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Civil Engineer

VANDENBERG AFB CROSS CONNECTION  
CONTROL & BACKFLOW PREVENTION  
PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This local instruction implements AFI 32-1066, *Plumbing Systems*. It provides further instruction and guidance in the local management of the Vandenberg Air Force Base Cross Connection Control and Backflow Prevention Program in accordance with rules established by state regulations and governed by the California Department of Health Services (DHS) of California and Santa Barbara County. Requirements are also further stipulated in the base water permit issued by the California DHS. Other applicable standards that are additionally referenced are Title 17 of the California Code of Regulations (CCR), *DHS Guidance Manual For Cross Connection Control Programs*, and the *Uniform Plumbing Code* (UPC). Also, as defined in CCR Title 17, Group 4, Article 1, Section 7584, Vandenberg Air Force Base reserves the right to implement further requirements beyond of Air Force or state regulations in regards to the cross connection and backflow prevention program to further protect the health of its consumers and to safeguard the base public water supply and system. This Instruction applies to all water systems located on Vandenberg Air Force Base property. This instruction does not apply to the Air Force Reserve Command (AFRC) nor Air National Guard (ANG). The Paperwork Reduction Act of 1974 as amended in 1996 and AFI 33-360, Volume 2, *Content Management Program-Information Management Tool (CMP-IMT)*, affects this publication.

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**1. Objectives.** The primary goal of the Vandenberg Air Force Base Cross Connection Control and Backflow Prevention Program is to protect public health and to ensure the potability and safety of the base drinking water supply and system. This program is also intended to identify local requirements as established by the 30<sup>th</sup> Civil Engineer Squadron, and to clarify and simplify existing requirements as established by AFI 32-1066, Plumbing Systems, Title 17 of the California Code of Regulations, the Uniform Plumbing Code (UPC), the Launch Operations & Support Contract, and any Memorandums of Understanding or Agreement. Furthermore, interpretations of existing California law as determined by the Department of Health Services of Santa Barbara County are included in this instruction.

**Figure 1. Double Check Valve Assembly (DCVA).**



**2. Scope.** A vigilant and proactive cross connection control and backflow prevention program will help to significantly minimize backflow occurrences in the base potable water supply and system. Serious illnesses and deaths have resulted in this country due to backflow incidents that were directly attributable to the ineffective management of a backflow prevention program. It is critically important, therefore, that a program be aggressively and alertly managed and maintained to ensure public safety and to protect the potable water supply and system. This instruction focuses on the following elements of the base program:

- 2.1. Base Cross Connection Control (CCC) and Backflow Prevention Program Management Responsibilities.
- 2.2. Contractor And Independent Agency (IA) Responsibilities.
- 2.3. Cross Connection Control, Identification, and Mitigation.
- 2.4. CCC and Backflow Prevention Assembly (BPA) Documentation And Inventory Control.
- 2.5. BPA Test Scheduling, Procedures, Documentation, and Reporting Requirements.
- 2.6. BPA Repair and Correction Requirements.
- 2.7. BPA Tester Certification Requirements.
- 2.8. BPA Tester Training Courses.

### 3. RESPONSIBILITIES :

#### 3.1. 30<sup>th</sup> Civil Engineer Squadron.

##### 3.1.1. The Base Civil Engineer will:

3.1.1.1. Ensure the overall implementation and success of the Vandenberg Cross Connection Control and Backflow Prevention (VCCCBP) Program.

##### 3.1.2. The Environmental Flight (CEV) Commander will:

3.1.2.1. Ensure all applicable Air Force, federal, state, and local environmental regulations concerning cross connection control and backflow prevention are implemented and enforced.

3.1.2.2. Assist the CES Operations Flight in providing guidance on applicable environmental issues such as Air Force, federal, state, and county regulations.

3.1.2.3. Assist the CES Operations Flight in coordinating activities and communication with contractor organizations which fall under CEV's scope of responsibility.

3.1.2.4. Assist the CES Operations Flight in operating and maintaining the Cross Connection Management System (CCMS) computer database program.

##### 3.1.3. The Operations Flight (CEO) Commander will:

3.1.3.1. Ensure all applicable Air Force, federal, state, and local laws and regulations concerning cross connection control and backflow prevention are implemented and enforced.

3.1.3.2. Ensure a base-wide cross connection survey is conducted every five years IAW AFI 32-1066, para 8 and para 12.1, either through in-house personnel or through a contracted agency. This survey pertains to all facilities on base and at geographically separated sites, to include USAF contractor and Independent Agency-operated and /or maintained facilities.

3.1.3.3. Ensure an adequate number of personnel are allocated for the Cross Connection Control and Backflow Prevention Program.

3.1.3.4. Ensure adequate funding is allocated for required training, certification, and recertification.

##### 3.1.4. The Infrastructure Element (CEOI) Chief will:

3.1.4.1. Ensure the successful implementation of the Vandenberg Cross Connection Control and Backflow Prevention Program.

3.1.4.2. Ensure all applicable Air Force, federal, state, and local laws and regulations concerning cross connection control and backflow prevention are implemented and enforced.

3.1.4.3. Ensure a base-wide cross connection survey is conducted by Utility Systems every five years IAW AFI 32-1066, para 8 and para 12.1, if this survey is to be performed by in-house personnel. This survey pertains to all facilities on base and at geographically separated sites, to include contractor and Independent Agency-operated and /or maintained facilities.

3.1.4.4. Ensure that an adequate number of personnel are properly trained and certified for backflow testing and program management.

##### 3.1.5. The Utility Systems (CEOIU) Foreman will:

- 3.1.5.1. Ensure the successful implementation and management of the Vandenberg Cross Connection Control and Backflow Prevention Program.
  - 3.1.5.2. Ensure all applicable Air Force, federal, state, and local laws and regulations concerning cross connection control and backflow prevention are implemented and enforced.
  - 3.1.5.3. Ensure a base-wide cross connection survey is conducted every five years IAW AFI 32-1066, para 8 and para 12.1, if conducted by Utility Systems personnel. This survey pertains to all facilities on base and at geographically separated sites, to include contractor and Independent Agency-operated and /or maintained facilities.
  - 3.1.5.4. Ensure the Recurring Work Program (RWP) database management records for Backflow Prevention Assemblies are maintained and kept current and that any RWP requirements are met.
  - 3.1.5.5. Ensure that an adequate number of personnel are properly trained and certified for backflow testing and program management.
  - 3.1.5.6. Appoint a manager and an adequate number of testing personnel for the Vandenberg Cross Connection Control and Backflow Prevention Program.
  - 3.1.5.7. Serve as the Alternate Vandenberg Cross Connection Control Backflow Prevention Program Manager.
- 3.1.6. The Vandenberg Cross Connection Control and Backflow Prevention Program Manager will:
- 3.1.6.1. Implement and manage the Vandenberg Cross Connection Control and Backflow Prevention Program.
  - 3.1.6.2. Ensure all applicable Air Force, federal, state, and local laws and regulations concerning cross connection control and backflow prevention are implemented and enforced.
  - 3.1.6.3. Conduct the base-wide cross connection survey every five years IAW AFI 32-1066, para 8 and para 12.1., if the survey is not contracted. This survey pertains to all facilities on base and at geographically separated sites, to include contractor and Independent Agency-operated and /or maintained facilities.
  - 3.1.6.4. Ensure all BPAs are maintained, operated, tested, and repaired in accordance with all applicable Air Force, federal, state, and local regulations.
  - 3.1.6.5. Manage the training program to ensure Backflow Prevention Assembly (BPA) testing and Cross Connection Survey personnel are properly trained and certified.
  - 3.1.6.6. Maintain a current list of personnel trained and certified in cross connection specialist program management and backflow testing, to include a copy of their current certifications. This list also pertains to USAF contractors and Independent Agency personnel who perform their own cross connection program administration and backflow testing.
  - 3.1.6.7. Ensure proper certification and documentation of USAF personnel (military and civil service) as trained backflow technicians through the completion of AF IMT 484, **Backflow Prevention Inspection Data**, (AFI 32-1066, Section 16.1 & 16.2, page 6).
  - 3.1.6.8. Proactively manage the CCMS database and ensure the records within the system are current and accurate (to include contractor and Independent Agency BPAs).

3.1.6.9. Implement an efficient, accurate, and timely method to identify and include newly-installed BPAs into the CCMS database.

3.1.6.10. Maintain current hard-copy records of AF IMT 845, **Cross Connection Information**, for each BPA, with line and isometric drawings (to include contractor and Independent Agency BPAs).

3.1.6.11. Maintain current hard-copy records of AF imt 848, **BPA Inventory List** (AF IMT 848 and computer database equivalent) for all BPAs (to include Contractor and Independent Agency BPAs).

3.1.6.12. Maintain current hard-copy records of all field test results for a minimum of three years for each installed BPA (to include contractor and Independent Agency assemblies).

3.1.6.13. Perform, at a minimum, a semi-annual review of the BPA Program to ensure its currency and compliance with all applicable Air Force, federal, state, and local regulations.

3.1.6.14. Provide technical guidance and advisement to Vandenberg contractor and Independent Agency personnel in the management of their BPA Program.

### 3.2. Contractor and Independent Agencies.

3.2.1. Contractor and Independent Agencies responsible for their own BPAs will, as stipulated by contract and/or Memorandum of Agreement:

3.2.2. Appoint a single individual as the User Supervisor for their organization to act as the focal point for the management of their own respective backflow prevention program. This individual must be trained or demonstrate one year's experience in cross connection control program administration. (Ref: California CCR Title 17, Group 4, Article 1, Section 7586. *California DHS Guidance Manual For Cross Connection Control Programs*, Chapter 1, Section II, Para d, Sept 1988.).

3.2.3. Ensure all applicable Air Force, federal, state, and local laws and regulations concerning cross connection control and backflow prevention are implemented and enforced.

3.2.4. Ensure all BPAs under their responsibility are maintained, operated, tested, and repaired in accordance with all applicable Air Force, federal, state, and local regulations.

3.2.5. Provide reasonable facility or site access to USAF personnel or their contracted representatives to conduct cross connection surveys and backflow prevention program inspections.

3.2.6. Provide to the VCCCBP Program Manager or appropriate USAF Contracting Program Manager a current list of trained and certified cross connection specialist program managers and backflow testers, to include a copy of their training documentation and/or current certification.

3.2.7. Maintain a current inventory list and applicable test schedule of all BPAs assigned to their responsibility. The inventory list will, at a minimum, contain information detailing assembly location, facility number, size, and manufacturer information (model & serial number). The test schedule will, at a minimum, conform to testing requirements listed elsewhere in this instruction.

3.2.8. Maintain at least a three-year historical record of all BPA Field Test Form sheets for the backflow assemblies assigned to their responsibility.

- 3.2.9. Provide a hard-copy test result to the VCCCBP Program Manager or their USAF Contracting Program Manager of all BPA Field Test Forms for each assembly within thirty days of its test, repair, or retest.
- 3.2.10. Ensure the BPA Field Test Forms for all BPAs under their responsibility are properly annotated in accordance with this local instruction
- 3.2.11. Review and update format and content of BPA Field Test Forms as necessary to ensure that they continue to be an effective means of documenting BPA testing procedures.
- 3.2.12. Notify the VCCCBP Program Manager:
- 3.2.12.1. if a BPA cannot be repaired within 30 days after a malfunction, test or retest failure.
  - 3.2.12.2. if a high hazard cross connection cannot be corrected within seven days of its discovery.
  - 3.2.12.3. if a low hazard cross connection cannot be corrected within thirty days of its discovery.
  - 3.2.12.4. within thirty days from the date of notification or discovery if any tester has lost certification through license expiration, revocation, or failure to pass recertification.
  - 3.2.12.5. within thirty days after discovery of any testing, repair, or reporting violation in accordance with this local instruction or applicable Air Force, federal, state, or local regulation.

**Figure 2. Reduced Pressure Principal Device (RPPD).**



#### **4. Cross Connection Control.**

##### **4.1. Procedures:**

##### **4.1.1. Identification.**

4.1.1.1. A cross-connection is any actual or potential physical connection between the potable water supply and a non-potable water supply. Non-potable sources include industrial fluids, gases, or any substance other than that intended for a potable water system.

4.1.1.2. Personnel performing Cross Connection surveys should be trained in a Backflow Prevention Assemblies or Cross-Connection Survey course. Certification by the United States Air Force, California-Nevada American Water Works Association (AWWA), American Backflow Prevention Association (ABPA), or the University of Southern California is highly recommended.

4.1.1.3. When surveying or identifying cross-connections, the craftsman should start tracing the water system from the facility's isolation valve to the mechanical or boiler room. From that point the rest of the potable water system should be traced downstream towards any other rooms that have a water supply terminating in it, such as laboratories, bathrooms, and kitchens. The facility's fire suppression system should also be inspected for BPAs or cross connections from the main valve connection [usually the Position Indicator Valve (PIV)] to the system's termination point(s).

4.1.1.4. An exterior inspection of the facility is also required, including the tracing and inspection of all hose bibbs, lawn sprinkler or irrigation systems, air conditioning or chiller units, cooling towers, and any other type of treatment equipment requiring water.

4.1.1.5. Once a cross connection has been identified, it must be classified according to the risk it poses to the potable water system or supply. Vandenberg Air Force Base will classify cross connections based on the potential pollutant or contamination threat it poses to the water system. All cross connections will be classified as either High or Low Hazards (see [Attachment 1](#)).

#### 4.1.2. Isolation / Mitigation.

4.1.2.1. Backflow Incidents. If a backflow incident occurs, the backflow hazard will be immediately corrected, a cause determined for the incident, and a plan of action implemented to prevent further backflow incidents of a similar nature from occurring.

4.1.2.2. High Hazards. If a cross connection is identified between the potable water system and a source of pollution or contamination, it will require urgent attention for remediation. If the source of cross connection poses a contamination risk to the potable water system (i.e., poison, sewage, or health risk), then it must be immediately corrected or the source of contamination disconnected from the potable water system until a correction can be made.

4.1.2.3. Low Hazards. If the source of cross connection poses a pollution (low) hazard to the potable water system, then it must be corrected within thirty days of its discovery. Immediate correction or isolation or the cross connection will only be required if a backflow condition is perceived or is occurring. If a correction cannot be made within thirty days, then the cross connection must be isolated or disconnected from the potable system until it is corrected.

4.1.2.4. Before, during, and/or after isolating and disconnecting a piece of equipment, area, or facility, you must immediately notify the Facility Manager and the Utility Systems Work Scheduler of your actions. When discussing your actions with the Facility Manager, it is important that you inform him or her that your primary duty is the protection of the potable water supply.

#### 4.1.3. Correcting Cross Connections.

4.1.3.1. Install only approved backflow prevention assemblies. Primacy over assembly approval rests with the California Department of Health Services in accordance with the Cali-

ifornia Code Of Regulations, Title 17. Local jurisdiction over enforcement and punitive action over these assemblies rests with the Department of Health Services of the County of Santa Barbara. A complete listing of approved assemblies is in Appendix G. Since this list is updated on an annual basis, the most current list can be obtained by accessing the California DHS website at: [http://www.dhs.ca.gov/ps/ddwem/publications/Backflow\\_2000.PDF](http://www.dhs.ca.gov/ps/ddwem/publications/Backflow_2000.PDF)

4.1.3.2. All assemblies must be installed in accordance with the Uniform Plumbing Code, Air Force, federal, state, or local regulation. Follow the regulation that requires the most stringent installation method.

4.1.3.3. Once a new assembly is installed, it is important to add the assembly to the Backflow Prevention Assembly Inventory and placed on the schedule for regular inspection and maintenance. An initial test and inspection must be performed immediately after installation, and a follow-up inspection must be performed 90 days after installation. Any additional or further inspections and testing will be conducted in accordance with 30SWI32-1066.

4.1.4. For further information regarding cross-connections and backflow assemblies, please refer to the *Uniform Plumbing Code*, Air Force Instructions, *Manual For Cross Connection Control (USC)*, the *California DHS Guidance Manual For Cross Connection Control Programs*, and applicable manuals and training texts.

**Figure 3. Pressure Vacuum Breaker (PVB).**



## **5. VCCCBP Program And BPA Documentation And Inventory Control.**

5.1. **Regulations Management.** The VCCCBP Program Manager will maintain all applicable Air Force, federal, state, county, and local operating instructions or regulations in a hard-copy and (if possible) electronic format concerning the VCCCBP Program.

5.2. **Field Test Forms Management.** The VCCCBP Program Manager will maintain hard-copy records all BPA Field Test Forms for a minimum of the prior three years' worth of test information for each BPA. The Field Test Forms will be organized and filed to allow quick and easy access to verify historical test data for each individual BPA. The VCCCBP Program Manager will be responsible for updating or modifying the Field Test Form if any changes are required.

**5.3. Database Inventory Management.** The VCCCBP Program Manager will be responsible for maintaining the database inventory record for all BPAs located on Vandenberg Air Force Base and any other remote sites assigned to its responsibility. The primary method of database management will be performed through the Cross Connection Management System, which is a Microsoft Access electronic database program. Hard-copy records of the database inventory and other relevant information will be maintained by the Program Manager as a standby for the electronic database record and to allow for faster access to certain elements of the program. Additional inventory control and testing schedules will be maintained and kept current in the Recurring Work Program (RWP) of the Interim Work Information Management System (IWIMS) or the Automated Civil Engineer System (ACES). The RWP is principally used to track work progress and accountability, and to monitor labor and material expenditures.

**5.4. Database Records Management.** All Vandenberg BPAs will be inventoried and the relevant information for each assembly will be maintained in the following formats:

5.4.1. AF IMT 843, **Backflow Prevention Inspection Form**, and AF IMT 844, **Backflow Prevention Inspection Form**, will be an optional method to track test information because Vandenberg uses a local Field Test Form as a suitable substitute.

5.4.2. AF IMT 845, **Cross Connection Information** record will be kept current with the following data:

- 5.4.2.1. Date.
- 5.4.2.2. Device number and serial number.
- 5.4.2.3. Device location.
- 5.4.2.4. Degree of hazard.
- 5.4.2.5. Device description.
- 5.4.2.6. Device type.
- 5.4.2.7. Manufacturer.
- 5.4.2.8. Model number.
- 5.4.2.9. Size.
- 5.4.2.10. Air gap distance (if applicable).
- 5.4.2.11. Location sketch.
- 5.4.2.12. Installation (isometric) sketch.

5.4.3. AF IMT 848, **Inventory Of Cross Connection And Backflow Prevention Devices** record will be kept current with the following data:

- 5.4.3.1. Name of base.
- 5.4.3.2. Name(s) of inventory personnel.
- 5.4.3.3. Date.
- 5.4.3.4. Cross connection control number.
- 5.4.3.5. Location.

- 5.4.3.6. Item/facility protected.
- 5.4.3.7. Potential contaminant or pollutant.
- 5.4.3.8. Degree of hazard.
- 5.4.3.9. Back pressure potential.
- 5.4.3.10. Back siphonage potential.
- 5.4.3.11. Control device type installed or required.
- 5.4.3.12. Device data.
- 5.4.3.13. Comments.

5.4.4. Recurring Work Program. Utility Systems will be responsible for maintaining the Recurring Work Program, to include the computer database entries for updating any scheduled RWP requirements (records management and RWP item completion).

- 5.4.4.1. AF IMT 1841 **Maintenance Action Sheets**.
- 5.4.4.2. Engineering Performance Standards.
- 5.4.4.3. IWIMS Labor and RWP item completion requirements.

5.4.5. 30SW IMT 1 **Backflow Prevention Field Test Form**, Apr 2004 (Required data entry fields listed in Backflow Prevention Assembly Field Test Form, [Table 3](#), Section 6.3.2.).

5.4.6. Cross Connection Management System (CCMS). This is an electronic database in the Microsoft Access format with multi-layered, inter-relational features. Although somewhat redundant to the AF Forms described above, it is a more detailed system of record keeping that helps to ensure tighter control of the VCCCBP Program. As stated earlier, the CCMS will be the primary means of maintaining an accurate database inventory and testing schedule for the VCCCBP Program through the use of the following program features:

- 5.4.6.1. Add BPD Test Results Information. This feature allows information from the Field Test Forms to be entered into the following data fields:
  - 5.4.6.1.1. Building Number.
  - 5.4.6.1.2. BPD ID Number.
  - 5.4.6.1.3. Test Date.
  - 5.4.6.1.4. Hazard Rank.
  - 5.4.6.1.5. Manufacturer.
  - 5.4.6.1.6. Model Number.
  - 5.4.6.1.7. Serial Number.
  - 5.4.6.1.8. Unit Size.
  - 5.4.6.1.9. Room (optional).
  - 5.4.6.1.10. Location / Point Of Use.
  - 5.4.6.1.11. Test Results.

5.4.6.1.12. Comments.

5.4.6.2. Cross Connection Review. This feature contains historical CC information and allows review of the following data fields:

5.4.6.2.1. Building Number.

5.4.6.2.2. Cross Connection (CC) ID Full.

5.4.6.2.3. Hazard Rank.

5.4.6.2.4. CC Description.

5.4.6.2.5. Corrective Action (CA) Priority.

5.4.6.2.6. CA Cost.

5.4.6.2.7. Inspected Date.

5.4.6.2.8. Scheduled Date.

5.4.6.2.9. Completed Date.

5.4.6.2.10. CA Deficiency.

5.4.6.2.11. CA Recommendation.

5.4.6.2.12. CA Complete.

5.4.6.3. Enter & Edit Corrective Action Data. This feature allows entries into the corrective actions database for the following data fields:

5.4.6.3.1. BPD ID Number.

5.4.6.3.2. Building Name.

5.4.6.3.3. Building Address.

5.4.6.3.4. Priority.

5.4.6.3.5. Date Inspected.

5.4.6.3.6. Estimated Cost.

5.4.6.3.7. Scheduled Date.

5.4.6.3.8. Completed Date.

5.4.6.3.9. Deficiency.

5.4.6.3.10. Recommendations.

5.4.6.3.11. Corrective Action Completed Comments.

5.4.6.4. Open Report Menu. This feature allows access to seven report submenus containing the following items:

5.4.6.4.1. Testing Schedule. This feature contains the testing schedule for the VCCCBP Program with the following data fields:

5.4.6.4.1.1. Building Number.

5.4.6.4.1.2. BPD ID Number.

- 5.4.6.4.1.3. Test Date.
  - 5.4.6.4.1.4. Hazard Rank.
  - 5.4.6.4.1.5. Manufacturer.
  - 5.4.6.4.1.6. Model Number.
  - 5.4.6.4.1.7. Serial Number.
  - 5.4.6.4.1.8. Unit Size.
  - 5.4.6.4.1.9. Room (optional).
  - 5.4.6.4.1.10. Location / Point Of Use.
  - 5.4.6.4.1.11. Test Result.
  - 5.4.6.4.1.12. Check Valve 1 Results.
  - 5.4.6.4.1.13. Relief Valve Results.
  - 5.4.6.4.1.14. Check Valve 2 Results.
- 5.4.6.4.2. Comprehensive List of Corrective Actions. This list maintains information on BPD repairs with the following data fields:
- 5.4.6.4.2.1. BPD ID Number.
  - 5.4.6.4.2.2. Building Name.
  - 5.4.6.4.2.3. Building Address.
  - 5.4.6.4.2.4. Priority.
  - 5.4.6.4.2.5. Date Inspected.
  - 5.4.6.4.2.6. Estimated Cost.
  - 5.4.6.4.2.7. Scheduled Date.
  - 5.4.6.4.2.8. Completed Date.
  - 5.4.6.4.2.9. Deficiency.
  - 5.4.6.4.2.10. Recommendations.
  - 5.4.6.4.2.11. Corrective Action Completed Comments.
- 5.4.6.4.3. Comprehensive List Of BPDs. This list contains the inventory information for all BPDs on Vandenberg with the following data fields:
- 5.4.6.4.3.1. Facility Number.
  - 5.4.6.4.3.2. BPD ID number.
  - 5.4.6.4.3.3. Hazard Rank.
  - 5.4.6.4.3.4. Manufacturer.
  - 5.4.6.4.3.5. Model.
  - 5.4.6.4.3.6. Unit Size.

5.4.6.4.3.7. Point Of Use.

5.4.6.4.4. Comprehensive List of Cross Connections. This feature details all cross connections on Vandenberg with the following data fields:

5.4.6.4.4.1. Building Number.

5.4.6.4.4.2. Cross Connection (CC) ID Full.

5.4.6.4.4.3. Hazard Rank.

5.4.6.4.4.4. CC Description.

5.4.6.4.4.5. Corrective Action (CA) Priority.

5.4.6.4.4.6. CA Cost.

5.4.6.4.4.7. Inspected Date.

5.4.6.4.4.8. Scheduled Date.

5.4.6.4.4.9. Completed Date.

5.4.6.4.4.10. CA Deficiency.

5.4.6.4.4.11. CA Recommendation.

5.4.6.4.4.12. CA Complete.

5.4.6.4.5. BPD Details. This list contains the full details for each BPD with the following data fields:

5.4.6.4.5.1. BPD ID Full.

5.4.6.4.5.2. Building Number.

5.4.6.4.5.3. Building Address.

5.4.6.4.5.4. Point Of Use.

5.4.6.4.5.5. Hazard Rank.

5.4.6.4.5.6. Manufacturer.

5.4.6.4.5.7. Model Number.

5.4.6.4.5.8. Serial Number.

5.4.6.4.5.9. Unit Size.

5.4.6.4.5.10. Previous Test Data.

5.4.6.4.6. Building Details. This list contains data on each facility containing a BPD with the following data fields:

5.4.6.4.6.1. Building Name.

5.4.6.4.6.2. Building Address.

5.4.6.4.6.3. Building Description.

5.4.6.4.6.4. Principal Activities In Building.

5.4.6.4.6.5. Previous Test Data.

5.4.6.4.7. Replaced BPDs. This list contains data on replaced BPDs with the following data fields:

5.4.6.4.7.1. Building Number.

5.4.6.4.7.2. BPD ID Number.

5.4.6.4.7.3. Manufacturer.

5.4.6.4.7.4. Model Number.

5.4.6.4.7.5. Unit Size.

5.4.6.4.7.6. Point Of Use.

5.4.6.4.7.7. Replaced By (Device).

5.4.6.5. Enter New Cross Connection, BPD, & Building Information. This feature contains update capabilities on the existing database with the following data items:

5.4.6.5.1. Enter New CC For This Building.

5.4.6.5.2. Enter New BPD For This Building.

5.4.6.5.3. Edit Building Information.

5.4.6.5.4. Add A New Building.

5.4.6.5.5. Any of the above items can then be updated through the following data fields:

5.4.6.5.5.1. Date Of Inspection.

5.4.6.5.5.2. Building Number.

5.4.6.5.5.3. Building Name.

5.4.6.5.5.4. Building Street Address.

5.4.6.5.5.5. Building Description.

5.4.6.5.5.6. Principal Activities In Building:

5.4.6.6. Edit Historical Cross Connection, BPD, Or Corrective Action Information. This feature contains update capabilities on the existing database with the following data items:

5.4.6.6.1. BPD Information.

5.4.6.6.2. Test Results Information.

5.4.6.6.3. Cross Connection Information.

5.4.6.6.4. Corrective Action Information.

## **6. BPA Test Scheduling, Procedures, Documentation, And Reporting Requirements.**

### **6.1. Test Scheduling.**

6.1.1. It is imperative that a consistent and recurring BPA test schedule be developed, implemented, tracked, and followed with minimal deviation. When developing a test schedule, one of

the most important variables to consider is the anticipated BPA failure rate, which can be as high as twenty-five percent. Part of the BPA testing schedule should therefore take into account adequate assembly repair and replacement time while still maintaining a viable testing schedule.

6.1.2. Following are the minimum testing requirements for Vandenberg BPAs:

**Table 1. BP Assembly Minimum Testing Requirements.**

| Assembly Type / Degree Of Hazard | Minimum Testing Requirements                                 |
|----------------------------------|--|
| Air Gap                          | Annual   |
| Low (Pollution) Hazard           | Annual   |
| High (Contamination) Hazard      | Semi-Annual  |
| Repaired BPA                     | Immediately After Repair                                     |
| New BPA                          | Immediately After Installation<br>90 Days After Installation |

## 6.2. Test Procedures And Repair Requirements.

6.2.1. Test procedures for all Vandenberg BPAs will be in accordance with industry-accepted standards as outlined in *Manual Of Cross Connection Control, Ninth Edition* (or later), University of Southern California. Applicable manufacturer's instruction manuals will also be used if they comply with the minimum testing standards as outlined in the *Manual Of Cross Connection Control*.

6.2.2. If a BPA should fail testing, then it will be immediately retested. If the assembly fails the retest, the BPA will be repaired as soon as possible to correct the malfunction. Time constraints on BPA repairs will be:

**Table 2. Assembly Repair Timetable.**

| Degree Of Hazard | BPA Will Be Repaired In |
|------------------|-------------------------|
| High             | 30 Calendar Days        |
| Low              | 30 Calendar Days        |

6.2.2.1. High Hazards. For high hazard applications, if a backflow condition is anticipated, perceived, or is occurring, then the assembly will be immediately isolated until it is repaired and passes the appropriate BPA test.

6.2.2.2. Low Hazards. For low hazard applications, malfunctioning assemblies can be left in service until repaired as provided by [Table 2.](#), but only if a backflow condition is not perceived or is not occurring. If a backflow condition is perceived or is occurring, then the assembly will be immediately isolated until the assembly is repaired and passes the appropriate BPA test.

6.2.2.3. Bypass Arrangements. A bypass system can be used while the BPA is isolated if the bypass arrangement has the same or higher backflow protection as provided by the isolated

BPA. To ensure the requirements in **Table 2.** are met, it is highly recommended that a sufficient amount of spare parts or repair kits be kept on inventory to avoid delays in the repair process.

### 6.3. Test And Repair Documentation.

6.3.1. Proper documentation for BPA testing is critical in maintaining an accurate database inventory system. Failure to properly document test results can result in program confusion, unnecessary retesting, and present a false impression of the program's status.

6.3.2. The Appendices have an example of the Vandenberg Backflow Prevention Assembly Field Test Form, dated August 2001. Proper annotation of the form requires the following data entry fields (highlighted) to be filled out:

**Table 3. Field Test Form Entry Requirements.**

| Highlighted Color | Status      | Description   |
|-------------------|-------------|---|
| Green             | Required    | Critical Information Identifying Facility, BPA, Tester Information And Certification, And Pass Or Fail Result |
| Yellow            | Required    | Applicable Test Data Information And Maintenance Actions Taken Or Required                                    |
| Blue              | Recommended | Comments Or Remarks On Test Results Or Maintenance Actions  |

### 6.4. Test Reporting And Documentation Control Requirements.

6.4.1. Backflow Tester Requirements. All Vandenberg Field Test Forms will be turned over to the Vandenberg Cross Connection Control And Backflow Prevention (VCCCBP) Program Manager no later than thirty days after the test procedure and/or repair has been documented on the test form. If so stipulated in a prior or supplemental agreement or understanding between a Contractor or Independent Agency (IA) and the United States Air Force (USAF), the Contractor or IA will have thirty days to submit the forms to their USAF Program Manager, who will then have 14 days to turn the forms over to the VCCCBP Program Manager. If there are any delays in the reporting process, the VCCCBP Program Manager will be notified within 14 days of the initial awareness of the problem.

#### 6.4.2. Vandenberg Cross Control And Backflow Prevention Program Manager.

6.4.2.1. The VCCCBP Program Manager will insert the paper copies of all Field Test Form result sheets into the program binders no later than 14 days after receipt of the test forms. Test result sheets will be maintained for a minimum of three years as required by CCR Title 17, Article 4, Section 7605, paragraph f.

6.4.2.2. The VCCCBP Program Manager will also input the test results into the Cross Connection Management System computer database within 14 days of receipt of the test result sheets.

**Figure 4. Atmospheric Vacuum Breaker (AVB).**



## **7. Backflow Prevention Assembly Tester Training, Certification Requirements, And Repair Experience Requirements.**

### **7.1. Backflow Prevention Assembly Tester Training And Certification Requirements.**

7.1.1. It is highly recommended that tester personnel complete formal training on cross connection principles and backflow prevention assembly testing and repair. Following is a non-exclusive list of recommended training sites:

7.1.1.1. Foundation for Cross Connection Control and Hydraulic Research, University of Southern California. Information from this school can be obtained by accessing their websites at <http://www.usc.edu.fchr>.

7.1.1.2. American Backflow Prevention Association (ABPA). Information on this school can be obtained by accessing their website at <http://www.abpa.org/>.

7.1.1.3. Backflow Prevention Course, Sheppard Air Force Base Mobile Training Team, United States Air Force.

7.1.2. Personnel testing and certifying backflow prevention assemblies on Vandenberg Air Force Base and/or its geographically separated sites will maintain current certification from at least one of the following backflow prevention associations:

7.1.2.1. American Backflow Prevention Association (ABPA).

7.1.2.2. California-Nevada Regional American Water Works Association (AWWA) Backflow Tester's Certification Program. Information about the AWWA certification program can be obtained by accessing their website at <http://www.ca-nv-awwa.org/>.

7.1.3. Personnel performing cross connection surveys will be trained and certified in cross connection surveying and have a minimum of one year of experience in backflow prevention assembly testing and repair. The minimum time requirement for a comprehensive, system-wide survey is every five years as established by Section C, Paragraph 12, AFI 32-1066. Training and certifica-

tion for this requirement is offered by the Foundation for Cross Connection Control and Hydraulic Research, USC, which is listed above in **Section 7.1.1**.

## **7.2. Backflow Prevention Assembly Installation And Repair Experience Requirements.**

7.2.1. Personnel performing installation or repair work on backflow prevention assemblies do not require tester certification, but must have at least one year of plumbing experience or formal certified training in general plumbing skills or in backflow prevention assembly repair. Documentation of plumbing experience will be acceptable from, but not limited to, apprenticeship training certifications, current or prior supervisor recommendations, or documented job experience. Training certificates will be acceptable from, but not limited to, such applicable training institutions as the United States Air Force Technical Training program, the University of Southern California, the American Backflow Prevention Association, the American Water Works Association, or applicable community college technical training programs. Final acceptance of plumbing experience or formal training documentation will be made by the VCCCBP Program Manager.

7.2.2. Personnel who do not meet the qualifications as outlined in the **7.2.1**, will not be authorized to perform installation or repair work on backflow prevention assemblies.

## **7.3. IMTs Prescribed and Adopted.**

7.3.1. IMTs Prescribed. 30SW IMT 1 **Backflow Prevention Assembly Field Test Form**.

7.3.2. IMTs Adopted: AF IMT 1841 **Maintenance Action Sheets**, AF IMT 848, **Inventory Of Cross Connection And Backflow Prevention Devices**, AF IMT 845, **Cross Connection Information**, AF IMT 843, **Backflow Prevention Inspection Form**, and AF IMT 844, **Backflow Prevention Inspection Form**.

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**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****Abbreviations and Acronyms***

**ABPA**—American Backflow Prevention Association  
**ACES**—Automated Civil Engineer System  
**AG**—Air Gap  
**AVB**—Atmospheric Vacuum Breaker  
**AWWA**—American Water Works Association  
**BPA**—Backflow Prevention Assembly  
**BPD**—Backflow Prevention Device  
**CCC**—Cross Connection Control  
**CCMS**—Cross Connection Management System (MS Access)  
**CCR**—California Code Of Regulations  
**CEO**—Operations Flight, Civil Engineer Squadron  
**CEOI**—Infrastructure Support Element, Civil Engineer Squadron  
**CEOIU**—Utility Systems, Civil Engineer Squadron  
**CES**—Civil Engineer Squadron  
**CEV**—Environmental Flight, Civil Engineer Squadron  
**DCVA**—Double Check Valve Assembly  
**DHS**—Department of Health Services (California)  
**IA**—Independent Agency  
**IWIMS**—Interim Work Information Management System  
**MAS**—Maintenance Action Sheet  
**OI**—Operating Instruction  
**PVB**—Pressure Vacuum Breaker  
**RPPD**—Reduced Pressure Principle Device  
**RWP**—Recurring Work Program  
**UPC**—Uniform Plumbing Code  
**USAF**—United States Air Force  
**USC**—University of Southern California  
**VCCCBP (Program)**—Vandenberg Cross Connection Control and Backflow Prevention (Program)

*Terms*

**Backflow Prevention Assembly**—The complete assembly of the backflow prevention device, to include isolation valves, test cocks, and any other appurtenance that is not a physical part of the core device.

**Backflow Prevention Contamination**—The term “contamination” shall mean an impairment of the quality of the water which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, waste, etc.

**Backflow Prevention Cross Connection**—Any unprotected actual or potential connection between a potable source and a non-potable source which can be liable to backsiphonage and /or back pressure through either a direct or indirect connection.

**Backflow Prevention Device**—The core physical backflow prevention device which only includes the parts of the device which are integral to the device’s primary function.

**High Hazard**—Hazards that pose a contamination risk to the potable water system.

**Immediately**—For the purposes of this Operating Instruction, this term will be defined as a period of not more than 24 hours after a requirement has been determined.

**Independent Agency**—This term applies to any organization that performs their own backflow testing and / or cross connection control program administration for BPAs under their control.

**Low Hazard**—Hazards that pose a pollution risk to the potable water system.

**Non-potable water**—Water that is not safe or has not been approved for human consumption.

**Pollution**—The term “pollution” shall mean an impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely affect and unreasonably affect the aesthetic qualities of such water for domestic use.

**Potable Water**—Water that has been designated or approved for human consumption.