoveries.

3.2. Terminal Aerodrome Forecasts (TAF). RWFs aid the 25 OWS to prepare a TAF for the area within a 5 statute mile radius of the airfield at 1500Z and 2300Z Monday through Friday and on weekends if the airfield is open. A third TAF is issued at 0700Z if flight operations are on-going.

3.3. Observing Hours of Operation. At a minimum, weather observers man the Representative Observation Site (ROS) and provide surface observing services from 1 hour prior to scheduled airfield opening until the airfield closes. Weather observers conduct daily upper-air soundings at 1200 UTC (ZULU), when weather conditions warrant additional upper-air sounding data (e.g, releasing a 1900Z balloon 1 day before expected thunderstorm activity), and as required for range operations.

3.4. Basic Weather Watch (BWW). A BWW will be conducted by weather personnel when the airfield is open and there is a radiosonde balloon being tracked in the air. Because of the balloon tracking, the observer cannot monitor the weather continuously and may not detect and report all weather changes as they occur. The BWW observing program establishes the minimum requirements needed to ensure the proper level of weather watch is maintained.

3.4.1. During a BWW, weather personnel will recheck weather conditions, at intervals not to exceed 20 minutes since the last observation/recheck, to determine the need for a Aviation Selected Special Weather Report (SPECI) observation, when any of the following conditions are observed to be occurring or are forecast to occur within 1 hour:

- 3.4.1.1. Ceiling forms below or decreases to less than 1,500 feet;
- 3.4.1.2. Ceiling dissipates, or increases to equal or exceed 1,500 feet;
- 3.4.1.3. Visibility decreases to less than 3 miles (4800 meters);
- 3.4.1.4. Visibility increases to equal or exceed 3 miles (4800 meters);
- 3.4.1.5. Precipitation (any form);
- 3.4.1.6. Thunderstorms;
- 3.4.1.7. Fog or mist;
- 3.4.1.8. All supplemental criteria including: Tornado, funnel cloud, waterspout, hail, volcanic ash, and ice pellets;
- 3.4.1.9. During mandatory back-up of the FMQ-23.

3.4.2. In addition to the above minimum requirements, weather personnel will remain alert for any other changes in weather conditions that require a SPECI observation. Weather personnel will also monitor local area observational and forecast products as often as necessary to keep abreast of changes expected to affect their area of responsibility.

3.5. Continuous Weather Watch (CWW). A CWW is conducted when not tracking weather balloons. Weather personnel monitor weather conditions continuously and perform no other significant duties. Weather personnel will take and disseminate and SPECI observations as conditions occur that meet the criteria.

3.6. Cooperative Weather Watch. Vandenberg control tower personnel will perform a cooperative weather watch, IAW Paragraph 2.12.5, and notify the observer of previously unreported changes in the weather which could be critical to flight safety or be critical to the safety or efficiency of other local operations and resources.

3.7. “Eyes Forward”. The WF will relay significant, time-sensitive meteorological information not found in coded meteorological reports to the 25 OWS. The eyes forward function includes periods when SWAP is implemented.

3.8. Observation Types. The WF produces two types of observations.

3.8.1. Manual Observations. When the airfield is open, a position qualified weather technician is responsible for observing, evaluating, and preparing Meteorological Aerodrome Report (METAR)/SPECI observations. These observations will be disseminated locally and longline via JET.

3.8.2. Automated Observations. During non-duty hours when the airfield is closed, the FMQ23 will continually sense and measure the atmosphere, sending out observations longline.

3.9. Points of Observation. For most meteorological elements the airfield is the primary Point of Observation.

3.9.1. Airfield. The FMQ-23 is spread across 3 locations along the Vandenberg’s runway. At the southern end (runway 30), the elements sensed include prevailing visibility, present weather, sky condition, temperature, dew point, pressure, wind data and runway visual range. At the mid-field point, elements sensed include wind data and visibility. At the northern end (runway 12) the elements sensed include wind data, sky condition and visibility.

3.9.2. Observation Facility. The cloud height and ceiling elements are measured at the airfield via the FMQ-23 sensors and, during hours of manual observing, the weather technician will use these readings as a baseline during their evaluation and preparation of the METAR/SPECI observations.

3.10. Special and Local Weather Observation Criteria. Observing procedures and observation criteria are derived from AFMAN 15-111, *Surface Weather Observations*, and from DoD FLIP published specifically for VAFB.

3.11. Limited Observation Support. Agencies requiring surface observing support from other VAFB locations will coordinate in advance with the RWF or WF NCOIC (see Attachment 2, Points of Contact).

3.12. Dissemination of Observations. Airfield observations are disseminated to VAFB air traffic control tower, base operations, VCP, and to the worldwide network via JET when observers are on duty at the ROS. FMQ-23 observations are available via telephone when observers are not on duty at the ROS during forecasting operating hours (see Attachment 2, Points of Contact).

3.13. Backup Dissemination of Observations. In the event of a JET outage, airfield observations are disseminated via telephone or direct line first to the VAFB control tower, then to base operations and VCP. Observations are disseminated longline via the Air Force Weather Web Services (AFW-WEBS) or another AF weather station if NIPRNet is inoperable.

3.14. Upper-Air Observing. Upper-air operations are conducted from Bldg 1764, North VAFB. Upper-air observers will obtain VAFB control tower clearance, when the airfield is open or contact Santa Barbara Approach (when open) and Los Angeles Center when the VAFB airfield is closed before releasing balloons not associated with mission operations. To collect upper level weather information, the observers release high and low resolution radiosondes.

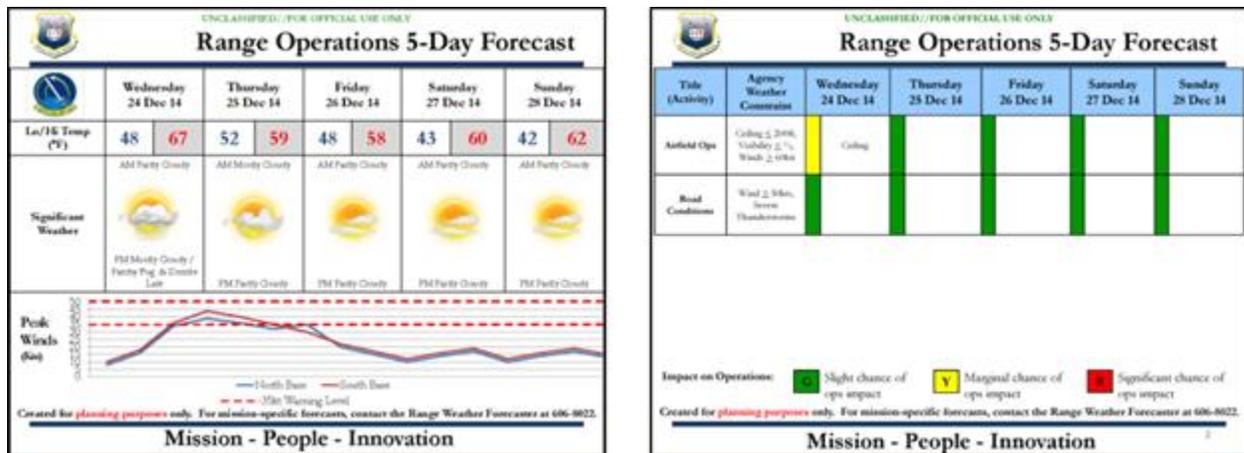
3.15. PMSV. RWFs provide PMSV response during operating hours on assigned frequency 342.4MHz. Aircrews shall relay PIREPs during PMSV contacts. PMSV phone patches will go through the RWF. Contact information is found on Attachment 2, Points of Contact. See paragraph 9.5 for PMSV outage procedures.

Chapter 4

PLANNING WEATHER

4.1. Range Operations 5-Day Forecast. This forecast is for planning purposes and is issued at 0600L and 1600L Monday through Friday. The forecast highlights weather conditions that may affect upcoming range operations (Figure 4.1. and 4.2.). The forecast is coded Green/Yellow/Red for each specific operation to indicate the likelihood of any weather impacts. If Y or R is forecast for the operation, the weather element expected to violate a constraint is annotated next to the Y or R indicator. This forecast is for mission planning only. Prior to beginning any operation, agencies should contact the RWF to obtain a site/mission-specific forecast.

Figure 4.1. Example of Range Operations 5-Day Forecast.



4.2. Launch-X (L-X) Day Forecasts. The LWO provides operational weather forecasts for all spacelift and ballistic missile launch/recoveries. Mission forecasts that specify the probability of violating constraints are typically issued at L-3 or L-2 days and are provided in the standard format (Figure 4.2.). LX day forecasts are not amended and are issued once per day leading up to a mission.

Figure 4.2. Examble of L-X Day Forecast.

UNCLASSIFIED//FOUO



L-3-Day-Forecast

Western-Range-Operation-Forecast

W7260

Issued: 08-Dec-14 / 0920L (08/1720Z)
 Valid: 11-Dec-14 / 1917L - 1927L (12/0317Z - 0327Z)

Vehicle/Payload: Atlas V, NROL-35
 Location: VAFB-SLC-3E

Launch-Weather-Officer: 2d Lt Joe Round (805) 606-3210 DSN 276-3210
 1st Lt Johnny Martin (805) 606-8684 DSN 276-8684 Forecaster (805) 606-8022

T-0-Forecast: A well-developed frontal system will dig into the west coast on Thursday with frontal passage occurring just after T-0. As such, unsettled weather is expected for the range to include precipitation, cumulus clouds, thick clouds, disturbed weather, strong winds, and a slight change for lightning as the system moves through the region. Cloud bases will be down around 1,800 feet with visibility between 5 and 7 miles in rain showers. Winds ahead of the system through the early portion of the count (to include MST-Roll) will be southerly at 25-30 knots with gusts up to 45 knots at 168 feet. They will back off slightly to southerly at 20-25 knots gusting to 35 knots by T-0. Temperatures will be 55F to 61F. Max upper level winds will be southwesterly at 115 knots from 30,000 to 36,000 feet. Current proton flux is at standard background levels. Overall POV will be 90% with Thick Clouds and Disturbed Weather being the primary constraints of concern (see below for additional constraints and their associated POVs).

24-Hour-Scrub-Forecast: While the main brunt of the system will be east of the range Friday afternoon, lingering post-frontal cumulus clouds will be an issue for the scrub forecast. Cloud bases will lift to 2,000 feet and visibility will drop to 4 to 6 miles in rain showers. Winds will be northwesterly at 20-25 knots and temperatures will drop to 53F to 58F. Max upper level winds will be northwesterly at 65 knots from 30,000 to 39,000 feet. Overall POV will drop to 60% with Cumulus Clouds and Disturbed Weather becoming the primary constraints of concern.

Clouds	Coverage	Bases	Tops
Stratocumulus	6/8ths	1,800-ft	4,000-ft
Cumulus	2/8ths	1,800-ft	15,000-ft
Nimbostratus	7/8ths	12,000-ft	18,000-ft
Cirrus	8/8ths	23,000-ft	26,000-ft
Cirrus	5/8ths	30,000-ft	33,000-ft

Visibility: 5-7 miles
 Weather: Scattered Showers
 Wind: 150-180 at 20-25 gust 35 knots
 Temperature: 55-61° F

Overall probability of violating weather constraints: 90%
 Areas of concern: Thick Clouds (90%), Disturbed Weather (90%), Winds (80%), Launch Visibility (80%), Cumulus (70%), Precipitation (20%), Lightning (10%), Debris Clouds (10%)

Overall probability of violating weather constraints for 24-Hour-Delay: 60%
 Areas of concern: Cumulus (60%), Disturbed Weather (60%), Lightning (30%), Debris Clouds (30%), Thick Clouds (30%), Precipitation (30%), Launch Visibility (20%)

Next-Forecast-Issuance: 09/0830L QC: TB

4.3. Staff Weather Briefings. Any 30 SW agency can request a weather briefing to an audience located on base. Some examples of staff weather briefings are the wing staff meeting, mission briefs, NST, and deployment weather briefings. If the location of interest for the briefing is susceptible to tropical cyclone activity, keep in mind the 48 to 72 hour tropical cyclone outlooks contain a high degree of uncertainty, are for planning purposes only, and are subject to change. The WF will not deviate from the official tropical cyclone forecasts provided by the 25 OWS, National Hurricane Center, or Joint Typhoon Warning Center.

4.4. X-37B 7-Day Forecast. The X-37B 7-Day Forecast is a planning tool for interested Boeing personnel. This planning weather will continue until the supported agency deems it is not required. The briefing consists of the following slides:

4.4.1. Slides 1-3: 7-Day slides, each focused on a particular criteria, in stop light chart fashion.

4.4.1.1. Slide 1: Wind restrictions vary per mission and are found in Universal Document System (UDS).

4.4.1.2. Slide 2: Precipitation within 30 nm, lightning within 30 nm and thunderstorms within 10 nm.

4.4.1.3. Slide 3: Visibility > 200 ft, Temperature < 25°F and > 100°F, relative humidity < 98% and temperature/dew point depression > 2°F.

4.4.2. Slide 4: 7-Day Lightning Launch Commit Criteria Forecast (either red or green).

4.4.3. Slide 5: Western U.S. satellite image.

4.4.4. Slides 6- 13: Forecast jet stream covering the 7-Day period.

4.4.5. Slide 14: Vandenberg climatology for the current month.

4.5. Joint Strike Force (JSF) Briefs. The JSF brief is part of the Major Range and Test Facility Base (MRTFB) base support and a product requirement for Frontier controllers and telemetry/radar instrumentation provided by 2 ROPS. This briefing consists of the following slides:

4.5.1. Slide 1: Current satellite image that depicts the main weather concern for the mission day.

4.5.2. Slide 2: Significant wave height forecast for the mission time period.

4.5.3. Slide 3: Current sea surface temperatures around the mission area.

Chapter 5

MISSION WEATHER PRODUCTS

5.1. Mission Weather Products (MWP). The WF will deliver MWPs through three different avenues: Flight Weather Briefing (DD Form 175-1), THZ forecasts, and on console mission forecasts. WF personnel will tailor information delivery to critical decision points (outlined on the MWPs) within the supported agencies' operational cycle (e.g., mission planning) where a weather forecast would provide the maximum benefit to the successful outcome of the mission. In accordance with AFI90-802, Risk Management (RM) will be implemented through the following table:

Table 5.1. RM 5-Step Process.

Step	Example
1. Identify the Hazard	Is there a potential for lightning or 50kt winds?
2. Assess Hazards	How close are we at seeing 50kt winds? Will it be just a one-time occurrence or do we think the winds will howl for several hours?
3. Develop Controls & Make Decisions	Is VAFB better served with a Weather Watch for potential damaging winds or are we confident enough to go ahead and issue a Warning? The RWF will select the appropriate WWA to issue
4. Implement Controls	Issue the WWA and ensure the appropriate agencies are contacted.
5. Supervise and Evaluate	Continue METWATCH and cancel any WWAs if/when warranted.

5.2. Flight Weather Briefing, DD Form 175-1. The WF will provide flight weather briefings to tenant units and transient aircrews when requested. The RWF will conduct the flight weather briefings by telephone, email or fax. Flight departure, enroute, and destination weather is briefed using DD Form 175-1, Flight Weather Briefing, or local log. WR mission briefings will include off-shore weather conditions, sea states and other information, as requested.

5.3.2.3. Observed wind speed is less than 4 knots and initial Potential Hazard Zone (PHZ)/Emission Hazard Zone (EHZ) forecast azimuth was not circular.

5.3.2.4. Observed wind speed is 4 knots or greater and initial PHZ/EHZ forecast azimuth was circular.

5.3.2.5. Observed standard deviation is two or more times the initial standard deviation.

5.3.2.6. Observed wind direction differs from the initial wind direction by plus or minus twice the initial standard deviation or more.

5.3.3. The originator of the request receives the THZ by phone and/or JET.

5.3.4. Hot spill toxic forecasts are prepared and disseminated by 30 SW/SEL incorporating data provided by WOC personnel.

5.4. On Console Weather Forecast. The Launch Weather Team (LWT) uses all meteorological sensing equipment, to include weather reconnaissance aircraft, to assess the current and forecast atmospheric conditions for mission operations. The LWT must have *clear and convincing* evidence that all launch commit criteria (LCC) are not being violated. The eight range safety LCCs are mandatory to protect Vandenberg vehicles from natural and triggered lightning (Figures 5.2. through 5.11.). The WF uses the Advanced Weather Interactive Processing System (AWIPS) to create an on console weather forecast. The product is amended as conditions warrant with consensus of the LWT. The slides are updated and the launch agency/range is notified of mission impacts IAW on console checklists. The briefing is typically composed of:

5.4.1. Slide 1: General Slide detailing mission information (name of mission, date of launch, etc.)

5.4.2. Slide 2: Severe Weather Status highlighting any WWAs

5.4.3. Slide 3: Exposure Forecast

5.4.4. Slide 3: Launch/recovery Forecast

5.4.5. Slide 4: Range Safety Launch Commit Constraints

5.4.6. Slide 5: Launch Agency Weather Constraints Status

5.4.7. Slide 6: Overall Probability of Violation (POV)

5.4.8. Slide 7: 24-Hour Scrub Forecast and Overall POV

Figure 5.2. Lightning.

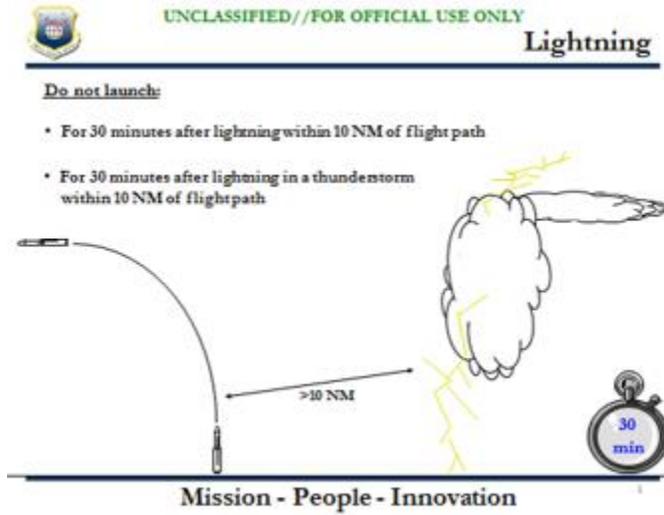


Figure 5.3. Cumulus Clouds.

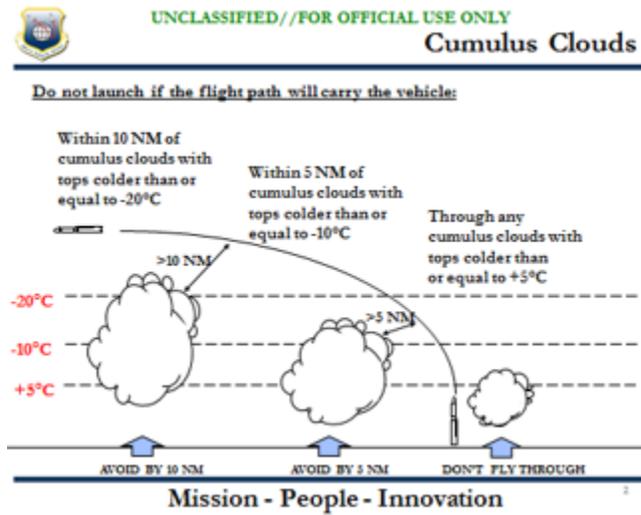


Figure 5.4. Attached Anvils.

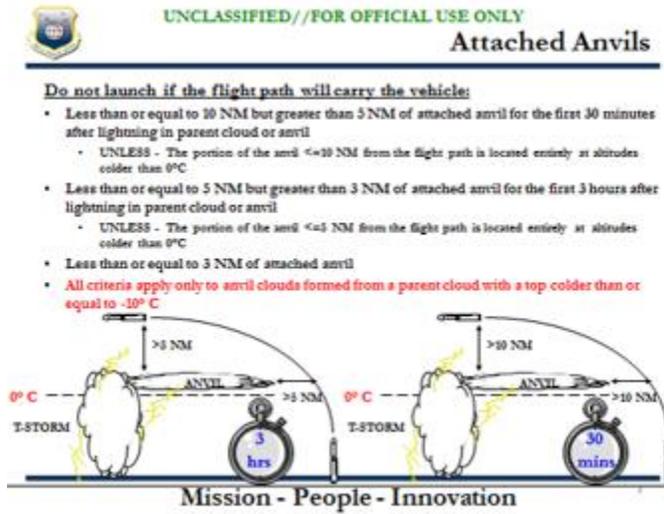


Figure 5.5. Detached Anvils.

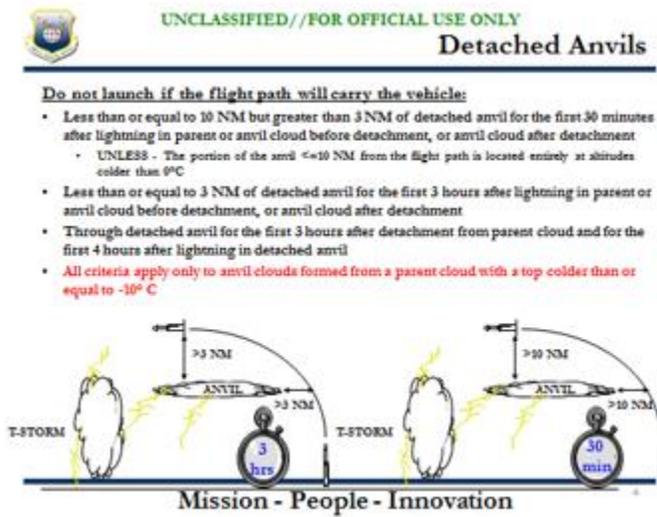


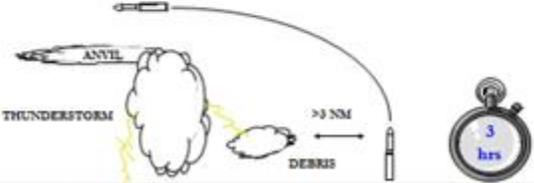
Figure 5.6. Debris Clouds.

UNCLASSIFIED//FOR OFFICIAL USE ONLY

Debris Clouds

Do not launch if the flight path will carry the vehicle:

- Less than or equal to 3 NM of a debris cloud during a 3-hour period
- Applies only to debris clouds whose parent cumuloform cloud has had any part at an altitude where the temperature was colder than -20°C or to any debris cloud formed by a thunderstorm
- 3-hour period: Begins after debris cloud detaches from parent cloud, or when debris cloud forms from decay of parent cloud top to an altitude warmer than -10°C , or after any lightning in debris cloud



Mission - People - Innovation

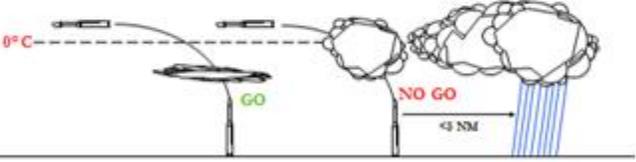
Figure 5.7. Disturbed Weather.

UNCLASSIFIED//FOR OFFICIAL USE ONLY

Disturbed Weather

Do not launch if the flight path will carry the vehicle:

- Through clouds associated with disturbed weather that has clouds tops colder than 0°C and that contains, within 5 NM of flight path, either:
 - "Moderate precipitation" or greater; or
 - Evidence of melting "precipitation" such as radar "bright banding."



Mission - People - Innovation

Figure 5.8. Thick Clouds Part 1.

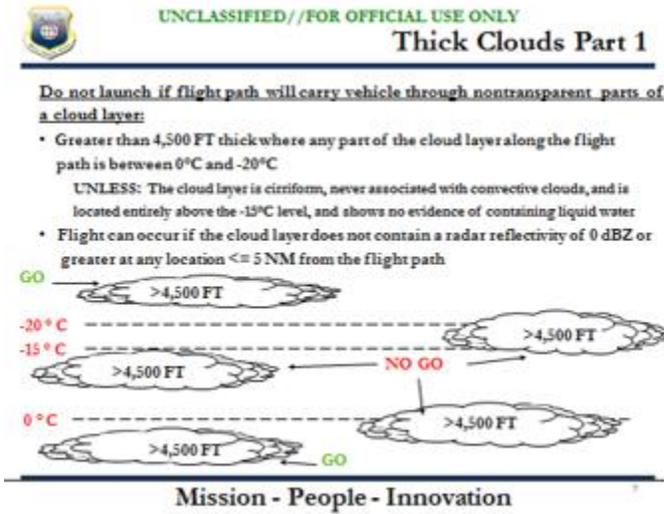


Figure 5.9. Thick Clouds Part 2.

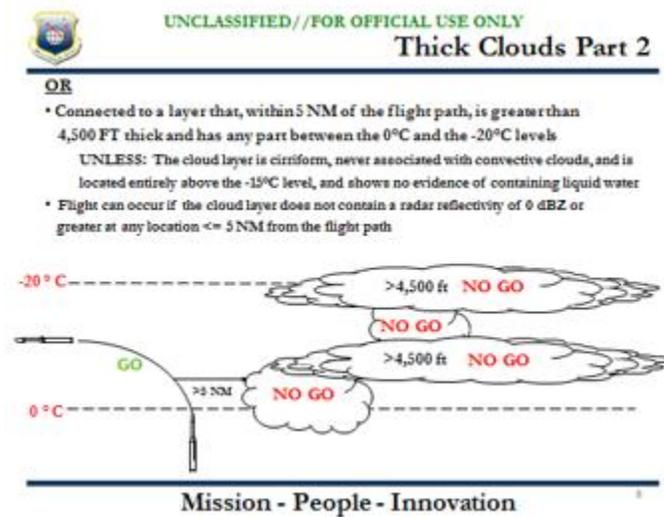
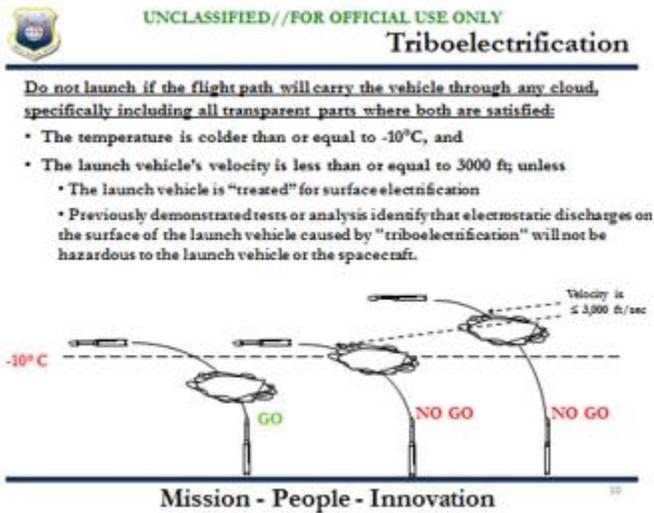


Figure 5.10. Smoke Plumes.



Figure 5.11. Triboelectrification.



Chapter 6

LAUNCH/RECOVERY WEATHER SERVICES

6.1. Launch/Recovery Support. The WF provides comprehensive launch/recovery support for DoD, commercial, and civil spacelift, ballistic missile test, and spacecraft recovery operations at VAFB. Each customer requests weather support in the UDS based on their mission-unique requirements for the space environment, wind, precipitation, temperature, etc. The available 30 OSS/OSW support is then documented in the applicable OD. The major launch/recovery systems supported at VAFB include Delta II, Delta IV, Atlas V, Pegasus, Minotaur, Minotaur-C, X37B, Falcon 9, and MDA test vehicles and interceptors. Descriptions of these systems are found in the Forecast Reference Material (FRM).

6.2. Pre-launch/Recovery Weather Support. Seventy two hours prior to launch, the RWF will take over the TAF (if identified as necessary by the LWO) and WWA support for the WR. Other weather services provided prior to the day of launch/recovery include:

6.2.1. Weather Constraint Coordination. The LWO, in consultation with the Program Support Manager (PSM), range safety, and the launch customer, assists in determining the launch weather constraints for each mission and how the constraints will be monitored. The resulting documents that detail the weather constraints are the OD and the launch constraints document. Launch vehicle specific weather sensitivities and support requirements change with each mission and are identified within the UDS.

6.2.2. Balloon Tests. Upper-air weather services and the ability of the launch customer to access balloon data are often tested several times leading up to the launch/recovery. Members of the LWT will release the balloons and make any required editing of the data during these balloon tests.

6.2.3. Dress Rehearsals. The LWO participates in rehearsals that are part of each mission campaign to include wet dress and mission dress rehearsals.

6.2.4. Preliminary Briefings/Reviews. The LWO provides operational weather forecasts for all spacelift and ballistic missile launch/recoveries. The L-X day forecasts are provided in the standard format (see [Chapter 4](#), Planning Weather). In addition, LWOs provide weather briefings at the Group Readiness Review, Pre-Launch Readiness Review, and Launch Readiness Review as well as other reviews depending on the launch agency and vehicle.

6.3. Day of Launch/Recovery Weather Support. The WF utilizes the majority of its personnel to provide weather support on the day of launch/recovery.

6.3.1. On Console Weather Support. The LWO leads the LWT and must have *clear and convincing* evidence that all launch commit criteria and launch agency constraints are not being violated. With the concurrence of the LWC, the LWO gives the final weather "go" for launch/recovery. During on-console briefings, the LWO provides current status as either "Red" or "Green" indicating a constraint is either currently violated or not violated. The LWO also provides a POV, which indicates the probability that a constraint will be violated at T-0. A high POV value indicates a likely "Red" condition at T-0 and allows the launch agency to choose a desired hold point in the count that occurs before an irreversible event in the countdown.

6.3.2. Upper-Air and Surface Observing. Upper-air balloon observations as well as balloon editing services are provided on the day of launch/recovery. These observations are needed by the launch customer in making the final decision to launch and by 30 SW/SEL in determining safety of flight. The balloon schedule is determined by range safety requirements and by the launch customer requirements outlined in the OD. Although each mission has its own unique balloon schedule, the first balloon is generally released approximately 8-10 hours before T-0. On average, weather balloons are then released approximately every hour; however, the time between balloon releases varies widely within each mission.

6.3.3. Cold Spill Toxic Hazard Zones. Cold-spill toxic analyses are provided by the RWF during the countdown to determine the threat to the base and local population in the event of an unplanned release of toxic chemicals before the launch. An increase in the size of a cold-spill THZ does not itself impact the launch countdown. It can be used by range safety and/or the launch agency as a reason to avoid proceeding with a particularly dangerous stage of the countdown where the potential for a toxic spill is at its greatest.

6.3.4. Hot Spill Weather Forecast. During mission operations the WF provides specialized wind and thermodynamic forecasts for T-0. These forecasts are used by 30 SW/SEL to conduct hot spill safety analyses using the Launch Area Toxic Risk Analysis 3D (LATRA3D) program.

6.3.5. Blast Distant Focusing Overpressure Model (BlastDFO). For certain mission operations, namely large class EELVs (Delta IV, Atlas V, and Falcon 9), the WF provides wind and thermodynamic forecasts to 30 SW/SEL to conduct blast distant focusing overpressure analyses using the BlastDFO model. Based on the results of the BlastDFO output, 30 SW/SEL may halt the countdown or delay the mission due to the threat to personnel and the public.

Chapter 7

WEATHER WARNINGS, WATCHES, AND ADVISORIES (WWAS)

7.1. Customer Requirements. Western Range agencies and customers needing special WWA support will document their requirements and forward them to the WF/CC for review and validation. Customer requirements must include weather phenomenon and thresholds (when applicable), lead-time required for notification, and actions taken by the customer upon receipt of a WWA. The final decision is left to the WF/CC to approve changes to current lead times due to mission constraints of other users. Figure 7.1. shows a complete list of those agencies and offices that get notified in the event of a WWA issuance. Customers are notified via JET email notifications and/or via automated phone notification. Should those methods be inoperative, Figure 7.1. outlines what office will make a phone notification. 30 MDOS/SGOJ, Bioenvironmental Engineering, provides Wet Bulb Global Temperature (WBGT) measurements and provides flag conditions for heat stress.

7.2. Meteorological Watch (METWATCH) Program. Via the METWATCH program, the 25 OWS and the WF monitor observations and forecasts for weather conditions that will endanger property or life, pose a safety hazard, or adversely affect a supported customer's operations. When these conditions are observed or forecast to occur, the 25 OWS will notify customers of these critical weather conditions through WWAs issued via JET.

7.2.1. Weather Warnings. A warning is a special notice to supported agencies of an established weather condition that is either occurring or expected to occur.

7.2.2. Weather Watches. A watch is a special notice to supported agencies of an established weather condition that has the potential to occur. A warning may be issued if atmospheric conditions persist or worsen.

7.2.3. Weather Advisories. An advisory is a special notice to supported agencies of an established, non-severe (i.e., does not pose a threat to life or property) weather condition that is either occurring or expected to occur.

7.3. WWA Criteria. The 25 OWS prepares and issues weather WWAs for VAFB as defined in Tables 7.1 and 7.2. The WF will issue observed WWAs while on duty as defined in Table 7.3. The 25 OWS will issue observed WWAs during all other hours. Desired Lead Time (DLT) is the advanced notice a supported agency needs to react to an advisory or warning/watch and to put protective measures into effect. VAFB weather warnings and watches require lead times that deviate from the standard as listed in AFMAN 15-129V1, Table 4.1. These deviations have been coordinated with Western Range Customers and the 30th Space Wing Commander to meet the unique mission and resource protection requirements of Vandenberg AFB. This requires base personnel to take appropriate protective measures due to warnings/watches issued for 10 NM vice 5 NM distances, as noted in AFOSH Standard 91-100. Resource protection and emergency actions resulting from weather events/natural disasters are further addressed in the 30 SW Comprehensive Emergency Management Plan (CEMP) 10-2.

7.4. Weather WWA Customer Thresholds and Actions. Table 7.4 shows all of the Vandenberg weather warning and watch customers, their weather thresholds, and the actions they take when one of their thresholds are met.

Figure 7.1. WWA Notification Chain.

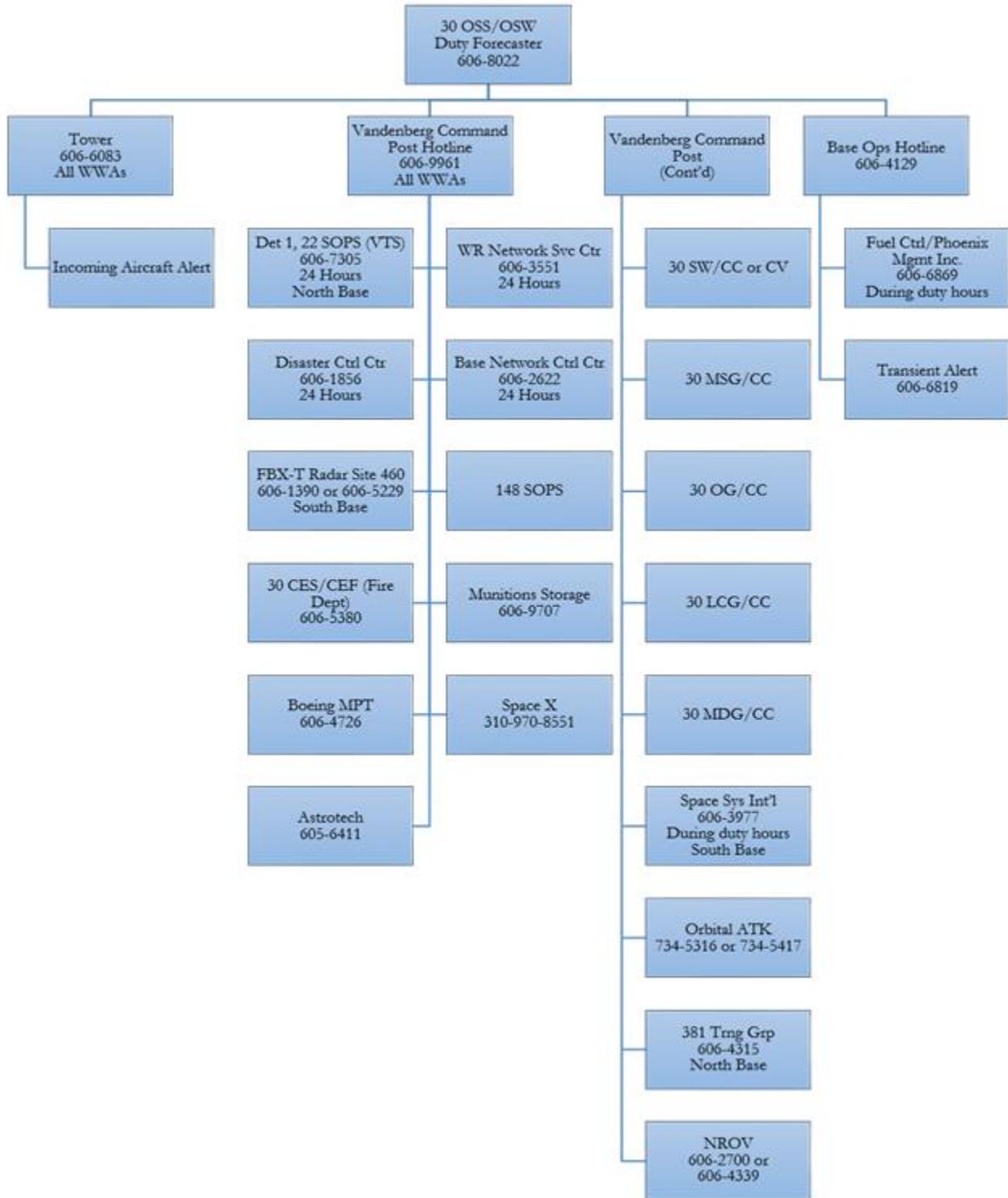


Table 7.1. Weather Warning Criteria.

CRITERIA	DLT	LOCATION
Tornado	15 Min	Within 10 NM of VAFB boundary
Strong Wind: Surface winds not associated with thunderstorms \geq 35-49 kts for elevations < 1000 ft excluding tower 81 (Boathouse)	1 Hour	North VAFB, South VAFB, and Vandenberg Airfield
Damaging Winds: Surface winds not associated with thunderstorms \geq 50 kts for elevations < 1000 ft excluding tower 81 (Boathouse)	2 Hours	North VAFB, South VAFB, and Vandenberg Airfield
Surface wind \geq 65 kts for elevations above 1000 ft and tower 81 (Boathouse)	2 Hours	Elevations above 1,000 feet and tower 81 (Boathouse)
Heavy Rain \geq 2 inches within 12 hours	1 Hour	Within 10 NM of VAFB boundary
Severe Thunderstorm: Winds \geq 50 kts associated with thunderstorms and/or hail \geq 3/4 inch	1 Hour	Within 10 NM of North VAFB, South VAFB
Moderate Thunderstorm: Winds \geq 35 - 49 kts associated with thunderstorms and/or hail \geq 1/4 inch	1 Hour	Within 10 NM of North VAFB, South VAFB
Lightning	Observed	Within 10 NM of North VAFB, South VAFB
Freezing Precipitation	1 Hour	Within 10 NM of VAFB boundary

Table 7.2. Weather Watch Criteria.

CRITERIA	DLT	LOCATION
Tornado	As potential warrants	Within 10 NM of VAFB Boundary
Damaging Winds- Surface Winds not associated with thunderstorms \geq 50 kts for elevations below 1000 ft excluding tower 81 (Boathouse)	As potential warrants	North VAFB, South VAFB, and Vandenberg Airfield
Heavy Rain \geq 2 inches within 12 hours	As potential warrants	Within 10NM of VAFB boundary
Severe Thunderstorm: Winds \geq 50 kts associated with thunderstorms and/or hail \geq 3/4 inch	As potential warrants	Within 10 NM of North VAFB, South VAFB
Lightning	2 Hours	Within 10 NM of North VAFB, South VAFB
Freezing Precipitation	As potential warrants	Within 10NM of VAFB boundary

Table 7.3. Weather Advisory Criteria.

CRITERIA	DLT	LOCATION
Surface Temperature $\geq 85^{\circ}$ F	Observed	Main Base

Table 7.4. Weather Warning and Watch Customer Thresholds and Actions.

ORGANIZATION/ LOCATION	WEATHER THRESHOLD(S)	THEIR ACTIONS TAKEN
FBX-T Radar Site, Site 460, South Base	.Winds GTE 48 kts (Will use wind watch/warning for surface winds 3549 kts) .Thunderstorms within 10 NM	Shut down power, inspect site, lock doors, and evacuate
Fitness Center North Base	.Lightning <u>Watch</u> North Base .Rain 2 inches in 12 hrs	Call coaches and teams to cancel sporting events
Pool North Base	Lightning Warning North Base	Evacuate Pool
Fam Camp North Base	Winds 50 kts or greater Tornados Rain 2 inches in 12 hrs	Notify Campers
Det 1, Vandenberg Tracking Station	.Winds GTE 39 kts (Will use wind watch/warning for surface winds 35- 49 kts) .Winds GTE 65 kts	At 39 kts stow 23 ft antenna; at 65 kts stow the domed antenna
BNCC	All warnings	BNCC relays warnings to techs in the field
NRO	All Warnings/Watch	Relay info to all of their Facility Managers (winds and lightning mostly)
Golf Shop	Lightning W/I 10 NM	Inform Golfers
Frontier Control	All Warnings/Watches/Advisories	Relay pertinent info to pilots
381st TRG	Advisory for Temp GTE 85° F in cantonment area. Lightning Warning	Limit student physical activity
Security Forces Control Center	Any severe weather on base	Warn duty personnel
Western Range Network Service Center (RGNext)	Any wind, lightning, tornado or rain warnings	Inform maintenance teams to take cover
Fire Department	All warnings and watches	Inform FD team for all situations
Disaster Control Center	All warnings and watches	Inform work crews out climbing power poles and digging holes etc
Space System International	Winds GTE 35 kts Winds GT 20 kts	Stop tower roll at SLC-8 Will not open rear hangar doors to move satellites in and out of

		SLC-6
NASA KSC and Associated Contractor	Lightning w/i 10 NM	Stop all HAZOPS like ordnance work, lifting, or toxics
Munitions Storage Area	Lightning w/i 10 NM	Stop all work on munitions
GMD (VOSC)	All Weather Warnings and Watches	Notify Prime contractor, their sub-contractors, and all GMD facilities that house explosive material or conduct hazardous operations affected by weather
Orbital Sciences/Missile Assembly Bldg 1819 North Base	Lightning w/i 10 NM	Inform work crews/Evacuate Building
ULA Bldg 945	Lightning w/i 10 NM	Evacuate Building
Boeing MPT North Base	Lightning w/i 10 NM	Shut down simulators and trainers
576 MMOC	All Weather Warnings and Watches	Brief commander, notify maintenance/operation crews
Child Development/Youth Center	Lightning w/i 10 NM Tornado Hail \geq 1/4 inch Surface Wind \geq 50 kts	Youth sports programs cancelled or delayed, no outside play

7.5. Severe Weather Action Procedures (SWAP). The duty forecaster will alert the WF NCOIC if there is a potential for severe weather. The WF NCOIC will determine if the Severe Weather Action Team (SWAT) needs activation. The SWAT will respond as required, before the expected occurrence of a severe weather event to analyze and assess the weather threat. If the SWAT determines the installation is at risk for severe weather, then a contingent of the SWAT will remain on duty performing enhanced MISSIONWATCH until the threat has passed. However, if the SWAT determines the installation is not at risk for severe weather, the weather support will return to normal operations. The SWAT team is composed of the SWAT leader (WF NCOIC or WF/CC) and any other weather personnel deemed essential by the SWAT leader. During non-duty hours, the 25 OWS will notify the designated WF standby person of any severe weather potential. In turn, this person will contact SWAT members as necessary.

7.6. Severe Weather Reporting. After an occurrence of severe weather (Any natural disasters affecting VAFB, any tropical storm within 24 hours or 250 miles, with potential impact to VAFB, or when any significant weather occurs and results in Class A or B damage, base closure, or mission degradation), the weather unit will report the following items to VCP, if requested: the actual severe weather conditions experienced; the forecast valid at the time of the occurrence to include any watches or warnings issued; and the operational status of meteorological equipment at the time of the event. If there is damage to Air Force property that rises to DoD, AF or MAJCOM interests, the VCP will report the severe weather occurrence on Vandenberg AFB in accordance with OPREP-3 reporting procedures in AFI 10-206.

Chapter 8

SPACE WEATHER

8.1. General. The foundation for information dominance lies in effective, secure military communications. Both space and terrestrial weather environments can degrade military communication systems. One of the objectives of the 557 Weather Wing (557 WW) is to provide analysis and forecast products that provide military communicators and end users with a single picture of potential environmental effects that may impact their systems. Several Vandenberg platforms are affected by space weather and could delay or scrub a launch/recovery.

8.2. WF Responsibility.

8.2.1. Identify those units and operations, within its purview, that may be affected by space weather events and should receive space weather support and interpret, apply, and tailor 557 WW and other space products to provide mission-enhancing data to their supported agencies.

8.2.2. Interpret, apply and tailor existing products for the appropriate supported agencies.

8.2.3. Submit any known space weather impacts within launch area to the 557th Weather Wing (557 WW) via the Space Weather Impact Debriefing and Assessment Form located on AF WEBS.

8.2.4. Be knowledgeable of the 557 WW space weather products built around six categories of missions/systems adversely affected by space weather.

8.2.5. Be aware of these space weather products and determine their utility to other supported agencies. If existing products do not meet supported agency's needs, requests for new products may be submitted through 557 WW to meet requirements.

8.2.6. Supported agencies will review solar impacts and contact the WF with their requirements.

8.3. Space Weather Events.

8.3.1. There are three space weather events that could cause impacts to operations:

8.3.1.1. Solar Activity: Occurrence of M-class or X-class solar flares and significant (R3 or greater) solar radio bursts.

8.3.1.2. Charged Particle Environment: When high energy protons ≥ 50 mega electron volts (MeV) increase above 10 particle flux units (pfu).

8.3.1.3. Geomagnetic Activity: When the planetary index (better known as the K-index) rises above 7.

8.3.2. There are six space environmental impacts:

8.3.2.1. High Frequency (HF) communications: Temporary degraded or total loss of HF communications. Solar flares usually affect the lower portion of the HF spectrum, but can blackout the entire spectrum if sufficiently energetic. Strong geomagnetic activity often results in a decrease in the ionosphere's ability to reflect HF signals.

8.3.2.2. Ultra High Frequency (UHF) SATCOM: Temporary degraded or total loss of UHF SATCOM communications due to changes in the ionosphere and occurs in the high latitudes and equatorial region. Strong geomagnetic activity can significantly degrade UHF communications.

8.3.2.3. Satellite Operations/Health: Spacecraft anomalies and degradation of spacecraft components due to radiation interference to communication satellite circuits. Geomagnetic particles can enhance and accelerate particles in the space environment which can cause damage through a discharge, or can damage the satellite through collision or by overwhelming or disorienting the satellite's sensors.

8.3.2.4. Satellite Object Tracking/Satellite Drag: Space object tracking loss and increase drag on low earth orbiting spacecraft. Drag results from the heating or cooling of the upper atmosphere due to the changes in the sun's radiation output, or to geomagnetic activity.

8.3.2.5. High Altitude Flight: Harmful radiation dosage to personnel in high altitude operations. This radiation is a product of cosmic rays from outside the solar system as well as very high-energy protons occasionally produced by explosive events on the sun.

8.3.2.6. Radar Interference/Anomalous Returns: Increased interference or false returns to sunward and/or poleward looking radars. Radio frequency bursts from the sun can cause interference to radars when the sun is in their field of view. Anomalous returns can occur when the geomagnetic activity disturbs the ionosphere.

Chapter 9

DISSEMINATION OF WEATHER INFORMATION

9.1. Weather Data Systems.

9.1.1. JET is used to acquire, process, display, and disseminate weather information. JET is used to transmit and receive weather observations, forecasts, and WWAs. Anyone possessing a valid JET account within the VAFB firewall can access weather information going to <https://owsjet2.dm.af.mil/portal/public/Guest/>. Additional supported agencies requiring JET access should contact the WF NCOIC.

9.1.2. Integrated Data System 5 (IDS 5). The IDS 5 system displays many types of airfield-related information, including weather, to Vandenberg Command Post and the Airfield Tower.

9.1.3. External User Interface (XUI). The XUI is a website on which users can monitor and download wind tower, profiler, and balloon data from across the WR.

9.2. Communication Outages.

9.2.1. JET External Communications. In the event of a system outage, the WF will contact the Base Network Control Center (BNCC) and/or JET Helpdesk to troubleshoot and mitigate the problem. In the interim, weather data will be retrieved via the Internet, using the AF WEBS or other meteorological web pages.

9.2.2. JET Terminal Outage. In the event a supported agency's JET access is unavailable, the supported agency will notify the WF of the outage and arrange alternate support if possible during the outage.

9.3. Telephone Hotlines. Hotlines connect the WOC to other VAFB agencies as listed below. Agencies must report hotline outages to 30 SCS telephone maintenance.

9.3.1. VCP (Bldg 10577)

9.3.2. Upper-air Observatory (Bldg 1764)

9.3.3. AOS (Bldg 1746)

9.3.4. 30 OSS/OSAA: Airfield Management Operations Flight Planning Room (Bldg 1746)

9.4. Closed Circuit Television (CCTV). During WR mission operations, weather information is routinely disseminated via the VAFB CCTV network.

9.5. Pilot-to-METRO-Service (PMSV). Edwards AFB provides backup PMSV coverage during extended PMSV outages. Airfield Management will update NOTAMs as needed.

Chapter 10

EMERGENCY/CRISIS AND BACK-UP SUPPORT

10.1. General. In the event of an emergency or crisis WF members will follow checklists outlined in the unit Emergency Action Binder located in Bldg 21150. The 25 OWS will provide backup during catastrophic communication and/or power outages as outlined on the Installation Data Page. If neither the Emergency Action Binder nor Installation Data Page covers the emergency/crisis WF, members will follow leadership direction using the RM 5-step process outlined in Table 5.1.

10.2. Alternate Observation Site (AOS). In the event Bldg 1764 is evacuated, surface observing support will be conducted from Base Operations, Bldg 1746. Service may be slightly degraded while the observer is operating from Bldg 1746. There is no alternate upper-air observing location.

10.3. Alternate Operating Location (AOL). In the event Bldg 21150 is evacuated, forecast operations and toxic hazard zone support will be conducted from the WF Surface and Upper-air Observing Facility, Bldg 1764. All products and services that are produced at the primary location, Bldg 21150, except PMSV information, can and will be produced at the alternate location. The quality of forecast products may be slightly degraded while the forecaster is operating from Bldg 1764 due to lack of access to the Doppler weather radar, local lightning detection system and locally-saved climatology data. As a backup for the PMSV, Edwards AFB will be asked to monitor our frequency in order to ensure pilots receive needed service.

J. CHRISTOPER MOSS, Colonel, USAF
Commander

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

DoD Flight Information Publications

AFPD 15-1, *Atmospheric and Space Environmental Support*, 12 November 2015

AFI 15-114, *Functional Resource and Weather Technical Performance Evaluation*, 7 December 2001

AFI 15-128, *Air and Space Weather Operations – Roles and Responsibilities*, 7 February 2011

AFI 10-206, *Operational Reporting*, 11 June 2014

AFI 10-2501, *Air Force Emergency Management Program*, 19 April 2016

AFMAN 15-111, *Surface Weather Observations*, 27 February 2013

AFMAN 15-124, *Meteorological Codes*, 28 February 2013

AFMAN 15-129V1 *Air and Space Weather Operations-Characterization* 6 December 2011

AFMAN 15-129V2 *Air and Space Weather Operations-Exploitation* 7 December 2011

AFSPCMAN 91-710, *Range Safety User Requirements, V6*, 1 Jul 2004

30 SW CEMP 10-2, *Comprehensive Emergency Management Plan*, March 2013

30 SWI 91-106, *Toxic Hazard Assessments*, 3 July 2007

EWR 127-1, *Eastern and Western Range Safety Requirements*, 31 December 1999

JP 3-59, *Meteorological and Oceanographic Operations*, 7 December 2012

Abbreviations and Acronyms

AFTOX— Air Force Toxic Diffusion Model

AOS— Alternate Observation Site

ATAD— Automatic Telephone Answering Device

DoD— Department of Defense

EHZ— Emission Hazard Zone

FLIP— DoD Flight Information Publications

FMQ— Fixed Meteorological Equipment

HAZMAT— Hazardous Materials

JET— Joint Environmental Toolkit

MARSSS— Meteorological and Range Safety Support System

METAR— Meteorological Aerodrome Report

METWATCH— Meteorological Watch

MSL— Mean Sea Level

NM— Nautical Miles

NOTAM— Notice to Airman

NST— New START Treaty

OHZ— Operational Hazard Zone

OWS— Operational Weather Squadron

PAPI— Precision Approach Path Indicator

PHZ— Potential Hazard Zone

PIREP— Pilot Report

PMSV - Pilot-to-Metro Service

ROS— Representative Observation Site

RSOR— Range Safety Operations Requirements

SPECI— Aviation Selected Special Weather Report (An unscheduled report taken when certain criteria have not been met)

START— Strategic Arms Reduction Treaty

TAF— Terminal Aerodrome Forecast

THZ— Toxic Hazard Zone

UCC— Unit Control Center

UTC— Universal Time Coordinate (ZULU Hour)

VAFB— Vandenberg Air Force Base

VCP— Vandenberg Command Post

WF— Weather Flight

WOC— Weather Operations Center (Bldg. 21150)

WR— Western Range

WRCC— Western Range Control Center

XUI— External User Interface

Terms

Aircraft Mishap— Term used to denote the occurrence of an aircraft accident or incident.

Airfield— The geographical coordinates are 34 degrees and 44 minutes North latitude and 120 degrees and 35 minutes West longitude with a field elevation of 367 ft above MSL. The magnetic deviation for Vandenberg AFB is +14.5°; we round this to +10° for airfield operations, and there is -8 hours difference between local standard time and GMT (-7 hours during Daylight Savings Time).

Ceiling— In aviation forecast code, the ceiling is equal to the height above the earth's surface of the lowest broken (5/8ths coverage or more) or overcast (8/8ths coverage) layer of clouds or the vertical visibility into an indefinite ceiling.

Chemical Downwind Message— A chemical downwind message (CDM) contains wind, stability, temperature, relative humidity, weather, and cloud data, valid for a 6-hour period, used to calculate chemical downwind hazards.

Desired Lead Time— The amount of advance notice an agency requires prior to the onset of a particular weather phenomenon.

Indefinite Ceiling— The vertical visibility, measured in feet, into a surface based total obscuration which hides the celestial dome (8/8ths coverage).

Main Base— The main base is located near the windward side of the Santa Lucia Range. This would include the cantonment area of the base, the airfield to the west, and the Lompoc Gate to the south.

METWATCH— Meteorological Watch. The process of monitoring the weather and informing designated agencies when certain weather conditions could impact operations or pose a hazard to property or life.

Missile Mishap— A term used to denote the occurrence of a missile accident or incident.

North VAFB— North of the Santa Ynez River (Highway 246) is the main base complex, airfield, WOC, ROS, and the majority of base facilities. This area is generally flat; however, there are numerous deep ravines formed by the San Antonio Creek and its tributaries. NVAFB starts at sea level along the beaches and rises very steeply ½ mile inland to about 350 ft and levels off. It rises again about 3-4 miles inland to heights of over 1,500 ft.

Severe Thunderstorm— Thunderstorms with wind speed greater than or equal to 50 knots and/or hail stones greater than or equal to 3/4 inch in diameter.

Severe Weather— High winds \geq 50 kt; hail \geq ¾ inch in diameter; or tornado.

South VAFB— South Vandenberg lies entirely in the Santa Ynez mountains. These mountains extend west to east from the Pacific Ocean to just east of Santa Barbara. The Pacific Ocean and Santa Ynez Valley border SVAFB on the west and south. The area is mountainous and rises from the beaches to over 2,000 ft. Tranquillon Peak is the highest point on SVAFB with an elevation of 2,159 ft.

Attachment 2
POINTS OF CONTACT

Table A2.1. Points of Contact.

ORGANIZATION	PHONE NUMBER
25 OWS MEFs	228-6598 / 6599
25 OWS Forecaster	228-6674
WF Range Weather Forecaster	606-8022/3
WF/CC	606-5148
WF/NCOIC	606-1397/8022
Weather Operations Center (WOC)	606-8022/3
CE Readiness	605-8996
CES Damage Control Center (DCC)	606-1856
Base Operations	606-6941
Frontier Control	606-4508
Observing Facility, Bldg 1764	606-6825
Vandenberg Command Post	606-9961
Tower	606-6083
JET Help Desk	DSN 272-2785/2783
557 WW Help Desk	DSN 271-2586
Telephone Maintenance (30 SCS)	606-2622
MetNav	606-7924
Emergency Operations Center	606-4512

Attachment 3

TAF SPECIFICATION AND AMENDMENT CRITERIA

A3.1. TAF Specification and Amendment Criteria. The TAF will specify the onset, duration and intensity for the standard criteria outlined below throughout the valid period of the forecast. Forecasts will be amended when conditions do not match specified conditions within the criteria listed in Table A3.1. and A3.2.

Table A3.1. TAF Specification and Amendment Criteria for Ceiling and Visibility.

Forecast Element/Occurrence	Specification and Amendment Criteria
Ceiling observed or later expected to decrease to less than, or if below, increase to equal or exceed:	$\geq 2,000$ feet $< 2,000$ feet but $\geq 1,000$ feet $< 1,000$ feet but ≥ 600 feet < 600 feet but ≥ 100 feet < 100 feet
Prevailing visibility observed or later expected to decrease to less than, or if below, increase to equal or exceed:	≥ 3 statute miles < 3 statute miles but ≥ 2 statute miles < 2 statute miles but $\geq 1/2$ statute mile $< 1/2$ statute mile

Table A3.2. Specification and Amendment Criteria Other Than Ceiling and Visibility.

	Specification Criteria	Amendment Criteria
Surface Wind Speeds	Specify wind speed changes of 10 knots or more	Amend if predominant wind speed is in error by 10 knots or more
Surface Wind Gusts	Specify onset, duration, and intensity of wind gusts	Amend if wind gust speed is in error by 10 knots or more
Surface Wind Direction	Specify a change in prevailing wind direction of more than 30 degrees when the predominant wind speed or gusts are expected to be 15 knots or more	Amend if prevailing wind speed is in error by more than 30 degrees OR winds are 15 knots or more
Icing	Specify Icing not associated with thunderstorms from surface to 10,000ft AGL	Amend if beginning or ending of icing first meets, exceeds, or decreases to less than or greater than moderate intensity and was not specified in the forecast
Turbulence	(Weather Category II Aircraft) Specify turbulence not associated with thunderstorms from surface to 10,000 ft AGL	Amend if the beginning or ending of turbulence first meets, exceeds, or decreases below moderate or greater intensity and was not specified in the forecast
Weather Warning	Specify the onset, duration,	Including non-convective low-level

Criteria and/or Weather Advisory Criteria	and intensity of weather warning and/or advisory criteria	wind shear: Occur, or are expected to occur, during the forecast period, but were not specified in the forecast. Were specified in the forecast, but are no longer occurring or expected to occur during the forecast period
Altimeter Setting		Altimeter setting meets or exceeds 31.00 INS and was not specified in the forecast; if above, drops below 31.00 INS and was not specified during the forecast period; drops below 28.00 INS and was not specified in the forecast; or if below 28.00 INS, increases above 28.00 INS and was not specified in the forecast
Thunderstorms	Specify onset and duration of thunderstorms at the aerodrome complex	Amend if the start or end time of the thunderstorm is incorrectly specified
Temporary Conditions	Specify the onset and duration of temporary conditions	1. Amend if temporary conditions become predominant. 2. Amend if temporary conditions do not occur as forecast. 3. Amend if temporary conditions are no longer expected to occur.
Changes to Predominant Conditions	Specify the onset, duration, and intensity (if applicable) of changes to predominant conditions	Forecast change conditions (BECMG or FM group) occur before the beginning of the specified period of change and are expected to persist; do not occur within 30 minutes after the specified time; or are no longer expected to occur.
Representative Conditions		Amend if forecast conditions are considered unrepresentative of existing or forecast conditions and amending the forecast improves safety, flight planning, operations efficiency, or assistance to in-flight aircraft.

Attachment 4

SPECIAL OBSERVATION (SPECI) CRITERIA

Table A4.1. Special Observation Criteria.

DEFINITION	CRITERION
Ceiling	Ceiling is observed to form below, decrease to less than or, if below, increase to equal or exceed the following values: 3000, 2000, 1500, 1200, 1000, 800, 700, 600, 500, 400, 200, 100 feet IAW local requirements, AFMAN 15-111, and all published landing minima per current DoD Flight Information Publication (FLIP).
Sky Condition	A layer of clouds or obscuring phenomena aloft is observed below 1200 feet and no layer aloft was reported below this height in the previous observation.
Visibility	Prevailing visibility is observed to decrease to less than, or, if below, increase to equal or exceed the following values: 3, 2 1/4, 2, 1 3/4, 1 1/2, 1 1/4, 1, 3/4, 1/2 statute miles IAW local requirements, AFMAN 15-111, and all published landing minima per current DoD Flight Information Publication (FLIP).
Tornado, Water Spout or Funnel Cloud	Is observed, disappears from sight, or ends
Thunderstorm	Begins or ends (occurring at the station). A SPECI is not required to report the beginning of a new thunderstorm if one is currently reported.
Precipitation	Hail begins or ends. Freezing precipitation or ice pellets begin, end, or change intensity. Any other precipitation type begins or ends.
Wind	Wind direction changes by 45 degrees or more in less than 15 minutes with sustained winds of 10 knots or more throughout the wind shift. When a squall occurs. Mean or maximum speed first exceeds: 35, 50, 65 knots. IAW local requirements.
Volcanic Eruption	When eruption or volcanic ash cloud first noted.
Aircraft or Missile Mishap	Immediately upon notification or observation of a mishap, accident or incident. Locals are not required for in-flight emergencies. IAW local requirements.
Spacelift or Missile Launch or Recovery	Immediately upon notification of a launch or recovery. IAW local requirements.
Upon resumption of observing function	A special (SPECI) observation will be taken within 15-minutes after the weather technician returns to duty following a break in observing coverage or augmentation at the observing location unless a record observation is filed during that 15-minute period.
Runway Change	When active runway is changed. IAW local requirements.
Miscellaneous	Any other meteorological situation that, in the weather technician's opinion, is critical.

Attachment 5

LOCAL OBSERVATION CRITERIA

Table A5.1. Local Observation Criteria.

DEFINITION	CRITERION
Altimeter Setting	At a frequency not to exceed 35 minutes when there has been a change of 0.01 inches since the last locally disseminated value.

Attachment 6

COLD SPILL TOXIC HAZARD ZONE FORECASTS

A6.1. Potential Hazard Zone (PHZ). The PHZ product is produced and disseminated prior to an operation in preparation for an accidental spill or unplanned emission. A PHZ has Zone 2 and 3 based upon the current allowable exposure criteria. PHZs issued for N₂O₄ will also have a Zone 1 calculated, however not disseminated unless requested. A PHZ is also issued for the transport of non-rocket propellant, toxic commodities. In this case, only one downwind distance, taken from DoT Pamphlet 5800.5, is given.

A6.2. Emission Hazard Zone (EHZ). The EHZ is established prior to the planned emission of toxic propellants into the atmosphere (e.g., tank venting). EHZs are based upon the exposure criteria values listed in Table 1 of 30 SWI 91-106.

A6.3. Operational Hazard Zone (OHZ). This THZ is established following the accidental or unplanned release of a toxic commodity to the environment. If a PHZ was previously in effect, the PHZ becomes the OHZ until a new OHZ can be calculated based upon exactly how much was released to the environment and predicted weather conditions. OHZs are based upon the Zone 1, 2 and 3 concentration levels, with Zone 1 being the maximum allowable for sensitive individuals. OHZs are issued at 15 minute intervals for as long as the accident or exercise scenario exists. Dissemination is via NTFS and other communication systems. For more detailed information on hazardous material emergency response, see 30 SW Plan 32-4002, Hazardous Materials (HAZMAT) Emergency Response Plan. **NOTE:** All wind directions are with respect to true North.

Figure A6.1. Sample PHZ Forecast.

UNCLASSIFIED//FOR OFFICIAL USE ONLY	
Potential Hazard Zone (PHZ)	
PHZ Number: 12-001	
Valid: 09/1920Z (09/1120L) to 09/2120Z (09/1320L)	
SITE: B974	
DELTA T: 0.3 DEG	
WIND: 320 DEG AT 04 KT	
DIR DIV: 17.9 DEG	
AZIMUTH: 090 DEG CW TO 190 DEG	
CHEMICAL: N ₂ O ₄	
SOURCE: STRENGTH: 100 SQ FT	
3 RD TIER DISTANCE:	1494 FT
2 ND TIER DISTANCE:	3608 FT
1 ST TIER DISTANCE:	5265 FT
REMARKS: TEMP 62.5F	
Forecaster Initials: 1120L /CS	
Please ensure you are viewing the most current information!	
For questions, dial 606-8022	
Mission - People - Innovation	

Table A6.1. References and Decoded Information.

<u>PHZ Reference</u>	<u>Decoded information</u>
12-001	Month - Running number of PHZs issued
VALID: 09/1920Z (09/1120L) to 09/2120Z (09/1320L)	Date/Valid time (Zulu and Local)
SITE: B974	Location of operations
DELTA T: 0.3 DEG	Change in temperature (°F) between 12' and 54' levels of wind tower nearest site
WIND: 320 DEG AT 4 KT	Wind direction and speed
DIR DEV: 17.9 DEG	Variability of wind direction (+ or – 17.9 deg of 320)
AZIMUTH: 090 DEG CW TO 190 DEG	Area downwind of spill (CW = clockwise)
CHEMICAL: N2O4	Chemical type
SOURCE STRENGTH: 100 SQ FT	Wetted area for potential spill
3 RD TIER DISTANCE: 1494 FT	End distance of highest concentration of chemical from release point
2 ND TIER DISTANCE: 3608 FT	End distance of second highest concentration of chemical from release point
1 ST TIER DISTANCE: 5265 FT	End distance of lowest concentration of chemical from release point
REMARKS: TEMP 62.5F	Additional support requests will fall into the remarks section, such as the current temperature.
Forecaster Initials: 1120L / CS	Initials of the range forecaster and the time this product was issued.