DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

18 OCT 1996

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT
Attn: Ms. Barbara Hoditschek
RCRA Permits Program Manager
Hazardous and Radioactive Materials Bureau
2044 Galisteo
P O Box 26110
Santa Fe NM 87502

RECEIVED
OCT 23 1996

FROM: 49 CES/CD
550 Tabosa Avenue
Holloman AFB NM 88330-8458

SUBJECT: Notice of Deficiency (NOD): 300-Pound Open Burn Unit.
(ref yr 20 Sep 96 ltr, same subj)

1. Referenced letter requested additional information on the Closure Plan for Holloman AFB's 300 Pound Open Burn (OB) Unit. Per your request, the additional information is attached in three hardcopies and on a 3.5" diskette compatible with Word Perfect 5.2.

2. If you have any questions or require additional information, please contact David Scruggs, 49 CES/CEV, at (505) 475-3931.

HOWARD E. MOFFITT
Deputy Base Civil Engineer

Attachments:
1. Response to NOD (3 copies)
2. 3.5" diskette

HOLLOMAN AFB 300-POUND OPEN BURN AREA

RESPONSE TO
CLOSURE PLAN NOTICE OF DEFICIENCY

Dated 20 SEPTEMBER 1996

Prepared for:

Holloman Air Force Base
550 Tabosa Ave.
Holloman AFB, NM 88330

Prepared by:

Radian International LLC
6400 Uptown Blvd., NE Ste. 250E
Albuquerque, NM 87111

15 OCTOBER 1996

Table of Contents

1.0 Introduction

This document contains Holloman Air Force Base's (AFB) responses to the Notice of Deficiency (NOD) for their 300-Pound Open Burn Area Closure Plan. The NOD was issued on 20 September 1996. Appendix A contains a copy of the NOD.

Section 2.0 addresses the requirements under Attachment A I. A. Topographic Map. Section 3.0 addresses requirements under Attachment A II. A. Closure Plan Submittal. Section 4.0 provides information on "Protection of Groundwater". Finally, Section 5.0 contains the groundwater monitoring waiver request for the 300-Pound Open Burn Area. The specific NODs are italicized in the text to distinguish them from the response.

2.0 Topographic Map

This section provides information requested in Attachment A. I. A of the NOD. The specific NOD and response follows:

The Closure Plan must include a map or maps that:

1. *Show the terrain for a distance of 1,000 feet outside the unit at a map scale of 1 inch equal to not more than 200 feet with appropriate contour lines;*

Response: A topographic map with the stipulated requirements is attached in Appendix B.

2. *Include a wind rose diagram showing prevailing wind directions and velocities;*

Response: The wind rose diagram is attached in Appendix B.

3. *The legal boundaries (and title) of the unit;*

Response: Facility boundaries are shown on the topographic map that is provided in Appendix B.

4. *Show access control to the OB treatment unit;*

Response: Revised Figure 2-1 of the Closure Plan in Appendix B shows the location of the locked gate that controls access to this site.

5. *Any on-site or off-site wells, buildings, and drainage and flood control barriers;*

Response: There are no such features within 1,000 feet of the unit.

6. *Locate the treatment unit, buildings on- and off-site, public roadways, and passenger railways; and*

Response: Figure 1-1 on page 1-2 of the Sampling and Analysis Plan portion of the Closure Plan shows the nearest public roadway. There is no passenger railway in this area of New Mexico. The nearest buildings are approximately 1.25 miles south of the unit.

7. *Enumerate any Solid Waste Management Units (SWMUs) that are in the vicinity of the OB unit.*

Response: The topographic map in Appendix B shows that the nearest SWMU is approximately 1.35 miles west-southwest of the OB unit.

3.0 Closure Plan Submittal

This section provides responses to Attachment A. II. A. of the NOD. The specific NOD and corresponding response follow:

1. *Describe the procedure for removal of hazardous waste, residues or post investigation derived waste, and contaminated soils including the location of disposed soils when removed;*

Response: A discussion of waste management activities was included as Section 4.5 of the Closure Plan. In summary, Section 4.5 stated that all treatment residuals and associated soils will be removed from each trench with a backhoe. Any waste that required further treatment, as determined by EOD personnel, would be treated at the 20,000-Pound Open Detonation site.

Treatment residuals and soil excavated from the trenches will be stored in appropriate containers such as drums or roll-off containers. The waste in the containers will be sampled for the purpose of waste characterization. Although not specifically stated in the Closure Plan, the waste will be analyzed for a similar suite of inorganic and organic compounds as specified in the Sampling and Analysis Plan using TCLP to determine if the waste is characteristically hazardous. The containers, with waste, will remain at a staging area at the 300-Pound OBA site until the waste characterization results are obtained and evaluated. Within 90 days of receipt of the waste characterization data the containers will be transported to DRMO for proper disposition based on the waste characterization data.

Section 4.6 of the Sampling and Analysis Plan portion of the Closure Plan specifies that investigation derived waste will be handled in accordance with the *Remediation Compliance Plan - Holloman Air Force Base, New Mexico* (prepared by Foster Wheeler Environmental and Radian, 1994).

2. *Define methods for sampling and testing surrounding soils and criteria for determining decontamination levels;*

Response: Sampling and testing methods and criteria for the surrounding soils are presented in Section 4, Investigation Methods, in the Sampling and Analysis Plan included as part of the Closure Plan. In summary, verification samples will be collected from the bottom and sides of the trench and analyzed for 13 metals, volatile organic compounds, semivolatile organic compounds, and total petroleum hydrocarbons. This is discussed in detail in the SAP.

3. *Describe how the fallout fan will de delineated.*

Response: The fallout fan will be delineated through visual inspection by EOD personnel. The initial inspection area will be a circular area having a diameter from the center of the OB Unit to 50 ft beyond the Unit boundary. If kickout is found in the area 50 ft beyond the Unit boundary, concentric circles will be inspected at 25 ft intervals until no kickout is found in an interval. All kickout will be collected by Holloman AFB personnel and taken to DRMO for proper disposal. Although unlikely due to the nature of the treatment, if unexploded ordnance is found among the kickout, it will be taken to the 20,000-Pound OD Unit for disposal.

4. *Delineate both the vertical and horizontal extent of the kickout resulting from the past activities that had occurred at the OB unit; and*

Response: See above response for determination of the horizontal extent of kickout. It is not expected that a "vertical" determination of extent of kickout will be necessary.

5. *Describe how each zone of contaminant plumes will be established from the center of the OB unit outwards. Explain how HAFB will determine lateral extent of the plume and where sampling will end.*

Response: Holloman AFB believes that no contaminant plume exists due to the fact that the thermal treatment process destroys the contaminants. In addition, once the soils have been excavated from the bottom and sides of the trenches, verification samples will be collected to verify that no residuals are present at or above levels that could pose a risk to human health or the environment. If verification samples indicate that a contaminant plume does exist, Holloman AFB will coordinate with NMED on the appropriate actions to be taken, such as a soil boring/monitoring well drilling program (or similar) to determine lateral and vertical extent of contamination.

4.0 Protection of Groundwater

This section provides response to the section of the NOD referring to "Protection of Groundwater". The specific NOD and corresponding response is as follows:

A. *Hydrology as required in 20 NMAC 4.1.900 incorporating 40 CFR §270.23(b). The Closure Plan must describe the hydrology below the open burn unit. (This may be available through published or private reports. Provide copies of the reference used.)*

Response: The following paragraph provides additional information to Section 4.7 of Closure Plan (Groundwater and Surface Water Investigation). Portions of the references used are attached as Appendix C.

Past field investigations at Holloman AFB have provided sufficient information about the geology and hydrology in the vicinity of the 300-Pound OBA. The depth to the uppermost saturated zone at RFP Site 51, located less than 1 mile west of the 300-Pound OBA, is 35 feet below ground surface (BGS) and Site 51 is also roughly 30 feet lower in elevation than the 300-Pound OBA (elevation of approximately 4,150 ft.MSL compared to about 4,120 ft. MSL at RFP Site 51). The water table depth beneath the 300-Pound OBA is estimated to be about 40 ft. BGS. The groundwater beneath the 300-Pound OBA is found within laterally discontinuous units of interbedded sands, silts, and clays typical of the intermingled alluvial fan and eolian deposits found at Holloman AFB. Hydraulic conductivities calculated at two nearby IRP sites (Site 4 and Site 36) both located approximately 1.7 miles northwest and southwest, respectively, of the 300-Pound OBA range from 7.19×10^{-4} to 1.12×10^{-3} ft/min, which are typical of silty sands found throughout Holloman AFB. Groundwater gradients from these same two sites range from 3.07×10^{-3} to 4.57×10^{-3} to the west-northwest with groundwater flow velocities ranging from 1.5 to 10 feet per year.

B. *Provide site-specific data for initially characterizing the OB unit and surrounding area. Hydrology and geology supportive of published reports must be confirmed through direct methods of data collection.*

Any saturated zones must be identified. Discuss appropriate spacial and temporal intervals for soil sample data collection prior to initiating any data collection program.

Response: As stated in Section 4.7 of the Closure Plan, "Because no contamination of groundwater is believed to have occurred from the operation of the 300-Pound OBA, groundwater investigation during or after closure is not considered appropriate." The additional information presented in "A" above discusses expected saturated zones and hydrology beneath the site.

C. Soil monitoring as required in 20 NMAC 4.1.500 incorporating 40 CFR 264.601(A) (2) and 40 CFR §270.23 (b).

The Closure Plan must:

1. Contain the proposed soil monitoring program, including sample collection, sample preservation and shipment, sampling and analysis procedures, and chain of custody control;

Response: The proposed soil monitoring program, including sample collection, sample preservation and shipment, sampling and analysis procedures, and chain-of-custody control is presented in Section 4 (Investigation Methods) of the Sampling and Analysis Plan included as part of the Closure Plan. Soil monitoring will be verification soil sampling of the trench bottom and sidewalls to determine the level of contaminants remaining (if any).

2. Indicate the parameters selected and the EPA approved or equivalent acceptable analytical method for each parameter;

Response: The EPA approved analytical parameters selected for soil monitoring are presented in Standard Operating Procedure B4 and discussed in detail in Section 5, Laboratory Analytical Procedures, of the Sampling and Analysis Plan included as part of the Closure Plan. Soil monitoring will consist of verification sampling after one foot of soil has been removed from the bottom and sides of each trench.

3. *Describe background values for each proposed monitoring parameter or constituent; and*

Response: As stated in Section 3 of the Closure Plan, Closure Performance Standards, "In the event that unexpected analytical results are encountered (e.g., constituents detected above Base-wide background levels), Holloman AFB may elect to clean close through a risk-based demonstration..."

4. *Describe the proposed sampling, analysis, and statistical comparison procedures.*

Response: A discussion of the statistical comparison procedures is presented in Section 8.7, Data Analysis and Reporting, of the Sampling and Analysis Plan included as part of the Closure Plan.

5.0 Groundwater Monitoring Waiver

This section presents a request for a groundwater monitoring waiver for the 300-Pound Open Burn Area (300-Pound OBA) at Holloman AFB, NM. The request for a groundwater monitoring waiver is based on the regulations in 40 CFR 265.90 (c).

The information presented in this section will show that, (1) the 300-Pound OBA does not receive or contain free-liquid wastes; (2) there is low potential for migration of contaminants to the groundwater; (3) the groundwater is of such poor natural quality in this area that there is no beneficial use; (4) the remote location of the unit results in no receptors for the groundwater; and (5) there is no risk associated with use of the groundwater since the resource is not used.

Three investigation summary reports prepared for Holloman AFB in 1992 and 1993 were used as references for preparation of the Groundwater Monitoring Waiver. The three reports referenced are the *Remedial Investigation (RI) Report, Volume I - Text and Plates, Investigation, Study, and Recommendation for 29 Waste Sites, Radian Corporation, October 1992.*, the *20,000# EOD Soil and Water Investigation, ICF Kaiser Engineers and Labat-Anderson, Inc., August 1993*, and the *Base-Wide Background Study, Sewage Lagoons and Lakes Investigation, Holloman Air Force Base, Radian Corporation, December 1993.* The applicable sections of these reports are provided in Appendix C.

5.1 Waste Characteristics and Treatment

This section provides a brief discussion of the wastes that were treated at the 300-Pound OBA and the thermal treatment process that was utilized. A detailed description of the characteristics of the wastes and treatment procedures that were used at the 300-Pound OBA are presented in Section 2.0 of the Closure Plan. The last treatment activity at the 300-Pound OBA occurred in September 1994.

The wastes treated at the 300-Pound OBA were generally propellant, pyrotechnic, and ordnance devices with expired shelf lives. The energetic materials contained in the wastes described above were considered characteristically hazardous on the basis of reactivity (D003) as these materials deflagrate or detonate when subjected to shock or heat. The total net explosive weight of ordnance, incendiary devices, and munitions that were simultaneously treated in a treatment trench at the 300-Pound OBA was limited to 250 pounds.

These waste munitions were transported to the 300-Pound OBA in their original containers or casings, which are designed for long-term stability and thus ensured that no wastes were inadvertently released to the environment prior to treatment. In addition, no free-liquid wastes were included among the wastes treated at the 300-Pound OBA.

The waste munitions were collected in a shallow (10 -12 ft. deep) trench within a cleared 11.5-acre area (the 300-Pound OBA). The thermal treatment process began by placing alternating 12-in. layers of waste munitions and wood (dunnage) in the treatment trench. Diesel fuel (approximately 100 gallons) was then added to the waste and dunnage and ignited. Potential contaminants which may have been released during thermal treatment would generally be limited to trace amounts of explosive compounds or metals. The thermal treatment process generally ensured complete destruction of the waste, dunnage, and diesel fuel.

Residual waste munition compounds became nonhazardous once thermally treated. Organic constituents of the wastes were converted to gaseous products such as CO, CO_2, and N_2 during thermal treatment thereby eliminating the hazardous characteristics of the wastes.

Once the wastes were thermally treated, a few small metal fragments (i.e., from casings, housings, etc.) would be scattered around the immediate treatment area. The metal debris remaining after thermal treatment of the wastes was typically present in elemental states or as oxides that were insoluble or of limited solubility in water, thus eliminating the potential for metallic compounds to have migrated through the soil or into surface water or groundwater. For closure of the 300-Pound OBA, EOD personnel will collect any remaining metal debris and deliver it to the Defense Reutilization Marketing Organization (DRMO). If any untreated waste munitions are found during closure, although extremely unlikely, they will be treated at the 20,000-Pound Open Detonation Unit (20,000-Pound OD Unit).

5.2 Hazardous Waste Migration Potential

5.2.1 Assessment of Hazardous Waste Migration Potential to the Uppermost Saturated Zone

In summary, factors supporting the determination that there is low hazardous waste migration potential to the uppermost saturated zone include the following:

- Waste munitions are transported to the 300-Pound OBA in their original containers or casings, which are designed for long-term stability and thus ensured that no wastes were inadvertently released to the environment prior to treatment. In addition, no free-liquid wastes were included among the wastes treated at the 300-Pound OBA;

- The 300-Pound OBA thermal treatment process generally ensured complete destruction of the waste. Residual waste munition compounds became nonhazardous once thermally treated. Organic constituents of the wastes were converted to gaseous products such as CO, CO_2, and N_2 during thermal treatment thereby eliminating the hazardous characteristics of the wastes;

- The metal debris remaining after thermal treatment of the wastes was typically present in elemental states or as oxides that are insoluble or of limited solubility in water, thus eliminating the potential for metallic compounds to have migrate through the soil or into surface water or groundwater;

- The low precipitation rate for the area results in a negligible driving force for hazardous waste contaminant migration. The annual precipitation at Holloman AFB averages 7.9 inches. The mean annual evapotranspiration rate averages an estimated 67 inches per year resulting in a net annual precipitation rate for the area of approximately -59 inches per year;

5.2.2 Hydrological Characteristics

Surface water resources within the Tularosa Basin are limited by the high evapotranspiration rate and low annual rainfall. The majority of surface water in the basin is either lost to evaporation, transpiration, and infiltration or collects in the lowest point in the basin at or near Lake Lucero, located at the southwest edge of the gypsum dune field approximately 20 miles southwest of the 300-Pound OBA. The Base is crossed by several southwest trending arroyos or draws which control surface drainage in the undeveloped part of the Base. In the vicinity of the 300-Pound OBA, surface water flow is only associated with infrequent heavy rainfall or rare snow melt events. The 300-Pound OBA is located on relatively flat terrain far above the 100-year floodplain boundaries. A 300-Pound OBA site location map is presented in Figure 2-1 (Appendix B).

5.2.3 Water Balance

Low annual precipitation rates coupled with the high evapotranspiration rate means that there is minimal infiltrating water into the subsurface. With minimal infiltrating water there is minimal potential for leaching of constituents to the uppermost saturated zone.

The annual precipitation at Holloman AFB averages 7.9 inches, with annual extremes from 2.5 inches to 13.5 inches. The mean annual lake evaporation rate, commonly used to estimate the mean annual evapotranspiration rate, averages an estimated 67 inches per year. The annual net precipitation for the area is approximately -59 inches per year.

5.2.4 Unsaturated Soil Characteristics

The potential for migration is further limited by the geologic and hydrogeologic conditions at Holloman AFB. The general unsaturated soil characteristics at Holloman AFB including the 300-Pound OBA are described in this section.

The U.S.D.A. Soil Conservation Service has identified two soil associations in the vicinity of Holloman AFB: the Holloman-Gypsum Land-Yesum complex and the Mead silty clay loam. The permeability of these soil horizons ranges from 4×10^{-4} to 1×10^{-3} cm/sec. The Holloman-Gypsum Land-Yesum complex is representative of the surface soil found throughout the Base (including the 300-Pound OBA). The soils of this association are formed from alluvial and eolian (wind blown) gypsiferous sediments. The Holloman unit makes up about 35% of the complex. It is a very fine grained, sandy loam with a high gypsum content. The soil is moderately permeable, calcareous, and mildly alkaline. The Gypsum Land unit makes up about 30% of the complex. It is soft to hard gypsum, typically overlain by less than one inch of very fine sandy loam. The Yesum unit, which makes up approximately 20% of the complex, is a very fine sandy loam that is also high in gypsum. It is moderately permeable, calcareous, and mildly alkaline.

The unsaturated zone at the 300-Pound OBA consists of alluvial fan/eolian deposits typical of those found at Holloman AFB. Alluvial fan deposits are characteristically laterally discontinuous units of interbedded sands, silts, and clays. The eolian deposits consist of gypsum sands. The eolian and alluvial fan deposits are often indistinguishable because the wind simultaneously reworks alluvial fan sediments and deposits gypsum sands, resulting in an intermingling of the two.

5.2.5 Depth to Uppermost Saturated Zone

The depth to the uppermost saturated zone decreases from 270 feet BGS (or more) near the base of the mountains west of Alamogordo to below 40 feet BGS at Holloman AFB. Normal, seasonal water table fluctuations of up to 2.58 feet have been measured at Holloman AFB with the water table standing higher in the spring than in the fall. The depth to the uppermost saturated zone at RFP Site 51, located less than 1 mile west of the 300-Pound

OBA, is 35 feet BGS and Site 51 is also roughly 30 feet lower in elevation than the 300-Pound OBA (elevation of approximately 4,150 ft.MSL compared to about 4,120 ft. MSL at RFP Site 51). The water table depth beneath the 300-Pound OBA is estimated to be about 40 BGS.

Because the net annual precipitation rate averages an estimated -59 inches per year, it is extremely unlikely that hazardous waste contaminants could migrate to the uppermost saturated zone at the 300-Pound OBA.

5.3 Groundwater Migration Potential

5.3.1 Assessment of Groundwater Migration Potential

The previous section has presented evidence that there is low potential for migration of contaminants to the uppermost saturated zone. This section presents information on the potential for migration of contaminants within the uppermost saturated zone. In summary, migration of contaminants within the uppermost saturated zone is considered negligible because of the following:

- An approximate groundwater flow velocity of about 1.5 to 10 feet per year and hydraulic conductivity values ranging from about 7.19×10^{-4} to 1.12×10^{-3} feet/minute (from RFP Sites 4 and 36) suggest an extremely low potential for hazardous waste contaminant migration within the uppermost saturated zone. Contaminants seldom move at the advective transport velocity of groundwater and generally move at much slower rates because of adsorption to soil particles and other processes;

- Groundwater in the Tularosa Basin beneath Holloman AFB contains concentrations of total dissolved solids (TDS) ranging from 3,100 milligrams per liter (mg/L) to 41,000 mg/L. Sulfate concentrations range from 1,700 mg/L to 6,700 mg/L. In general, the high concentrations of TDS and sulfate in the Tularosa Basin make groundwater unusable for domestic or agricultural water supplies and can be classified as Class III B groundwater (not considered a source or potential source of drinking water) under EPA guidelines. Average values of other groundwater quality parameters measured at Holloman AFB sites (chloride and nitrate-nitrite) also exceed New Mexico Human Health Standards (HHSs) and federal and secondary drinking water maximum contaminant levels (MCLs and SMCLs);

- No water supply wells are located on the Base due to poor water quality. The nearest well of any kind is a livestock water supply well located approximately 3.5 miles southwest of the Base;

- There is no risk associated with the groundwater in the vicinity of the 300-Pound OBA since the resource is not used as a domestic, industrial, or agricultural water supply and in all likelihood will never be used as a resource; and

- Runon and runoff from the 300-Pound OBA is minimized by earthen berms (2-3 ft. In height) surrounding the cleared area.

5.3.2 Hydrogeologic Characterization

Groundwater occurs in unconfined conditions in the unconsolidated bolson deposits beneath Holloman AFB. The primary source of recharge for groundwater in the bolson fill is percolation of rainfall and stream runoff through the coarse, unconsolidated alluvial fan deposits along the western flank of the Sacramento Mountains. Water migrates downward into the bolson fill and flows downgradient through progressively finer-grained sediments into the basin. The hydraulic gradient is steep along the recharge zones at the base of the mountains, but then flattens out as groundwater migrates into the valley. Groundwater discharge occurs either through evapotranspiration, springs or seeps along steep-sided arroyos, or into closed playa lakes such as Lake Lucero, the regional groundwater discharge area approximately 20 miles southwest of the 300-Pound OBA. The groundwater flow beneath the 300-Pound OBA is to the west toward the center of the basin.

5.3.2.1 Saturated Zone Physical Properties

The uppermost saturated zone likely contains laterally discontinuous units of interbedded sands, silts, and clays typical of the intermingled alluvial fan and eolian deposits found at Holloman AFB. Calculated hydraulic conductivities from 83 monitoring wells at Holloman AFB ranged from 6.8×10^{-5} to 1.7×10^{-2} ft/min, and averaged between 7×10^{-4} and 2×10^{-3} ft/min. Two IRP sites (Site 4 and Site 36) both located approximately 1.7 miles northwest and southwest, respectively, of the 300-Pound OBA have calculated hydraulic conductivities ranging from 7.19×10^{-4} to 1.12×10^{-3} ft/min. This range is typical of silty sands, which comprise much of geology seen during past field investigations at the Base.

5.3.2.2 Existing Groundwater Quality

Overall water quality in the Tularosa Basin varies with the distance from the recharge areas. Regions of groundwater recharge near the mountain escarpments have the best water quality. Wells installed in the alluvial fans that surround the valley floor are used for domestic and agricultural purposes. Water percolating through sediments high in gypsum, limestone, and dolomite becomes highly mineralized. Groundwater in the Tularosa Basin beneath Holloman AFB contains concentrations of total dissolved solids (TDS) ranging from 3,100 milligrams per liter (mg/L) to 41,000 mg/L. Sulfate concentrations range from 1,700 mg/L to 6,700 mg/L. In general, the high concentrations of TDS and sulfate in the Tularosa Basin make groundwater unusable for domestic or agricultural water supplies and can be classified as Class III B groundwater (not considered a source or potential source of drinking water) under EPA guidelines. Average values of other groundwater quality parameters measured at Holloman AFB sites (chloride and nitrate-nitrite) also exceed New Mexico Human Health Standards (HHSs) and federal and secondary drinking water maximum contaminant levels (MCLs and SMCLs).

According to the New Mexico Water Quality Control Commission Regulations (NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103), the groundwater below Holloman AFB is designated as unfit for human consumption because it exceeds NMHHS for TDS and sulfate.

5.3.2.3 Groundwater Direction and Flow Rate

In the vicinity of Holloman AFB, groundwater generally flows toward the west and southwest. Based on potentiometric surface maps prepared during the 29 Sites Investigation (Radian, 1992), groundwater beneath the 300-Pound OBA appears to flow west toward Ritas Draw. Two IRP sites (Site 4 and Site 36) both located approximately 1.7 miles northwest and southwest, respectively, of the 300-Pound OBA have groundwater gradients ranging from 3.07×10^{-3} to 4.57×10^{-3} to the west-northwest and groundwater flow velocities ranging from 1.5 to 10 feet per year.

5.3.2.4 Proximity to Groundwater Withdrawal Points

No water supply wells are located on Holloman AFB because of the poor water quality. Base potable water supplies are obtained from Bonita Lake and from 21 wells in three separate well fields (Boles, San Andres, and Douglas) located on the western slope of the Sacramento Mountains approximately 10 miles east of Holloman AFB. Production wells in that area intercept groundwater at depths ranging from 250 to 300 feet BGS. The nearest production well downgradient of Holloman AFB is a livestock well located approximately 3.5 miles southwest of the Base. No other downgradient or near-Base potable or irrigation wells exist.

Other chief water users in the Tularosa Basin include the city of Alamogordo and White Sands Missile Range Headquarters. The city of Alamogordo obtains its water from several sources including: Lake Bonita, 60 miles northeast of the basin; developed springs in La Luz, Alamo, and Fresnal Canyons in the Sacramento Mountains; and from wells drilled in alluvial fan deposits at the base of the Sacramento Mountains between Alamogordo and La Luz (located roughly 10 miles southeast of the 300-Pound OBA). White Sands Missile Range obtains its fresh water supply from alluvial deposits between the Organ and San Andres Mountains, and along the mountain front on the west side of the basin.

It is extremely unlikely that the water in the uppermost saturated zone beneath the 300-Pound OBA would ever be used for drinking water, domestic purposes, or irrigation.

5.4 Proximity to Surface Waters

Surface water resources within the Tularosa Basin are limited by the high evapotranspiration rate and low annual rainfall. The majority of surface water in the basin is either lost to evaporation, transpiration, and infiltration or collects in the lowest point in the basin at or near Lake Lucero, located at the southwest edge of the gypsum dune field approximately 20 miles southwest of the 300-Pound OBA. There are no surface water resources in the vicinity of the 300-Pound OBA. In the vicinity of the 300-Pound OBA, there is virtually no possibility of water in the uppermost saturated zone to discharge into surface water features such as arroyos.

5.5 Land Use Patterns

The 300-Pound OBA is located wholly within Holloman AFB. No agricultural or industrial development zones are located in the vicinity of the 300-Pound OBA. Access to the 300-Pound OBA is tightly controlled (locked entrance gate to access road), because of potential hazards and security requirements associated with past open burning activities. Clearance to enter the area must be obtained from Base EOD personnel. Because of the remoteness of the site and the restricted access requirements, the likelihood that the site will be used in the future for any purpose is extremely low. Even if military activities cease at this site it is unlikely that this area will ever be used for anything other than industrial activity.

5.6 Certification

To the best of my knowledge, I certify that the above information is accurate and this document has been prepared under my direct supervision.

(Signature)

Gary D. Henderson
American Institute of Professional Geologists
7581

Appendix A
Notice of Deficiency

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous & Radioactive Materials Bureau
2044 Galisteo
P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-1557
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

CD
CEV

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Recvd @ 49CES 24 Sep 96

September 20, 1996

Howard E. Moffitt
Deputy Base Civil Engineer
49 CES\CEV
550 Tabosa Ave
Holloman Air Force Base, N.M. 88330-8458

SUBJECT: **Notice of Deficiency (NOD): 300-Pound Open Burn Unit. EPA I.D. Number NM6572124422**

Dear Mr. Moffitt:

The Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department (NMED) has reviewed for technical adequacy, the Holloman Air Force base (HAFB) October 1992 Closure Plan for the 300 pound Open Burn (OB) treatment unit as required under the New Mexico Hazardous Waste Management Regulations 20 NMAC 4.1 (Revised November 1, 1995).

After reviewing the Closure Plan, the NMED has found the Closure Plan to be technically deficient. The enclosed Attachment A lists the required information necessary for NMED to declare the Closure Plan technically complete adequate and consider it for approval.

The information requested in Attachment A must be submitted to NMED within thirty (30) days of receipt of this NOD. Please present the required information in three hard copies and on a 3.5" diskette compatible with Word Perfect 5.2. Failure to submit the required information in this designated time may result in issuance of a Notice of Violation (NOV), or denial of the Closure Plan.

If you have any questions regarding this matter you may contact Mr. Cornelius Amindyas at (505) 827-1561.

Sincerely,

Benito Garcia, Chief
Hazardous and Radioactive Materials Bureau

cc: Barbara Hoditschek, HRMB
David Neleigh, EPA Region 6
Files: Red and Reading 96

ATTACHMENT A

Notice of Deficiency for HAFB Open Burn Closure Plan

September 20, 1996

I. A. **Topographic Map** as required in 20 NMAC 4.1.900 incorporating 40 CFR §270.14(b)(19).

The Closure Plan must include a map or maps that:

Holloman Drawing

1. show the terrain for a distance of 1,000 feet outside the unit at a map scale of 1 inch equal to not more than 200 feet with appropriate contour lines;

2. include a wind rose diagram showing prevailing wind directions and velocities;

3. the legal boundaries (and title) of the unit;

4. show access control to the OB treatment unit;

5. any on-site or off-site wells, buildings, and drainage and flood control barriers; and

6. locate the treatment unit, buildings on- and off-site, public roadways, and passenger railways.

7. enumerate any Solid Waste Management Units (SWMUs) that are in the vicinity of the OB unit.

II. A. **Closure Plan Submittal** as required in 20 NMAC 4.1.600 incorporating 40 CFR §265.112 through §265.115, and

1. Describe the procedures for removal of hazardous waste, residues or post investigation derived waste, and contaminated soils including the location of disposed soils when removed;

2. Define methods for sampling and testing surrounding soils and criteria for determining decontamination levels;

3. Describe how the fallout fan will be delineated.

4. Delineate both the vertical and horizontal extent of the kickout resulting from the past activities that had occurred at the OB unit.

5. Describe how each zone of contaminant plumes will be established from the center of the OB unit outwards. Explain how HAFB will determine lateral extent of the plume and where sampling will end.

Protection of Ground Water

Additional Information requirements as required by 20 NMAC 4.1.600 incorporating, 40 CFR §265.90 (c)

A. **Hydrology** as required in 20 NMAC 4.1.900 incorporating 40 CFR §270.23(b). The Closure Plan must describe the hydrology below the open burn unit. (This may be available through published or private reports. Provide copies of the references used.).

B. **Provide site-specific data for initially characterizing the OB unit and surrounding area.** Hydrology and geology supportive of published reports must be confirmed through direct methods of data collection. Any saturated zones must be identified. Discuss appropriate spacial and temporal intervals for soil sample data collection prior to initiating any data collection program.

C. **Soil Monitoring** as required in 20 NMAC 4.1.500 incorporating 40 CFR 264.601(A)(2) and 40 CFR §270.23(b).

The Closure Plan must:

1. contain the proposed soil monitoring program, including sample collection, sample preservation and shipment, sampling and analysis procedures, and chain of custody control;

2. indicate the parameters selected and the EPA approved or equivalent acceptable analytical method for each parameter;

3. describe background values for each proposed monitoring parameter or constituent; and

4. describe the proposed sampling, analysis and statistical comparison procedures.

If HAFB wishes to pursue a ground water monitoring waiver, HAFB must satisfy all applicable regulations listed below, CFR §265.90 (c) and submit this waiver to HRMB within the timelines outlined above for review.

1. All or part of the ground water monitoring requirements of this subpart may be waived if the owner can demonstrate that there is a low potential for migration of hazardous waste or hazardous waste constituents from the facility via the uppermost aquifer to water supply wells (domestic, industrial, or agricultural) or to surface water.

This demonstration must be in writing and must be kept at the facility. This demonstration must be certified by a New Mexico independently registered professional engineer and must establish the following:

(1) The potential for migration of hazardous waste or hazardous waste constituents from the facility to the uppermost aquifer, by an evaluation of :

(i) a water balance of precipitation, evapotranspiration, runoff, infiltration; and

(ii) unsaturated zone characteristics (i,e., geologic materials, physical properties, and depth to ground water); and

(2) The potential for hazardous waste or hazardous waste constituents which enter the uppermost aquifer to migrate to a water supply well or surface water, by an evaluation of :

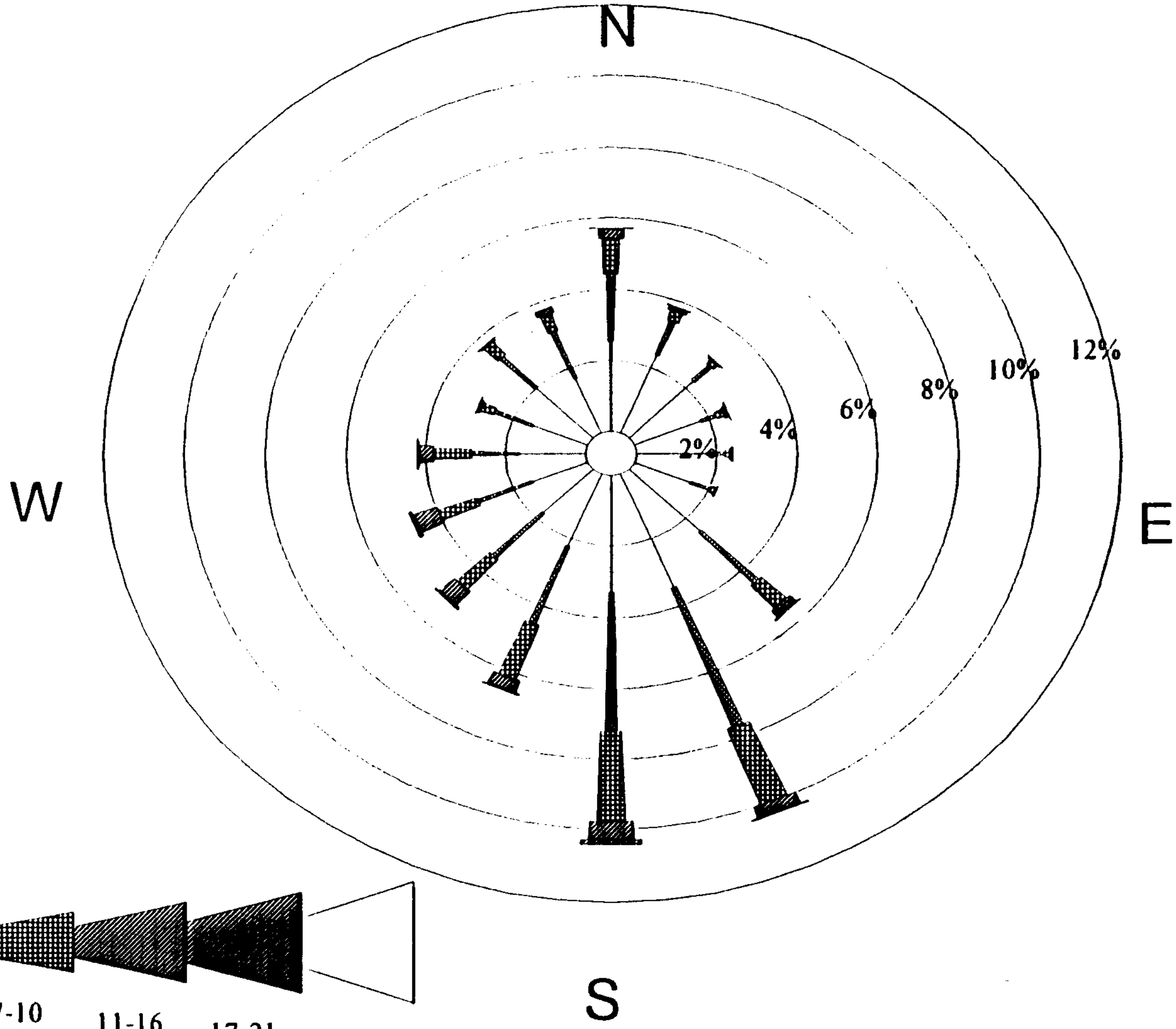
(i) saturated zone characteristics (i.e., geologic materials, physical materials physical properties, and rate of ground-water flow); and

(ii) the proximity of the facility to water supply wells or surface water.

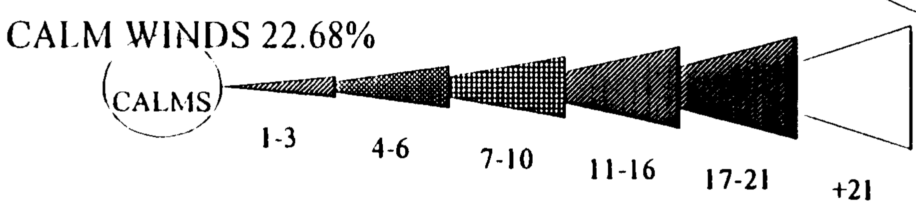
See Landfill Report

Appendix B
Drawings

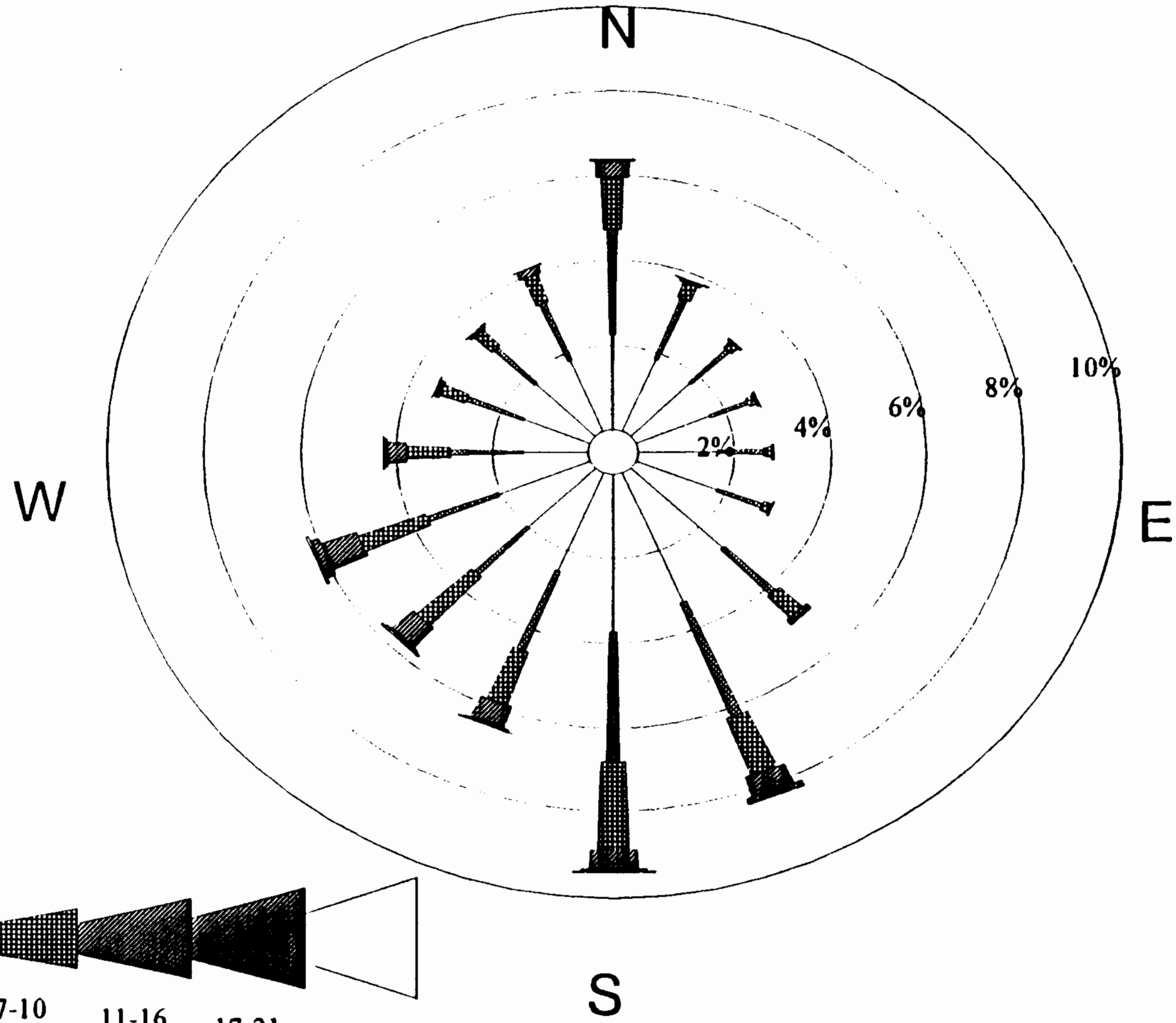
Holloman AFB 1990
January 1
December 31
Midnight-11 PM



NOTE: Frequencies indicate direction from which the wind is blowing.



Holloman AFB 1991
January 1
December 31
Midnight-11 PM



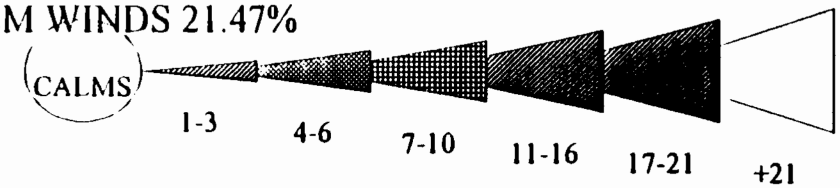
NOTE: Frequencies

indicate direction

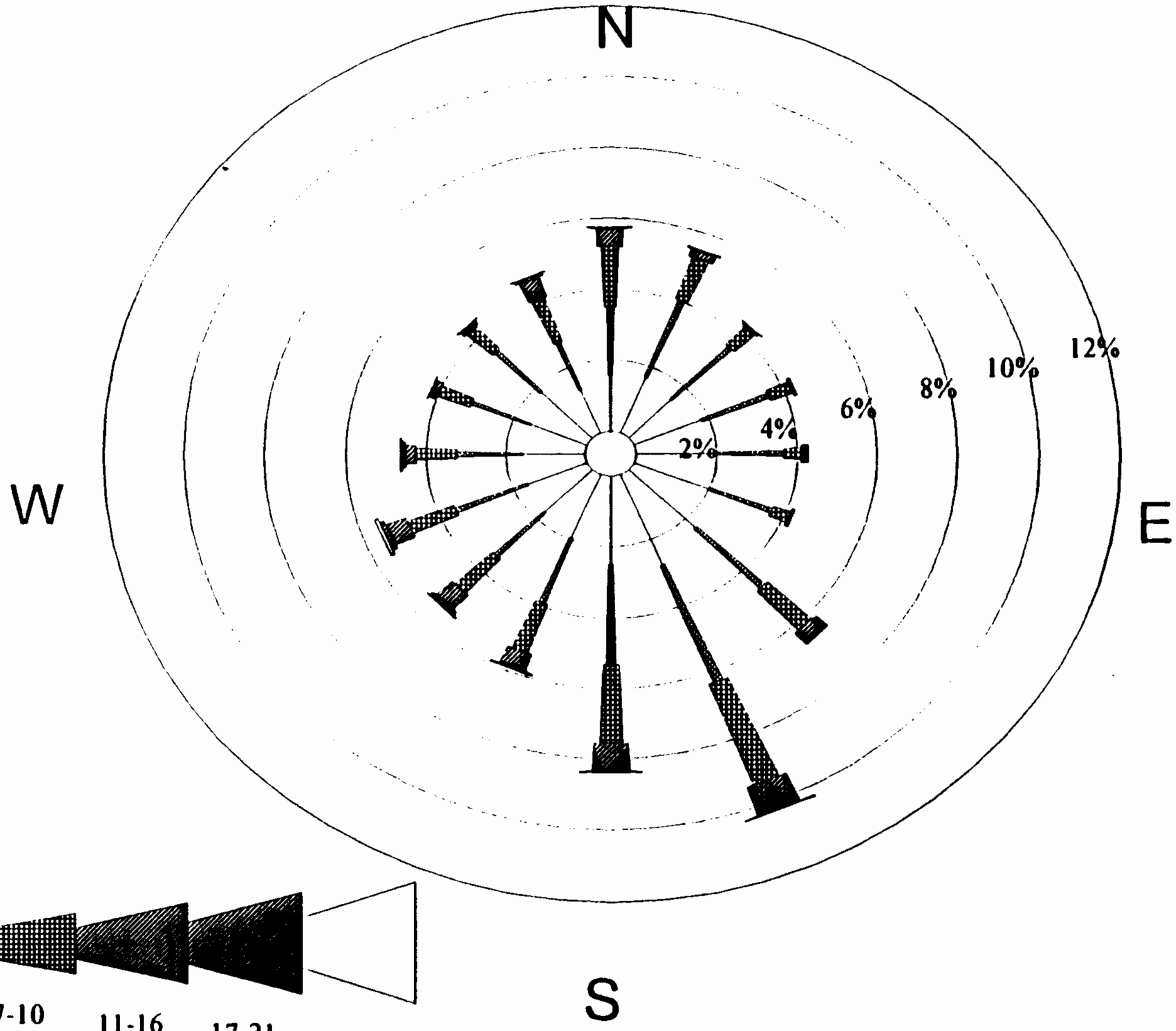
from which the

wind is blowing.

CALM WINDS 21.47%

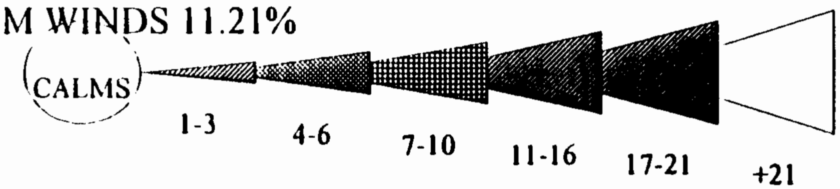


Holloman AFB 1992
January 1
December 31
Midnight-11 PM

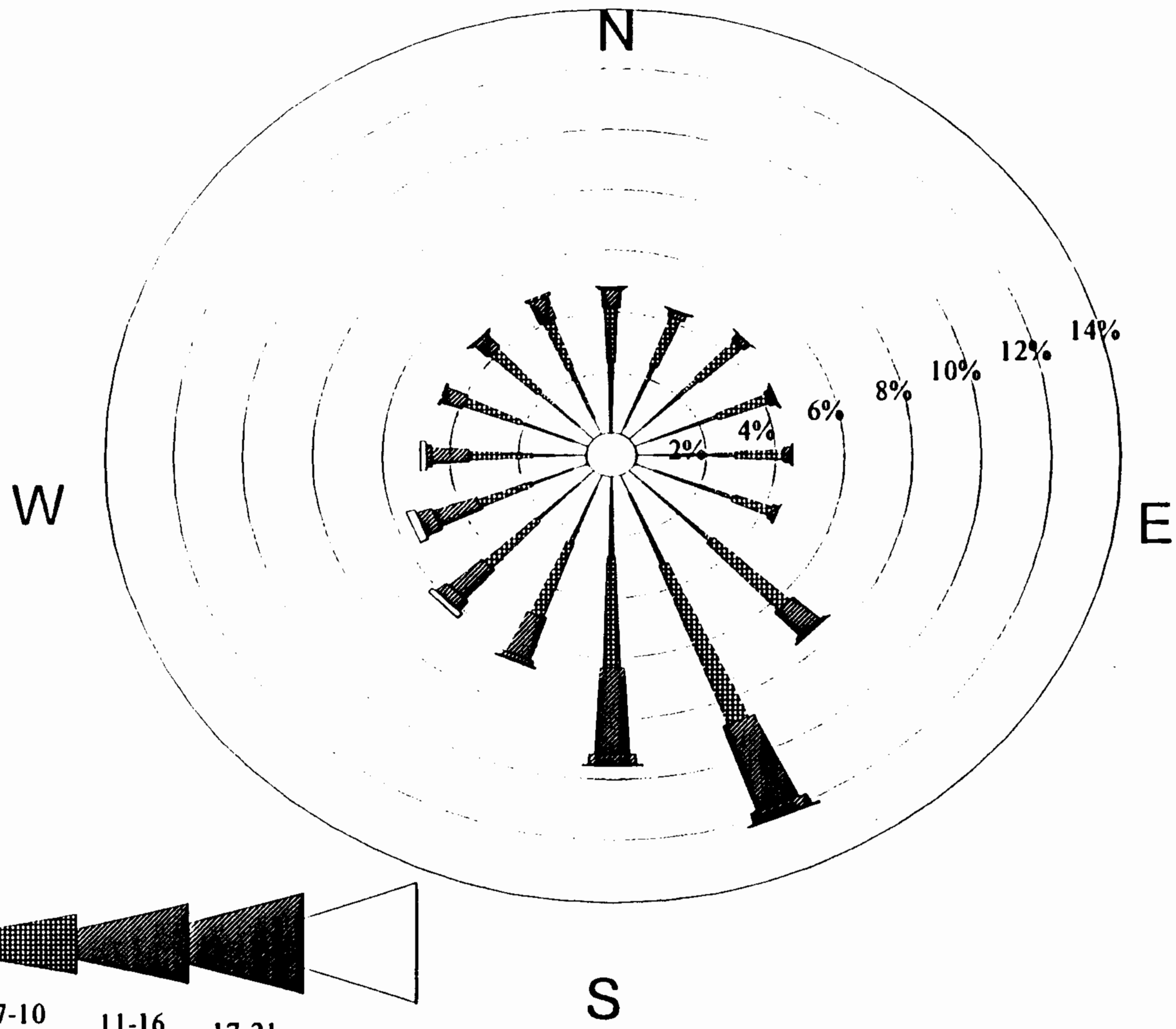


NOTE: Frequencies indicate direction from which the wind is blowing.

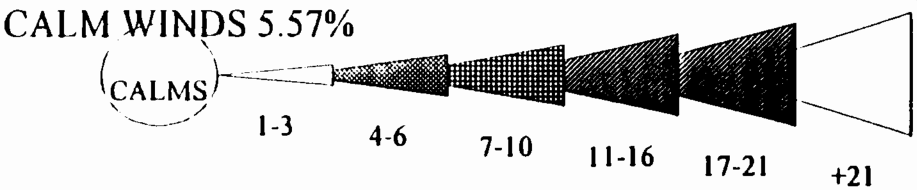
CALM WINDS 11.21%



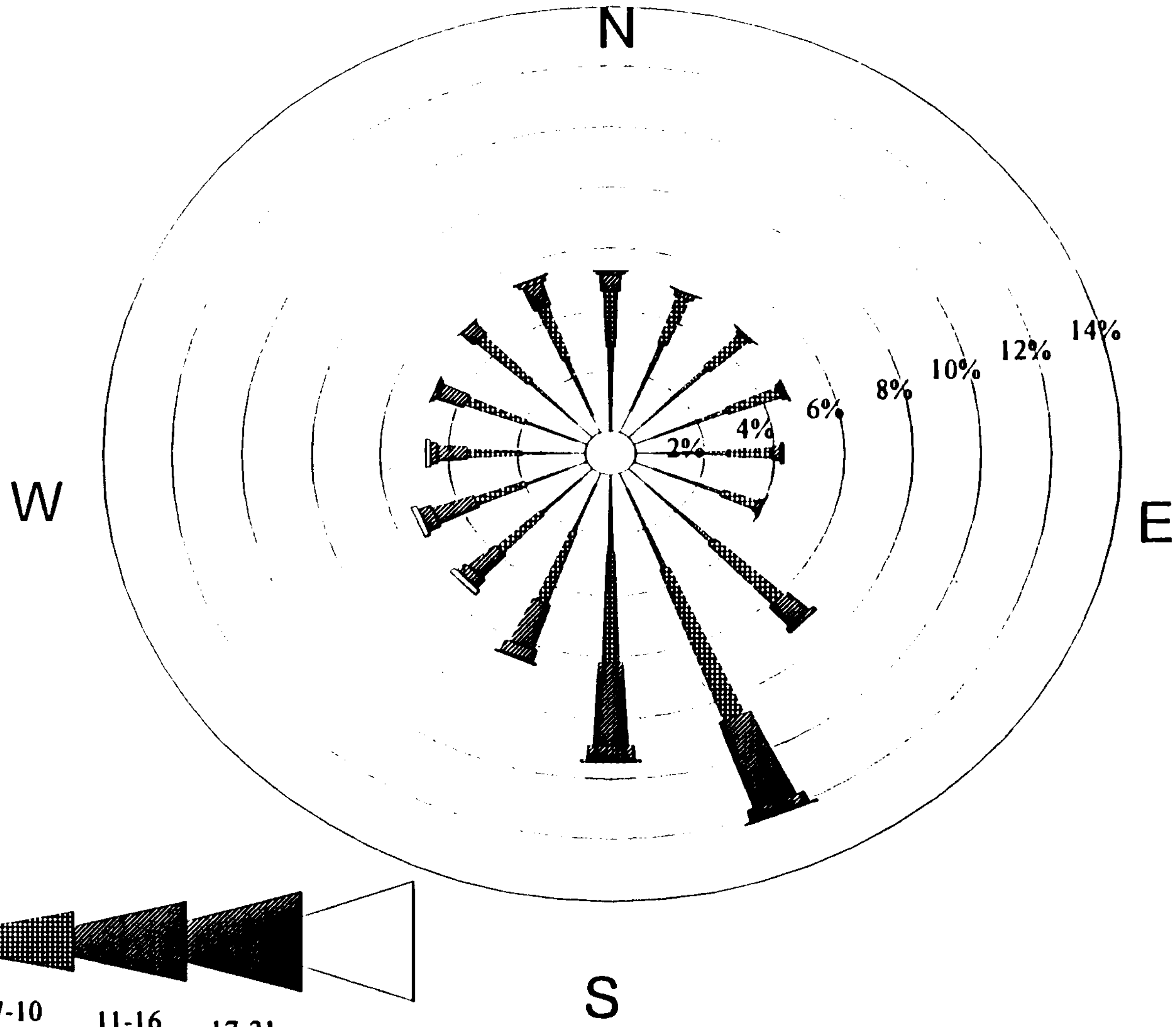
Holloman AFB 1993
January 1
December 31
Midnight-11 PM



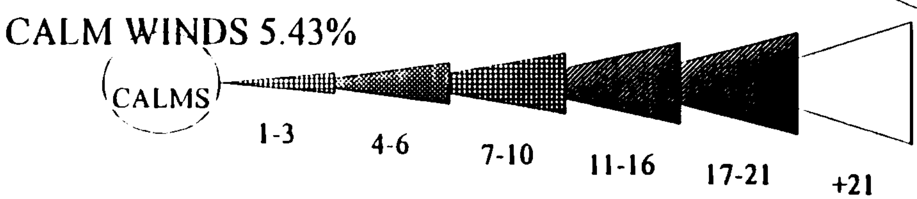
NOTE: Frequencies indicate direction from which the wind is blowing.



Holloman AFB 1994
January 1
December 31
Midnight-11 PM



NOTE: Frequencies indicate direction from which the wind is blowing.



Appendix C
References