ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

VN 3900.1

04/30/04

SUBJ: AVN OCCUPATIONAL SAFETY AND HEALTH PROGRAM

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1. PURPOSE. This order establishes the policy framework and assigns responsibility for an effective AVN wide Occupational Safety and Health (OSH) program.

2. DISTRIBUTION. This order is distributed to AVN Branch level and above; Safety and Facility Services Management, AMP-100; and Environmental Branch, ACT-640.

3. DEFINITIONS: See Appendix 1.

4. POLICY STATEMENT. AVN's mission is to ensure standard development, evaluation, and certification of airspace systems, procedures, and equipment for customers worldwide. The AVN OSH program does not exist separate from this mission--it is tied directly to it, and enhances it. The primary instruments in completing the AVN mission are its employees. All workspace, aircraft, and equipment are merely tools to enable AVN employees to succeed. The goal of the OSH program is to ensure that AVN employees are provided these tools free from recognized hazards that cause or are likely to cause them death or serious physical harm. The program also protects these valuable tools to improve mission accomplishment. The safety management system described in this order is intended to meet or exceed all federal, state and agency OSH requirements and is based on the Occupational Health and Safety Assessment Series 18001 specification (OHSAS 18001). This order establishes a system safety approach relying on operational risk management to identify and manage risks within AVN.

5. RESPONSIBILITIES. Management will be fully committed to developing, implementing and improving the AVN OSH program to include identifying, requesting and providing the required resources. Management will establish accountability systems at all employee levels, throughout the organization, to ensure success. See Appendix 2 for accountability system guideline.

a. Manager, Safety and Quality Assurance Staff, AVN-6, is responsible for the overall AVN OSH program to include development, maintenance, and oversight and is the focal point for all OSH related issues within AVN. Additionally, AVN-6 will provide the necessary assistance and technical expertise in the development and operation of division level OSH programs. AVN-6 will monitor new occupational safety and health legislation and agency orders to assure that the development and implementation of controls are planned and executed. AVN-6 will establish an Occupational Safety and Health Program Manager to meet this requirement.

b. AVN Division Managers. AVN Division Managers will be responsible for developing, implementing and improving an effective OSH program within their division. One or more Division Occupational Safety and Health Representatives will be assigned in writing by Division Management. These representatives may be full time safety specialists or collateral duty safety personnel depending on the scope and nature of operations within the division. AVN Division OSH Representatives will have direct line reporting and accountability to the Division. The AVN Occupational Safety and Health Program Manager will participate in the indirect management of Division Occupational Safety and Health

Representatives with regard to the development and implementation of division safety program performance goals and objectives.

c. AVN Division OSH Representatives. AVN Division OSH Representatives will be responsible for leading and coordinating the development, implementation and improvement of the division occupational safety and health program. Division OSH representatives will be the points of contact for AVN-6, and other internal and external OSH contacts.

d. All AVN employees are responsible. All AVN employees are responsible to support the occupational safety and health program. They must comply with federal, state, and AVN safety program requirements and will be encouraged to notify supervisors and/or safety representatives of hazards they find in the work place.

6. PROGRAM GOALS AND OBJECTIVES: The overall goal of the AVN Occupational Safety and Health program is to prevent injury and illness to AVN personnel. This is achieved through the identification, evaluation and control of risk. Operational Risk Management (ORM) is a tool that enhances this process and assists with the prioritization of safety program efforts. See Appendix 3, 3.1, 3.2 and 3.3 for ORM guidelines.

a. Fiscal Year. Each fiscal year, specific safety program objectives will be determined for each AVN division. These objectives may be determined collectively through the Division Safety Committee but must be supported with a documented risk assessment and approved by Division Management. See Appendices 4, 4.1, 4.2, 4.3 and 4.4 for implementation guidance. Objectives must be submitted to the AVN Occupational Safety and Health Program Manager along with a request for resources. The AVN Occupational Safety and Health Program Manager will review all division safety program objectives. Divisions will be held accountable for demonstrating good faith effort to meet agreed-to expectations.

b. Safety Program Objectives. Documented Division Safety Program objectives will include the following information.

(1) Identification of individuals delivering the program objectives.

(2) Identification of tasks, which need to be implemented in order to achieve objectives.

(3) Allocation of appropriate responsibility and authority for each task.

(4) Allocation of time lines to each individual task, in order to meet the overall time line of the related objective.

(5) Allocation of suitable resources (e.g. financial, human, equipment, logistics) to each task.

(6) Identification and delivery of training to affected employees related to objectives.

(7) Procedures for managing change (e.g. new or altered practices, processes, equipment or material).

7. SAFETY AND HEALTH ORGANIZATION. The AVN occupational safety and health program will be organized to optimize effective communication and delivery of resources. This will be established through the following means:

a. Organizational Structure: Appendix 6 illustrates the AVN OSH organizational structure. AVN-6 represents AVN as the Program Manager for Occupational Safety and Health. Division management designates division Occupational Safety and Health Representatives. Each branch establishes collateral duty safety functions as required to support development and implementation of safety procedures at the branch level. Branch management designates personnel with this responsibility.

b. Executive Occupational Safety and Health Committee. The AVN Executive Occupational Safety and Health Committee will be established. The AVN OSH Program Manager will serve as the Secretary who is responsible for initiating the development and implementation of the Executive Occupational Safety and Health Committee. The principal function of the director level committee is to consult and provide policy advice on and monitor the performance of, the AVN-wide safety and health program.

c. Division Occupational Safety and Health Committees. AVN Division Occupational Safety and Health Committees will be established. The Division OSH Representative will serve as the chairperson who is responsible for initiating the development and implementation of the safety committee. Division Occupational Safety and Health Committees will provide a method by which employees can utilize their knowledge of workplace operations to assist division management in the improvement of safety policies, conditions, and practices.

d. Facility Safety and Health Committees: Occupational Safety and Health Committees will be formed at the facility level where practicable, when the facility is detached from an AVN Division office. Facility Occupational Safety and Health Committees will provide a method by which local employees can utilize their knowledge of workplace operations to assist facility and division management in the improvement of safety policies, conditions, and practices.

e. Committee Development and Implementation. Committee development and implementation will be provided according to the following:

(1) Committee chairperson. The committee chairperson will be nominated from among the committee's members and will be elected by the committee members. Management and non-management members should alternate in this position. Maximum service time as chairperson should be two consecutive years.

(2) Employee Representation. Committee will have equal representation of management and non-management employees, who will be members of record. Non-management members of division level committees will represent all employees of the division and will be determined according to the following rules:

(a) Collective bargaining arrangements. Where employees are represented under collective bargaining arrangements, members will be appointed from among those recommended by the exclusive bargaining representative.

(b) Employees not represented by bargaining arrangements. Where employees are not represented under collective bargaining arrangements, members will be determined through procedures devised by the AVN Executive Safety Committee that provide for effective representation of all employees.

(c) Others. Where some employees are covered under collective bargaining arrangements and others are not, members will be representative of both groups.

(3) Management Representation. Division Managers will appoint management representatives in writing. These individuals are designated as Division OSH Representatives.

(4) Terms. Committee members should serve overlapping terms. Such terms should be of at least two years duration, except when the committee is initially organized.

(5) Meetings. Committees will establish a regular schedule of meetings and special meetings will be held as necessary; division level committees will meet at least quarterly and the director level committee will meet at least annually.

(a) Notice of meetings. Adequate advance notice of committee meetings will be furnished to employees and each meeting will be conducted pursuant to a prepared agenda.

(b) Meeting minutes. Written minutes of each committee meeting will be maintained and distributed to each committee member, and upon request, will be made available to employees and to outside officials.

8. HAZARD IDENTIFICATION, EVALUATION & CONTROL: Occupational hazards will be identified, evaluated and controlled by implementing the following:

a. Design Review. Design reviews will be conducted of all proposed facility construction and maintenance projects to identify, evaluate and mitigate potential hazards associated with completed operations/processes and potential hazards to AVN personnel generated by these operations.

(1) Facilities. Local jurisdictional codes, best management practices, American National Standards Institute (ANSI), Occupational Safety and Health Administration (OSHA), and National Fire Protection Association (NFPA) standards will be applied to all new, altered or modified occupant facilities and workstations. Facility construction, alteration and/or renovation projects will not be initiated without design review and AVN concurrence of plans. Affected Division OSH Representatives and the AVN OSH Program Manager will be authorized to conduct said reviews and will document findings, change requests and concurrence status.

(a) Operational Risk Management. Operational Risk Management will be utilized as the primary design review method. See Appendix 3, 3.1, 3.2 and 3.3 for ORM guidelines.

(b) Design Review Implementation. The Design Review Checklist may be used to assure that applicable items are considered. See Appendix 5.

(c) Work instruction and training. Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of a design review are incorporated into employee work instruction and training.

(2) Contractor Safety. To assure the safety of AVN employee exposed to construction, alteration and/or renovation projects, Division OSH Representatives will participate in pre-construction meetings and periodic contractor meetings.

(a) Safety Plans. The contracting officer's technical representative, facilities manager and AVN management representatives will gain agreement to a site-specific contractor safety plan prior to the initial performance and major phases of work. FAA Order 3900.57 and Form 3900-8 will be used to evaluate and document the project safety plan.

(b) Work Instruction and Training. Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of a contract review are incorporated into employee work instruction and training.

b. Job Hazard Analysis. Job Hazard Analysis (JHA) will be completed on routine tasks and jobs as required. Due to the magnitude of tasks, the prioritization for completing JHAs will be based on risk. JHAs will be completed by trained, competent OSH personnel and will involve the participation of affected employees, lead supervisors, and branch managers.

(1) JHA Worksheet. The JHA Worksheet or equivalent will be used to document the identification, evaluation and mitigation of occupational injury and illness exposures. Findings and conclusions will be reviewed and approved by AVN Division OSH Representatives and forwarded to Division Management as required for authorization to mitigate. See Appendix 7, JHA Worksheet.

(2) Work instruction and training. Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of job hazard analyses are incorporated into employee work instruction and training.

(3) Implementation Guideline. The JHA Implementation Guideline may be used to aid in the completion of job hazard analyses. See Appendix 7.1.

c. Self-Inspection.

(1) Coordination. All inspection activity will be coordinated with employee bargaining units in accordance with contract requirements.

(2) Workplaces and Facilities. AVN workplaces and facilities will be categorized as a general workplace or increased risk workplace based upon an evaluation of the operations by the AVN OSH Program Manager. The AVN OSH Program Manager will maintain a list of increased risk workplaces. For each of the increased risk workplaces, a list of associated facilities will be identified; e.g., facility (MMAC), workplace (Battery Room), location or room number (H-9 Lean-to). The list will be updated at least annually with the revision date documented. However, workplaces will be added to the increased risk list as soon as it is indicated that conditions change and the risk increased; i.e., accident reports, medical monitoring results, construction projects, etc.

(3) Frequency. Increased risk workplaces will be inspected at least twice a year by an OSH Professional. All others will be inspected annually.

(4) Documentation. Documentation will be prepared by the inspector for each workplace inspection and made available upon request by region/center, headquarters, or authorized employee representatives. Documentation will include the date of the inspection, identification of facility, location of finding, description of finding, regulatory citation, risk assessment code and recommended corrective action. The AVN OSH Program Manager is responsible for maintaining a master copy of all inspection reports and abatement plans.

(5) Risk Assessment. Risk values (risk assessment codes) will be assigned to each finding and will be determined in accordance with Appendix 8, Risk Assessment Code Matrix. Where available, quantitative risk assessment methods will be preferred, otherwise qualitative assessment methods may be used.

(6) Posting. Form 3900-1, Occupational Safety & Health Inspection Report, will be prepared, issued, and posted when a finding generates a risk value of one to ten (1-10). Division OSH Representatives will post the form as soon as possible, but no later than 15 days of the finding. The posting will be placed at or near each place an unsafe or unhealthful working condition referred to in the notice exists or existed. In addition, a notice will be posted if any special procedures are in effect. Where, because of the nature of the workplace operations, it is not practicable to post the notice at or near each such place, such notice will be posted, unedited, except for reason of national security, in a prominent place where it will be readily observable by all affected employees. A copy of the notice will be sent to employee representatives and to the AVN OSH Program Manager.

(7) Findings. The AVN OSH Program Manager and Division Management must be contacted immediately when imminently dangerous conditions are found or when a finding is equivalent to a 1-5 risk value. Otherwise, the AVN OSH Program Manager must receive safety inspection reports within 14 days of the completed inspection.

(8) Abatement. With the support of the AVN OSH Program Manager, Division OSH Representatives will gain agreement with Division Management to each abatement plan. Each finding must be supported by an abatement plan to assure that safety violations are corrected and hazards are mitigated. Appendix 9, Abatement Implementation Guideline, will be utilized to determine abatement plan completion schedules. A copy of each abatement plan will be sent to affected employee representatives.

(a) Root Cause Analysis. Division OSH Representatives and Division Management will apply root cause analysis to determine corrective action that may be required to prevent a recurrence of a finding.

(b) Work Instruction. Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of an inspection and root cause analysis are incorporated into employee work instruction and training. See Appendix 10, Root Cause Analysis Implementation Guideline.

(9) Verification. Division OSH Representatives will conduct follow-up inspections on all abatement plans and report any failure to complete corrective actions to the AVN OSH Program Manager and employee representatives.

d. Inspections by other organizations. All safety inspections conducted by organizations outside of AVN (i.e., OSHA, Regions, Centers) will be coordinated through the AVN OSH Program Manager and Division OSH Representatives. AVN Safety Representatives will be responsible for ensuring that all applicable aspects of paragraph 8.c. of this order are completed.

e. Employee Reports of Unsafe Conditions. Employees are considered the best source of hazard information. All AVN employees are responsible and encouraged to recognize and report and/or correct hazardous working conditions without fear of reprisal.

(1) Communication. Employees may report hazardous conditions verbally or in writing. Employees may communicate their concern to their team lead, supervisor or manager, but in all cases the Division OSH Representative must be notified as soon as possible for imminently dangerous conditions. The employee's report must include the nature and location of the hazard and the time and date it was discovered. Employees will be encouraged to recommend corrective action.

(2) Notification. The employee or employee's representative may use the FAA Hazard Report or equivalent to document the notification.

(3) Risk Assessment. Management will use Appendix 11, Management Follow-Up Report of Unsafe Condition, or equivalent to document the receipt, investigation and corrective action of the employee's report. A preliminary risk assessment will be completed. Conditions producing a risk value of 1-5 (imminent danger) will be investigated and corrected immediately. Conditions generating a risk value of 6-10 will be investigated and corrected as required within three working days. Conditions generating a risk value of 11-20 will be investigated and corrected as required within 20 working days. Management will forward a copy of the completed Management Follow-Up Report of Unsafe Condition to affected employees within 15 calendar days.

(4) Documentation. Division OSH Representatives will maintain a Log of Employee Reports. The log will include a file or reference number, date/time report was received, location of reported unsafe condition, a description of the reported unsafe condition, a risk assessment value and the date and description of corrective action. The log will be forwarded to the AVN OSH Program Manager every year on December 31. Division OSH Representatives will forward copies of all completed employee and management reports to the AVN OSH Program Manager.

(5) Reporting. The AVN OSH Program Manager will assist division management as required in the investigation, evaluation and correction of hazardous conditions. The AVN OSH Program Manager will submit a consolidated report containing all logged entries to AFZ-800 and AEE -200 by January 15 of each year.

(6) Work Instruction and Training: Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of the investigation and corrective action of employee reports are incorporated into employee work instruction and training.

f. Industrial Hygiene Surveys. The Division OSH Representative and/or the AVN OSH Program Manager will justify the need for industrial hygiene (IH) and other specialized surveys as required. These surveys may consist of personal, environmental, or biological monitoring depending on the potential hazard and exposure. The AVN OSH Program Manager will assist with the coordination of resources and the performance of these surveys as required.

(1) Risk Assessment. To assure the effective use of limited resources, to eliminate the tendency to respond to problems that seem to be hot at the moment, and to assure that regulatory requirements are met, the Division OSH Representative and the AVN OSH Program Manager will prioritize the implementation of industrial hygiene monitoring based on risk.

(2) Reporting. All specialized surveys will be coordinated with bargaining units, thoroughly documented, reviewed and approved by the Division OSH Representative and/or AVN OSH Program Manager, and findings disseminated to affected employees and managers within 30 days of receiving the final report.

(3) Surveys by other organizations. Any industrial hygiene surveys of AVN operations by external parties must be coordinated through the AVN OSH Program Manager and the Division OSH Representative.

(4) Work Instruction and Training. Division OSH Representatives and Division Management will assure that any safety procedures, facility or equipment needs identified as a result of these surveys are implemented and incorporated into employee work instruction and training.

g. Medical Surveillance. The goal of the AVN Medical Surveillance Program is to safeguard employees' health by anticipating and identifying physiological changes in employees related to workplace exposures so that preventive measures can be taken, as well as identifying occupationally induced diseases prior to incapacitating illness.

(1) Hazard Identification and Evaluation. The Division OSH Representatives and the AVN OSH Program Manager will investigate health hazards affecting AVN employees and determine which employees will be included in or removed from the AVN medical surveillance program. Division OSH Representatives will ensure that job hazard analyses and/or industrial hygiene surveillance procedures are used to identify AVN employees whose job tasks expose them to occupational health hazards. Division Management, Division OSH Representatives and the AVN OSH Program Manager will ensure that employees have an avenue for requesting a job hazard analysis of their workplace and/or work tasks. Division Management and Division OSH Representatives will ensure the annual reviews of employees' work tasks and/or work environments to identify new operations or modifications to the workspace environment; and ensure these reviews are documented. All personnel will be responsible for informing Division Management, Division OSH Representatives or the AVN OSH Program Manager of any new occupations, job tasks or environmental hazards that should be covered in the medical surveillance program.

(2) Exams. Division Management, Division OSH Representatives and the AVN OSH Program Manager will ensure that medical evaluations are tailored to specific groups of employees and their exposures, that a qualified physician supervises the medical testing, and that the results are furnished to appropriate recipients in a coordinated, timely manner. Division OSH Representatives and the AVN OSH Program Manager will ensure that funding for industrial hygiene surveillance/exposure monitoring and job hazard analyses of workplaces is requested in the budgetary review process. Division Management will ensure that the required medical examinations are provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(3) Record Confidentiality and Accessibility. Division Management, Division OSH Representatives and the AVN OSH Program Manager will ensure that a confidential repository of all employee medical records is maintained and secured, and that employees have access to their records as needed for personal medical care in accordance with 29 CFR 1910.1020.

(4) Program Management. Division Management, Division OSH Representatives and the AVN OSH Program Manager will review the medical surveillance program and update it based upon changes in regulations, consultation with site management and employees, exposure data, and medical monitoring test results.

(5) Enrollment. Division OSH Representatives and the AVN OSH Program Manager will ensure coordination with qualified medical service providers when results of job hazard analyses and/or industrial hygiene monitoring indicate the need to include an employee in or remove an employee from the medical surveillance program; and that the designated medical review officer is provided copies of all documentation supporting this determination for inclusion in, or removal from, the medical surveillance program. Division OSH Representatives and the AVN OSH Program Manager will ensure that a current listing of all employees who are included in the medical surveillance program is maintained and is provided to the qualified medical service provider.

(6) Training. Division Management and Division OSH Representatives will ensure that all affected individuals are informed and trained in the hazards of their job and the relevance of industrial hygiene surveillance and medical monitoring; and that this training is documented. The AVN OSH Program Manager will ensure that Division OSH Representatives and any other appropriate personnel receive training needed to evaluate workplace hazards properly, and ensure that all training is documented.

h. Mishap Investigation. The purpose of a mishap investigation is to determine the causes so that corrective action can be taken to prevent a recurrence and for documenting workers compensation claims. Causes are hazards and those factors that, individually or in combination, directly cause mishaps. Mishap investigations should be performed as soon as possible after the rendering of emergency medical services. Mishaps are occupational injuries and/or illnesses sustained by AVN employees. Contractor mishaps, visitor mishaps and mishaps involving bodily injury to all other non-AVN personnel working on-site for AVN are included in this reporting requirement; however, non-AVN personnel injuries and illnesses are reported for information only. Employees will notify supervisors of mishaps as soon as possible. All mishaps will be investigated.

(1) Reporting. Within 30 days of employee notification of mishap, the supervisor directly responsible for the operation, material, or persons(s) involved in the mishap will investigate and provide a written report of the results using FAA Form 3900-6, FAA Mishap Report (use AC3900-11 for Aeronautical Center mishaps). The Division OSH Representative or AVN OSH Program Manager will provide guidance and consultation as required or requested by the supervisor. Form 3900-6 (or succeeding form) will be forwarded to the Division OSH Representative who will ensure complete data to facilitate hazard identification and trend analysis. Division OSH Representatives will forward copies of all mishap reports to the AVN OSH Program Manager within 15 days of completion. The AVN OSH Program Manager will establish and maintain a mishap database to facilitate periodic analysis and required annual summary reporting.

(2) Fatalities. Supervisors will immediately notify the Division OSH Representative and AVN OSH Program Manager of any death or the in-patient hospitalization of three or more

employees involved in one incident within 8 hours after the incident. The Division OSH Representative or AVN OSH Program Manager will notify the OSHA area office within 8 hours after the incident. The Division OSH Representative or AVN OSH Program Manager will make a verbal report to the region/center OSH Program Manager, AFZ-800 and AEE-200 within 24 hours. AEE will formally report to OSHA. The Director of Aviation System Standards, AVN-1, will appoint an investigation team when an on-duty death or the hospitalization of three or more employees occurs as the result of a single accident.

(a) Written Report. The team will prepare a written report and forward it to the region/center OSH Program Manager, AFZ-800 and AEE-200 within 15 days after completing the investigation.

(b) Procedures. Procedures to be used by the investigation team will be developed by the AVN Manager of Safety and Quality Assurance/AVN-6, depending on the type of accident.

(c) Investigation Reports. Investigation reports will include appropriate documentation, photographs, employee interviews, witness reports, measurements, and other pertinent information. A checklist of items to be covered in the narrative report is addressed in Appendix 12.

(d) Report copies. Copies of reports will be provided to the facility supervisor or manager, the appropriate OSH committee, AVN-1, AVN OSH Program Manager, center director, and national headquarters. If requested, the report will be available to the Secretary of Labor or his/her representative.

(e) Form CA-6. Supervisors will complete a CA-6 form for all deaths and forward through the appropriate AHR office to OWCP.

(3) Workers Compensation. Forms CA-1 and/or CA-2 will be forwarded to the Aeronautical Center Workers Compensation Specialist/AMH-200 if the injury or illness results in lost time or medical expenses (actual or anticipated). Mishap and Workers' Compensation forms will be forwarded by Division Management or the Division OSH Representative when all information has been obtained, but in no case later than 30 days after the date of employee notification.

(4) Work Instruction and Training. Division OSH Representatives and Division Management will assure that any safety procedures developed as a result of a mishap investigation are incorporated into employee work instruction and training.

i. Accident Analysis: Periodic analysis of AVN workplace accidents provides an indication of an organization's safety performance, but more importantly the identification of trends, problem areas and opportunities for improvement. The AVN OSH Program Manager will ensure that periodic summary reports are provided to the AVN Director, AVN Division Managers and AVN Facility Managers. Summary Reports will be retained for a period of 5 years. Statistics should indicate mishap dates, nature of the mishap, the affected division and branch, incidence rates, the amount of lost time and the estimated costs. Refer to the USDOL Occupational Injury and Illness Classification Manual for assistance.

9. TRAINING: This section describes procedures for the identification of competency and training requirements to implement the AVN Occupational Safety and Health System described in this order.

a. Full time safety representatives. Full time safety representatives will seek and/or maintain competency as a Certified Safety Professional or equivalent.

b. Part-time and/or collateral duty safety representatives. Part-time and/or collateral duty safety representatives will establish and maintain a fundamental knowledge of the OSHA standards by completing the OSHA No. 600 Course, or equivalent, triennially. See Appendix 13 for a course description.

c. Management. The AVN Occupational Safety and Health Program Manager will be responsible for ensuring that safety representatives and managers are adequately indoctrinated with the AVN safety system.

d. New Employees. Division OSH Representative and Division Management is responsible for providing new employees an overview presentation of the AVN safety system, including general safety precautions and emergency procedures.

e. All Employees. Supervisors will assure that any safety procedures developed as a result of hazard identification, evaluation and control efforts are incorporated into employee work instruction and training plans. Supervisors will assure that individual safety training plans are integrated with mission related training requirements. General safety training will be performance based unless otherwise imposed by regulation. All training will be coordinated in accordance with the AVN Management Handbook. Division OSH Representatives will assist supervisors with the identification of recurrent training requirements established by OSHA. Documented quarterly safety training will be conducted at all employee levels to maintain a heightened awareness of workplace hazards and precautions. Division Safety Representatives and the AVN OSH Program Manager will provide assistance to supervisors in the accessibility, selection, presentation and maintenance of training resources. Division Safety Representatives will be responsible for ensuring that appropriate briefings are provided as required for abnormal or unique employee exposures and for visitor orientation.

10. INITIATIVES.

Safety Awards Program. The AVN Occupational Safety and Health Manager will be responsible for directing and implementing an organization-wide safety awards program. The intent of the awards program is to encourage employee involvement in the occupational safety and health program, recognize outstanding employee safety performance and superior contributions and to improve safety in the workplace. Division Managers and Safety Representatives will be responsible for implementing the safety awards program at the division and branch level.

11. DOCUMENTATION: A substantial amount of safety documentation will be maintained to assure the occupational safety and health program is understood and effectively and efficiently operated.

a. AVN Occupational Safety and Health Order. This Occupational Safety and Health Order (VN 3900.1) will serve as AVN's top level of the safety documentation system and may be widely distributed to stakeholders, regulatory officials and other interested parties. It defines the approach and responsibility for AVN's safety management system and provides the methods for containing and indexing all occupational safety and health documentation including procedures and job instructions. AVN-6 is the office of primary responsibility and will review the order annually. The AVN OSH Order will include the following:

(1) **Safety Policy**.

(2) **Organizational Chart**.

(3) **Safety Organization**.

(4) **Statement of Authority** and Responsibility.

(5) **Distribution List** of Controlled Copies.

(6) **Safety System Specification**/Standard Procedures Index.

(7) **Forms Index**.

b. **Division Occupational Safety and Health Manuals.** Occupational safety and health manuals will be prepared for each AVN division. Division OSH Manuals will define the responsibility (who, what, when) for each division's safety management system and will be written by division management. Division OSH Manuals will describe safety management activities, methods and processes at the division level. Divisions will be the office of primary responsibility and will review the OSH Manuals annually. Division OSH Manuals will include the following:

(1) **Purpose** and objective.

(2) **Scope**.

(3) **Responsibilities**.

(4) **References to all documents** covered under the program.

(5) **Definitions** of key terms.

(6) **Procedures providing a description** of the actions or tasks to be carried out by whom, and in what sequence.

(7) **Documentation requirements**.

c. **Work/Job Instruction**. Safety-related work instructions will be prepared for use at all applicable employee levels as required based on the nature of the hazard and magnitude of the risk. The purpose of work instructions is to define how hazardous work will be safely completed (e.g. task cards). AVN divisions and branches will be the offices of primary responsibility and will continuously review work instructions. Safety-related work instruction will include the following:

(1) **A sequence of actions** necessary to complete a job or task.

(2) **Scope**.

(3) **Responsibilities**.

(4) **References to all documents** covered under the instruction.

(5) **Documentation requirements**.

d. Other Safety Related Documentation. This documentation may consist of forms or controlled documents that may become a safety record like air quality logs and employee reports of unsafe conditions. The purpose of this documentation is to prompt the recording of forms (hard copy and/or electronic), tags, and labels that may become a safety record. AVN divisions and branches will be the offices of primary responsibility to ensure the development and integrity of these documents. Examples of other safety related records are as follows:

(1) **Safety Policy**.

(2) **Safety objectives** and commitment.

(3) **Organization charts**.

(4) **Mishap reports**.

(5) **Certificate** of training.

(6) **New employee** orientation.

(7) **Internal evaluation** reports.

(8) **Annual inspection** reports.

e. Document Control. All documents and data containing information critical to the operation of this program and the performance of AVN's safety and health activities will be identified and controlled. AVN divisions will be responsible for identifying and controlling safety documentation within the division safety program. The AVN OSH Program Manager is responsible for maintaining a master index of all AVN OSH programs, procedures and forms. Each division will establish the following document controls:

(1) **Procedures for controlling documents**, including assigned responsibilities and authorities.

(2) **Procedures for documentation** of registers, master lists or indexes.

(3) **Procedures for the archiving** of records as required.

12. EMERGENCY PREPAREDNESS & RESPONSE. Plans, equipment and exercises will be established at the lowest operating level to ensure the safe and efficient delivery of emergency response for the protection of AVN employees, assets, and liabilities. Each division, via the local safety committee, will be responsible for establishing and maintaining the following:

a. Emergency Plans. Emergency plans will outline the actions to be taken when specified emergency situations rise and should include the following:

(1) **Identification of potential accidents** and emergencies.

(2) **Identification of the person** to take charge during an emergency.

(3) **Details of actions** to be taken by personnel during an emergency, including those actions to be taken by external personnel who are on site of the emergency, such as contractors or visitors.

(4) **Responsibility, authority and duties** of personnel with specific roles during the emergency.

(5) **Evacuation procedures**.

(6) **Identification and location** of hazardous materials and emergency action required.

(7) **Interface with external** emergency services.

(8) **Communication with neighbors** and the public.

(9) **Protection of vital records** and equipment.

(10) **Availability of necessary information** like a master list of hazardous materials during the emergency.

b. **Emergency Equipment**. Emergency equipment needs will be identified and equipment will be provided in adequate quantity. Equipment will be tested, inspected and maintained at regular intervals for continuing operability. Examples include the following items:

(1) **Alarm systems**.

(2) **Emergency lighting** and power.

(3) **Means of** escape.

(4) **Safe refuges**.

(5) **Critical isolation valves**, switches and shut-offs.

(6) **Fire-fighting** equipment.

(7) **First aid equipment** (including emergency showers, eye wash stations, etc.).

(8) **Communication facilities**.

c. **Practice Drills.** Practice drills will be carried out according to a pre-determined schedule. Where appropriate and practical, the participation of external emergency services in practice drills should be encouraged.

13. SAFETY INFORMATION SYSTEM. The AVN Occupational Safety and Health Program Manager will be responsible for ensuring that safety information is readily available, accessible and appropriately disseminated to division safety representatives and affected employees.

14. PROGRAM EVALUATION: The AVN Occupational Safety and Health Program Manager will be responsible for developing, initiating and implementing a performance evaluation program for the overall AVN occupational safety and health system. This program will include procedures for the AVN Director's review of the operation of the occupational safety and health management system to assess whether it is being fully implemented and remains suitable for achieving the organization's stated policy and objectives. The objectives of this program will be to identify and evaluate key performance parameters including, but not limited to the following:

a. **Development and completion** of safety program objectives.

b. **Development and implementation** of effective safety controls.

c. **Utilization of "lessons learned"** from mishap analysis, inspection findings and system failures.

d. **Integration of operational** risk management.

e. **Effective training** and communication systems.

f. **Internal evaluation** programming.

g. **Safety program** quality assurance.

Thomas C. Accardi
Director of Aviation System Standards, AVN-1

APPENDIX 1
DEFINITIONS

Division Occupational Safety and Health Representative: Personnel assigned by division management having sufficient training and experience to perform general workplace safety duties (i.e., JHAs, workplace inspections, mishap investigations, etc.). As a minimum, these personnel will meet the Agency's definition of *Collateral Duty Safety and Health Personnel*, but may also be full-time Occupational Safety and Health Professionals.

Design Review: A tool and process involving the review and evaluation of proposed facility specifications, drawings, plans and/or blueprints in accordance with OSHA, EPA, NFPA, ANSI, FAA Orders and other applicable safety standards.

Exposure: The state of being exposed to accident, injury or illness potential.

Facility Manager: The Facility Manager is generally, the highest-ranking resident manager of the primary occupant line of business in an FAA owned or leased facility, or designee, selected by mutual agreement of the occupant line of business officials.

Hazard: A limit of exposure likely to cause bodily harm. Unsafe acts and conditions.

Industrial Hygiene: The identification, evaluation and control of environmental health hazards (i.e., disease and illness) in the workplace

Job Hazard Analysis (JHA): Hazard analysis tool that utilizes observations to review job methods and uncover hazards.

Medical Surveillance: A method to support hazard identification, evaluation and control involving the examination of workers by medical personnel to determine physiological and psychological responses to potentially hazardous agents like toxic substances, radiation and noise.

Mishap: An occurrence in a sequence of events that produces unintended injury, death or property damage. Also referred to as an accident or incident.

Occupational Safety and Health Professional: Safety Specialists, safety managers, safety engineers, or industrial hygienist; or equally qualified agency, military, or non-Government personnel who meet the basic qualifications of the above classifications as defined by AHR standards and recommended by the AVN OSH Manager.

Operational Risk Management: A management tool that deals with the identification, assessment, and mitigation of risk.

Resources: Elements of time, personnel, facilities and equipment necessary to complete a project or process.

Risk: Probability and magnitude of bodily harm.

Root Cause Analysis: A management tool used to identify underlying factors that contributed to the cause of an accident.

Safety Controls: Designs, devices, procedures and warnings that may be of administrative or engineering nature and that serve to reduce the risk of accident.

Self-Inspection: Internal inspections of workplaces in accordance with OSHA, EPA, NFPA, ANSI, FAA Orders and other applicable safety standards.

APPENDIX 2
ACCOUNTABILITY SYSTEM GUIDELINE

1. Purpose: The purpose of this guideline is to assist AVN management in the development of an Occupational Safety and Health Accountability System. The principle content contains the essential elements necessary to meet safety performance expectations.

2. Principle of Operation: A safety accountability system "makes" a safety program work by establishing employee and management performance expectations. Meeting or exceeding expectations should result in rewards, recognition or promotion, which provide employees with incentives to implement various elements of the safety program. It also credits employees for proactive, prudent safe behavior and actions.

A safety accountability system should be designed to easily integrate with an existing employee performance appraisal system. As with most appraisal systems, safety performance elements should be weighed in accordance with the organization's values just as the weight of other performance factors (i.e. quality of work, timeliness, etc.)
are determined.

Objectives should be established at the beginning of the evaluation period, agreed to between management and labor, and measured at the end of the period.

The determination of objectives begins with the organization's needs. For the occupational safety and health program, this will involve the identification, evaluation and control of risk of injury or illness. These risks are identified as a result of the operational risk management program.

Performance evaluations may be performed qualitatively and/or quantitatively. A qualitative evaluation would consider the completion and general observation of safety program objectives or routine procedures. A quantitative evaluation would consider the grading of safety program outcomes based on the amount of completion and effectiveness.

3. Management Performance Factors: Division management should be held accountable for meeting safety performance objectives established by the Program Director. These may be passed onto branch management. One to three specific objectives should be established per year. Annual objectives may be considered large scale, thus requiring at least a year to complete. An example of a long scale safety objective is the development and implementation of a fall protection program, an ergonomics program or a hearing conservation program throughout a Division.

In addition, division management should be held accountable for implementing existing safety program elements like risk assessment, self-inspections, safety training, and accident investigation.

4. Employee Performance Factors: Recommended employee safety performance factors include the following:

- Observation of standard practices and safety procedures.
- Reporting of hazards and injuries.

- Participation in safety projects, training and education.
- Cooperation/assistance with safety activities.

APPENDIX 3
OPERATIONAL RISK MANAGEMENT

1. PURPOSE. The management of risk, all dimensions of risk, is key to maximizing mission effectiveness and sustainment of readiness. Operational Risk Management (ORM) principles, techniques, and tools will be used to increase mission success, strengthen job performance, and identify opportunities to expand mission capabilities in all areas and at all levels, thereby strengthening AVN's mission posture.

2. DISTRIBUTION. This is a mandatory appendix to VN 3900.

3. DEFINITIONS. See Appendix 3.1.

4. GOALS. The fundamental goals of ORM are to:

a. Enhance mission effectiveness at all levels, while preserving assets and safeguarding health and welfare.

b. Integrate ORM into mission processes; ensuring decisions are based upon assessments of risk integral to the activity and mission.

c. Create an organization in which every leader, airman, and employee is trained and motivated to manage risk in all their on- and off-duty activities.

d. Identify opportunities to increase AVN's mission effectiveness in the National Airspace System.

5. PRINCIPLES. The four guiding principles of ORM are:

a. Accept no unnecessary risk.

b. Make risk decisions at the appropriate level.

c. Accept risk when benefits outweigh the costs.

d. Integrate ORM into operations and planning at all levels.

6. SCOPE. This mandatory appendix requires the application of a flexible but formalized risk management process for all business decisions. The objective of this policy is to formalize a common sense approach to risk management and risk analysis/assessment in AVN decision-making.

This mandatory appendix is not intended to interfere with regulatory processes and activities. Each division office will interpret, establish, and execute the policy contained herein consistent with its role and responsibility.

7. RISK MANAGEMENT POLICY. Aviation System Standards will use a formal, disciplined, and documented decision-making process. The critical information resulting from a risk management process can thereby be effectively communicated in an objective and unbiased manner to decision makers, and from decision makers to stakeholders.

All decision making authorities within AVN will maintain risk management expertise appropriate to their operations, and will perform and document the safety risk management process prior to issuing decisions. The choice of methodologies to support risk management efforts remains the responsibility of each AVN Division office. The decision-making authority will determine the documentation format. The approach to safety risk management is composed of the following steps:

a. Plan. A case-specific plan for risk analysis and risk assessment will be predetermined in adequate detail for appropriate review and agreement by the decision making authority prior to commitment of resources. The plan will additionally describe criteria for acceptable risk.

b. Hazard Identification. The specific hazard or list of hazards to be addressed by the risk management plan will be explicitly identified to prevent ambiguity in subsequent analysis and assessment.

c. Analysis. Both elements of risk (hazard severity and likelihood of occurrence) will be quantitatively characterized. The inability to quantify and/or lack of historical data on a particular hazard does not exclude the hazard from this requirement. If the seriousness of a hazard can be expected to increase over the effective life of the decision, this should be noted. Additionally, both elements should be estimated for each hazard being analyzed, even if historical and/or quantitative data is not available.

d. Assessment. The combined impact of the risk elements will be compared to acceptability criteria and the results provided for decision-making.

e. Decision. The risk management decision will consider the risk assessment results. Risk assessment results may be used to compare and contrast alternative options.

See Appendix 3.2 and 3.3 for implementation guidelines and additional resources, respectively.

8. PRINCIPLES FOR RISK ASSESSMENT AND RISK CHARACTERIZATION. In characterizing risk, one must comply with each of the following:

a. General. Risk assessments, to the maximum extent feasible:

(1) Are scientifically objective.

(2) Are unbiased.

(3) Include all relevant data available.

(4) Employ default or conservative assumptions only if situation-specific information is not reasonably available. The basis of these assumptions must be clearly identified.

(5) Distinguish clearly as to what risks would be affected by the decision and what risks would not.

(6) Are reasonably detailed and accurate.

(7) Relate to current risk or the risk resulting from not adopting the proposal being considered.

(8) Allow for unknown and/or unquantifiable risks.

b. Principles. The principles to be applied when preparing risk assessments are:

(1) Each risk assessment should first analyze the two elements of risk: severity of the hazard and likelihood of occurrence. Risk assessment is then performed by comparing the combined effect of their characteristics to acceptable criteria as determined in the plan.

(2) A risk assessment may be qualitative and/or quantitative. To the maximum extent practicable, these risk assessments should be quantitative.

(3) The selection of a risk assessment methodology should be flexible.

(4) Basic assumptions should be documented or, if only bounds can be estimated reliably, the range encompassed should be described.

c. Significant risk assessment assumptions, inferences, or models should:

(1) Describe any model used in the risk assessment and make explicit the assumptions incorporated in the model.

(2) Identify any policy or value judgments.

(3) Explain the basis for choices.

(4) Indicate the extent that the model and the assumptions incorporated have been validated by or conflict with empirical data.

(5) All risk assessments should include or summarize the information of paragraphs 8.1.3 and 8.1.4 as well as 8.2.4 and 8.2.5. This record should be maintained by the organization performing the assessment in accordance with FAA Order 1350, Records Organization, Transfer, and Destruction Standards.

d. Analysis of risk reduction benefits and costs.

(1) Compare the results of a risk assessment for each risk-reduction alternative considered, including no action, in mandatory appendix to rank each risk assessment for decision-making purposes. The assessment should consider future conditions, e.g., increased traffic volume.

(2) Assess the costs and the risk reduction or other benefits associated with implementation of, and compliance with, an alternative under final consideration.

10. SUBSTITUTION RISKS. Risk assessments will include a statement of substitution risks. Substitution risks will be included in the risk assessment documentation.

11. RESPONIBILITIES. The following responsibilities and authorities are to be derived from this policy:

a. AVN Division Managers.

(1) Serve as principal advocates for the ORM program.

(2) Develop and maintain ORM implementation and sustainment plans for their functional areas that direct the integration of ORM into all operational decision-making processes.

(3) Develop and provide policy, plans, and programs that support and ensure ORM integration within their functional areas.

b. AVN Branch Managers.

(1) Tailor ORM application and techniques to accommodate the unique mission needs of their organization.

(2) Develop and maintain ORM implementation and sustainment plans for their branch that direct the integration of ORM into all operational decision-making processes.

c. AVN Program Managers. Integrate the ORM process, principles, and techniques into curricula for all education and training programs to the extent that it is possible and mission supportive to do so. ORM integration into curriculum will be tailored to meet the unique mission of the program in consideration of the goals outlined in this Policy Directive.

d. Safety & Quality Staff, AVN-6.

(1) Lead the overall cross-functional integration effort of ORM into AVN.

(2) Designate an AVN ORM Program Manager.

(3) Monitor advancements and innovations in risk management for application to the AVN ORM program.

(4) Provide guidance and oversight of all matters pertaining to the formulation, review, and execution of policies, plans, and programs relative to the AVN ORM program.

(5) Maintain statistical databases, tools and other resources as required to assist AVN Divisions.

e. All AVN Personnel. Apply ORM principles, concepts, and techniques to assess the risks associated with the daily mission and duty-related activities.

APPENDIX 3.1
OPERATIONAL RISK MANAGEMENT DEFINITIONS

Costs. Direct and indirect costs to the United States Government, State, local, and tribal governments, international trade impacts, and the private sector.

Emergency. A circumstance that requires immediate action to be taken.

Hazard. Condition, event, or circumstance that could lead to or contribute to an unplanned or undesired event.

Mishap. Unplanned event, or series of events, that results in death, injury, occupational illness, or damage to or loss of equipment or property.

Operational Risk Management (ORM). The systematic process of identifying hazards, assessing risk, analyzing risk control options and measures, making control decisions, implementing control decisions, accepting residual risks, and supervising/reviewing the activity for effectiveness.

Product Life Cycle. The entire sequence from precertification activities through those associated with removal from service.

Risk. The probability and severity of loss or adverse impact from exposure to various hazards.

Risk Assessment. The process of detecting hazards and their causes, and systematically assessing the associated risks.

Risk Characterization. Identification or evaluation of the two components of risk, i.e., undesired event severity and likelihood of occurrence.

Risk Management. Management activity ensuring that risk is identified and eliminated or controlled within established program risk parameters.

System. A composite, at any level of complexity, of personnel, procedures, materials, tools, equipment, facilities, and software. The elements of this composite entity are used together in the intended operational or support environment to perform a given task or achieve a specific mission requirement.

Substitution Risk. Additional risk to human health or safety, to include property risk, from an action designed to reduce some other risk(s).

APPENDIX 3.2
ORM IMPLEMENTATION GUIDELINE

Operational Risk Management (ORM) is a continuous process designed to detect, assess, and control risk while enhancing performance and maximizing organizational capabilities. ORM provides the basic structure for the detection, assessment, and ultimate sustained control of risk while enhancing performance and maximizing organizational capabilities. Individuals at all levels identify and control hazards through the ORM process. Figure 1 shows the ORM process chart with its six steps.

Figure 1

Step 1. Identify the Hazard. A hazard can be defined as any real or potential condition that can cause mission degradation, injury, illness, death to personnel or damage to or loss of equipment or property. Experience, common sense, and specific risk management tools help identify real or potential hazards.

Step 2. Assess the Risk. Risk is the probability and severity of loss from exposure to the hazard. The assessment step is the application of quantitative and/or qualitative measures to determine the level of risk associated with a specific hazard. This process defines the probability and severity of a mishap that could result from the hazard based upon the exposure of personnel or assets to that hazard. Apply the risk assessment code matrix to quantify the level of risk.

Step 3. Analyze Risk Control Measures. Investigate specific strategies and tools that reduce, mitigate, or eliminate the risk. Effective control measures reduce or eliminate one of the three components (probability, severity, or exposure) of risk.

Step 4. Make Control Decisions. Decision makers at the appropriate level choose the best control or combination of controls based on the analysis of overall costs and benefits.

Step 5. Implement Risk Controls. Once control strategies have been selected, an implementation strategy needs to be developed and then applied by management and the work force. Implementation requires commitment of time and resources.

Step 6. Supervise and Review. Risk management is a process that continues throughout the life cycle of the system, mission, or activity. Leaders at every level must fulfill their respective roles in assuring controls are sustained over time. Once controls are in place, the process must be periodically reevaluated to ensure their effectiveness.

Example 1: AVN Occupational Safety & Health Program Risk Assessment

The following example illustrates application of the first four steps in the six-step process. The "Operational Analysis" methodology was used to identify hazards. Figure 2 was used to qualify the level of risk.

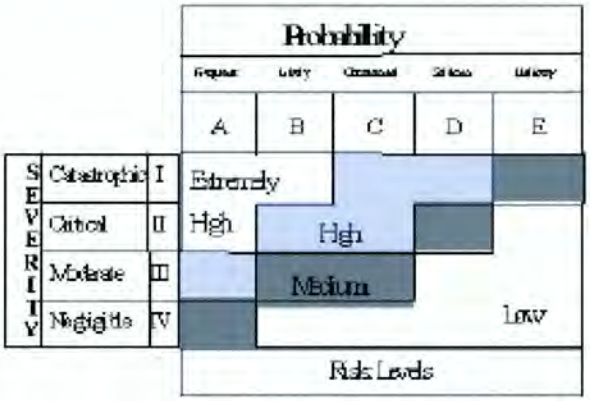


Figure 2

Problem ID: What are risks associated with taking "ownership" of the AVN OSH Program?

a. Transfer the Program Manager back to AVN-6. An agreement was reached with AMP-10 and the paperwork has been started to complete the transfer. This should be effective by the next pay period. If not done correctly, could cause a political problem with the MMAC (L).

b. Survey AVN operations/ID Exposure

(1) Not asking the right questions or applying the right regulations (L)

(2) People attempt to use the survey and program for personnel gain(M)

(3) Could put some people on the defensive (L)

c. Revise MOA we have with MMAC. This has been completed and is ready to be staffed in MMAC and AVN

(1) Alienate MMAC (M)

(2) Failure to define and include all program elements resulting in gaps of coverage (M)

(3) Since the MOA covers many areas other than Safety the coordination with the other areas will slow down the process and delay funding of the safety program requirements (H)

d. Write Draft AVN Order.

(1) Alienation of unions (L)

(2) Alienation of Managers (L)

(3) To restrictive (L)

(4) To lenient and does not fulfill legal, regulatory requirements (L)

(5) Does not improve safety (L)

(6) Does not integrate with ISO (L)

(7) Does not enhance the mission (M)

e. Publish Order

f. Establish Funding Requirements with AFZ-800

(1) AFZ-800 doesn't come through with the money as promised (M)

(2) We miscalculate the amount of funds needed (H)

g. Train Safety Representatives

(1) Training is inadequate or inappropriate (L)

(2) Training is to expensive or no money will be available due to budget cuts (L)

(3) Training takes too long and managers don't want to release the people (L)

h. Program Evaluation.

Summary & Conclusions: Two high risks were identified:

a. Revising the MOA. It was decided to mitigate the risk here by insuring we maintained open channels with MMAC, leaving the funding process as is until all coordination was done, continue to apply steady pressure to move the coordination along on both sides, AVN and MMAC

b. Funding. It was decided the best way to mitigate this was to estimate dollars for the first year only rather than try and project a 5 year requirement.

Example 2: Aircraft Storage in Hangar 8

The following example illustrates application of the USAF Comparative Risk Assessment Model.

1. **Scope**: This risk assessment considers the occupational safety/health, equipment damage and mission impact associated with the proposed change. It is intended to provide non-biased, objective based decision making information for the Director of the Aeronautical Center. The process used in completing this assessment is based on the FAA System Safety Handbook, FAA Order 8040.4 and Air Force Pamphlet 90-902.

2. **Proposed Change**: AMP has requested the discontinued occupancy of Hangar 10 by FAA Academy personnel due to, reportedly, unsafe facility conditions; however, contract aircraft maintenance operations shall remain.

3. **General Requirements**: The FAA Academy utilizes light aircraft in support of their mission to train and educate aviation safety inspectors (OPS) assigned to Flight Safety District Offices. The Academy operates ten aircraft consisting of two King Air A200s, five Beechcraft Barons, and three Cessna 172s.

   Aviation System Standards operates and maintains 33 aircraft in support of their flight inspection mission. The fleet consists of six British Aerospace Hawkers, three Challengers, six Learjets, and eighteen 300 series Beechcraft King Airs distributed among six flight inspection offices.

   Both organizations need hangar and ramp facilities for storing, launching, parking, servicing, maintenance and testing aircraft as well as pilot and crew briefing and debriefing.

4. **Options**: Operational options are the various conditions and configurations associated with the operation, maintenance and storage of the Academy's aircraft.

   Option A (Leave as is in current configuration)

   - Maintenance - "Louisiana Aircraft of Oklahoma" provides contract maintenance on all aircraft except the A200s. The A200s were recently transferred to AVN-300. The contractor is housed in the south end of Hangar 10. Ground based operational maintenance test are conducted on Hangar 9 and 10 ramps.

- Storage – All airworthy aircraft are stored in the north end of Hangar 8.
- Operations – Briefings are conducted in the office trailer adjacent to Hangar 9. Aircraft depart and arrive using the Hangar 9 ramp directly east of the Academy briefing office.

Option B

- Maintenance – Same as Option A.
- Storage – All airworthy aircraft are stored in the north end of Hangar
- Operations – Same as Option A. In addition, space in Hangar 8 would be available, within reason, for pre-flight inspections and/or temporary emergency facilities as required.

Option C

- Maintenance – Same as Option A.
- Storage – All airworthy aircraft are stored in the north end of Hangar 8.
- Operations – Briefings are conducted from a room in the northeast end of Hangar 8. Aircraft are parked and launched along the northern-most row of the Hangar 8 ramp.

5. Hazard Identification: A hazard is defined as a condition, event, or circumstance that could lead to or contribute to an unplanned or undesired event. The potential hazards listed below are common to all aircraft ramp operations. The following list was determined qualitatively and is inclusive of significant exposures:

(1) Aircraft Damage – contact with ground vehicles, stationary objects or other aircraft

(2) Foreign object damage (aircraft engine damage)

(3) Noise – hearing loss

(4) Slips/trips/falls – strains, sprains, contusions and fractures

(5) Temperature extremes – frostbite, hypothermia, heat exhaustion, heat stroke

(6) Airborne dust/debris/smoke/vapor – eye injuries, acute respiratory failure

(7) Struck-by ground vehicles – strains, sprains, contusions and fractures

(8) Jet blast - strains, sprains, contusions and fractures

(9) Struck-by operating aircraft - strains, sprains, contusions and fractures

(10)Struck by aircraft in tow - strains, sprains, contusions and fractures

(11)Struck by projectiles – fire/explosion

All potential hazards except no. a & b are associated with casualty risk.

6. Risk Assessment: Risk assessment is a process of identifying hazards and quantifying or qualifying the degree of risk they pose for exposed individuals, populations, or resources. Risk is identified as an expression of the impact of an undesired event in terms of event severity and event likelihood.

This project uses the "Modified Comparative Risk Assessment" method depicted in Air Force Pamphlet 90-902. This method is considered the most appropriate when comparing options associated with change. This method also provides for numerical assignments of risk assessment codes (RAC), which can then be quantified.

In this assessment, both qualitative and quantitative risk analysis methods were used. Quantitative risk assessment is preferred since it removes bias and is based on factual data. Qualitative methods are used when statistical data is not available, as in this case with hazard number two through eleven (see paragraph 5).

The Modified Comparative Risk Assessment Matrix Model

Figure 3. llustrates the modified risk assessment matrix model (adopted from ***Air Force Pamphlet 90-902***, 12/14/00) used to assign risk levels. Modified means the traditional risk assessment codes (i.e., 3C) are replaced with numerical values (i.e., 10). The lower the numerical value, the higher the risk. For example, one (1) is the greatest possible risk and twenty (20) is the least possible risk.

			Probability				
			Frequent	**Likely**	**Occasional**	**Seldom**	**Unlikely**
			A	**B**	**C**	**D**	**E**
Severity	**Catastrophic**	**1**	**1**	**2**	**6**	**8**	**12**
	Critical	**2**	**3**	**4**	**7**	**11**	**15**
	Moderate	**3**	**5**	**9**	**10**	**14**	**16**
	Negligible	**4**	**13**	**17**	**18**	**19**	**20**
			Risk Levels				

Severity Categories

CATASTROPHIC—Complete mission failure, death, or loss of system

CRITICAL—Major mission degradation, severe injury, occupational illness or major system damage
MODERATE—Minor mission degradation, injury, minor occupational illness, or minor system damage
NEGLIGIBLE—Less than minor mission degradation, injury, occupational illness, or minor system damage

Probability Categories

FREQUENT
Individual item—Occurs often in the life of the system
Fleet or inventory—Continuously experienced
Individual Airman—Occurs often in career
Airmen exposed—continuously experienced

LIKELY
Individual item—Occurs several times in the life of the system
Fleet or Inventory—Occurs regularly
Individual Airman—Occurs several times in a career
All Airmen exposed—Occurs regularly

OCCASIONAL
Individual item—Will occur in the life of the system
Fleet or Inventory—Occurs several times in the life of the system
Individual Airman—Will occur in a career
All Airmen exposed—Occurs sporadically

SELDOM
Individual item—May occur in the life of the system
Fleet or Inventory—Can be expected to occur in the life of the system
Individual Airman—May occur in a career
All Airmen exposed—Occurs seldom

UNLIKELY
Individual item—So unlikely you can assume it will not occur in the life of the system
Fleet or Inventory—Unlikely but could occur in the life of the system
Individual Airman—So unlikely you can assume it will not occur in a career
All Airmen exposed—Occurs very rarely

Figure 3

The Comparative Risk Assessment

Figure 4 illustrates the numerical values assigned to each potential hazard. All assigned values except hazard no. 1 are based on qualitative analysis. Risk values assigned to hazard no. 1 are based on quantitative analysis (See **Aircraft Damage** for more information).

Values assigned to hazard no. 2, foreign object damage (FOD), are based on a proportional increase in the amount of FOD generation from AMA operations. This takes into consideration the additional equipment and material associated with AMA ramp operations.

Values assigned to hazard no. 3, noise, assume propeller aircraft produces less noise than jet aircraft.

Values assigned to hazard no. 11, fire/explosion, assume a higher fire/explosion risk associated with the handling of aviation gas. Aviation gas has a lower flash point (is more volatile) than jet fuel.

FIGURE 4. Comparative Risk Assessment

No.	Potential Hazard	Risk Values		
		Option A	Option B	Option C
1	Aircraft Damage – contact with ground vehicles, stationary objects or aircraft	11	15	7
2	Foreign object damage (aircraft engine damage)	11	11	7
3	Noise – hearing loss	7	7	7
4	Slips/trips/falls – strains, sprains, contusions and fractures	14	14	14
5	Temperature extremes – frostbite, hypothermia, heat exhaustion, heat stroke	14	14	14
6	Airborne dust/debris/smoke/vapor – eye injuries, acute respiratory failure	14	14	10
7	Struck-by ground vehicles – strains, sprains, contusions and fractures	11	15	7
8	Jet blast - strains, sprains, contusions and fractures	14	14	10
9	Struck-by operating aircraft – strains, sprains, contusions and fractures	15	15	11
10	Struck by aircraft in tow - strains, sprains, contusions and fractures	16	16	14
11	Struck by projectiles – fire/explosion	12	12	8

Aircraft Damage: Quantitative methods were used to determine the risk of Aircraft damage – contact with ground vehicles, stationary objects or other aircraft. A review of accident statistics associated with

this hazard revealed several occurrences when AVN aircraft were damaged and decommissioned while at fixed based operator's facilities (FBO). No such occurrences at AVN Flight Inspection Offices (FIO) have been experienced. The FBO occurrences are summarized in Figure 4.

The FBO occurrence frequency is 1.4 incidents per year. This frequency was used in Option C (Figure 3) based on the amount of ramp congestion equivalent to a typical FBO. Ramp congestion at FBOs is considerably greater than at FIOs because FBOs seek to maximize ramp and aircraft service capacity.

Date	Aircraft Type	Tail Number	Occurrence Description	Mission Interruption	Est. Cost of Repairs
12/20/96	BE300	N67	Right aileron damaged by vehicle while aircraft parked	30+ days	$20,000 +
01/22/97	BE300	N81	LH wingtip damaged during tow	3+ days	$5,000 +
02/11/98	BE300	N83	RT wingtip damaged by ground vehicle	2+ days	$1,000 +
04/20/01	BE300	N79	Tow tug impacted aircraft - minor damage to landing gear nose strut	None	$500 +
10/11/01	BE300	N77	NLG tire and wheel damaged while being towed	2 + days	$3,000 +
1999	BAe125		Radom damage by tug	2 + days	$30,000 +
1999	BAe125		Wingtip damage by vehicle	2 + days	$10,000 +
10/01	BAE 125		Radom damaged while parked	2 + days	$30,000 +

FIGURE 5. FBO Occurrences

Change in Risk: The change in risk, from the baseline Option A, is illustrated in Figure 5. Change in Risk was determined using the following equation:

$$\% \text{ Change In Risk} = (R_A - R_X)/R_A * 100\%$$

Where;

R_A = Risk value assigned to Option A.

R_X = Risk value assigned to Option B or C.

No.	Potential Hazard	Change in Risk		
		Option A	Option B	Option C
1	Aircraft Damage – contact with ground vehicles, stationary objects or aircraft	0%	-36%	+53%
2	Foreign object damage (aircraft engine damage)	0%	0%	+36%
3	Noise – hearing loss	0%	0%	0%
4	Slips/trips/falls – strains, sprains, contusions and fractures	0%	0%	0%
5	Temperature extremes – frostbite, hypothermia, heat exhaustion, heat stroke	0%	0%	0%
6	Airborne dust/debris/smoke/vapor – eye injuries, acute respiratory failure	0%	0%	+29%
7	Struck-by ground vehicles – strains, sprains, contusions and fractures	0%	-36%	+53%
8	Jet blast - strains, sprains, contusions and fractures	0%	0%	+29%
9	Struck-by operating aircraft - strains, sprains, contusions and fractures	0%	0%	+27%
10	Struck by aircraft in tow - strains, sprains, contusions and fractures	0%	0%	+13%
11	Struck by projectiles – fire/explosion	0%	0%	+33%

FIGURE 6. Change in Risk

Conclusions: Option B offers the least amount of risk based on the reduction in ramp congestion and associated reduction in risk to aircraft damage and personnel injury. Option C offers the greatest amount of risk primarily based on the increased congestion of the ramp operating area.

APPENDIX 3.3
ADDITIONAL RESOURCES

The following resources (hyperlinks to the WWW) are offered for enhancing knowledge, understanding and application of the AVN ORM Program:

- U.S. Army (http://safety.army.mil/home.html)
- U.S. Air Force ORM Guidelines and Tools (http://www.e-publishing.af.mil/pubfiles/af/90/afpam90-902/afpam90-902.pdf)
- Naval Safety Center (http://www.safetycenter.navy.mil/orm/default.htm)
- U.S. Marine Corp (http://www.hqmc.usmc.mil/safety.nsf/)
- FAA Office of System Safety (ASY) (http://www.asy.faa.gov/)

APPENDIX 4
SAFETY PROGRAM OBJECTIVES GUIDELINES

INTRODUCTION:

The purpose of this guideline is to aid AVN division managers, occupational safety/health representatives and safety committees in the development of annual safety program objectives.

Objectives are established to meet goals. Goals should be realistic, measurable and reachable. Goals should also be prioritized based on the relative level of risk when compared to other safety goals.

PROGRAM RISK ASSESSMENT:

Program risk assessment is the starting point for the identification and prioritization of hazard evaluations.

A Job Hazard Analysis (JHA) is a micro evaluation tool that assesses the risk factors associated with a specific job cycle. On the other hand, a Program Risk Assessment is a macro evaluation tool that provides for the prioritization of resources by qualifying and quantifying the risk associated with each environmental, safety and health program listed in Appendix 4.1. Likewise, Each program is designed to manage specific risks associated with injury, illness, property damage or environmental impairment. Each safety program element is normally made up of program elements like written policy, implementation procedures and training.

There are two fundamental risk factors associated with ESH Programs. The first one deals with the level of regulatory compliance and the other deals with the inherent liability risk the safety program is designed to control. The level of risk must be determined for each factor and then combined to establish the overall risk associated with the program.

REGULATORY COMPLIANCE:

The overall compliance rating is determined by the average ratings assigned to the following program elements:

(1) Written Policy

(2) Implementation

(3) Training

The specific criteria and rating for each of these elements is illustrated in Appendix 4.2. For example, the composite compliance rating of a fall protection program was determined to be 1.33 based on the following;

Written Policy = None 1 point

Implementation = None	1 point
Training = Competent Persons identified and trained	2 points

Composite Compliance Rating = 1+1+2=4/3=**1.33**

Inherent Liability Risk

Inherent liability risk is the estimated monetary loss potential the safety program seeks to mitigate. Liabilities are categorized as follows:

(1) Fines and penalties: Currently, federal agencies are not subject to OSHA fines and penalties so this is a moot point for federal occupational safety and health programs; however, the FAA is subject to fines and penalties promulgated by the EPA.

(2) Compensation for personal injury, property damage and economic loss: This is the direct cost incurred as a result of a paid claim to an individual or organization. For occupational injuries and illnesses, this would be the workers compensation benefit.

(3) Indirect cost of accident: The indirect cost of accidents includes non-compensible items and activities like lost production time, damaged products, damaged equipment, overtime expenses, training and replacement, time spent rendering medical aid, time spent on hospital calls and extra management time completing reports and forms. Experts estimate the indirect cost of accidents is four times the amount of the direct cost.

(4) Corrective action cost: This is the cost borne from the corrective action an organization takes to reduce the risk of a recurrent safety violation or similar accident. An example would be the cost of disposing hazardous waste from an accidental spill of hazardous material.

Each category is assigned an estimated range of liability severity (i.e., Fines & Penalties is $0 to $25,000). Likewise, each category is assigned an estimated range of liability probability (i.e. .04 to 1.0). The estimated liability for the category is the product of severity and probability. The total estimated liability for the program is the sum of each category's estimated liability. See Appendix 4.3 for an illustration of the application of an inherent liability risk assessment for a Fall Protection Program.

Overall Program Risk

Appendix 4.4 illustrates an example of the overall risk associated with an ESH Program. The compliance rating is the composite value determined from Appendix 4.2. The estimated liability is the total for the program derived from Appendix 4.3. The overall risk value is the product of the estimated liability divided by the compliance rating. The programs are then sorted by risk for prioritization as illustrated in Appendix 4.4.

Risk Controls

Following the identification, assessment, and prioritization of risk, safety controls are then developed and implemented to eliminate or reduce risk. To maximize effectiveness, a hierarchy of safety controls should be applied when determining what controls to implement first. The **hierarchy of controls** is as follows:

a. Engineering controls are the most reliable and effective type of controls. These are design changes that directly eliminate (ideally) or limit the severity and/or likelihood of the hazard, e.g. reduction in pressure/amount of hazardous material, substitution of less hazardous material, reduction of noise produced, fail-safe design, leak before burst, fault tolerance/redundancy, ergonomics, etc. Although not as reliable as true engineering controls, this category also includes protective safety devices such as guards, barriers, interlocks, grounding and bonding systems, pressure relief valves to keep pressure within a safe limit, etc. These items typically seek to reduce indirectly the likelihood of the hazard. These controls are often linked with caution and warning devices like detectors and alarms that are either automatic (do not require a human response) or manual (require a human response).

b. Administrative controls that significantly limit daily exposure to hazard by control or manipulation of the work schedule or manner in which work is performed, e.g., job rotation;

c. Work Practice controls, a type of administrative control that includes workplace rules, safe and healthful work practices, and procedures for specific operations. Work Practice controls modify the manner in which an employee performs assigned work. This modification may result in a reduction of exposure through such methods as changing work habits, improving sanitation and hygiene practices, or making other changes in the way the employee performs the job.

d. Personal protective equipment.

APPENDIX 4.1
Environmental, Safety and Health Programs

ESH Program Number	ESH Program Name	ESH Program Description
1.01	On-Site Cleanup, Non-Petroleum	This program involves the cleanup of contaminated sites on Aeronautical Center leased property including soil and groundwater under the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA).
1.02	On-Site Cleanup, Petroleum Product	This program involves the cleanup of contaminated sites on Aeronautical Center leased property including soil and groundwater under the Resource Conservation and Recovery Act (RCRA).
1.03	Off-Site Cleanup	This program involves the cleanup of contaminated sites at non-Aeronautical Center property including soil and groundwater under the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA).
2.01	Air Emissions Management	This program involves ensuring compliance of Aeronautical Center air emissions with the Clean Air Act. Emissions include volatile organic compounds of various types including refrigerants.
2.02	Asbestos Management	This program involves management of the asbestos-containing materials present in MMAC buildings in accordance with OSHA and NESHAPS regulations and FAA policy.
2.03	Drinking Water	This program involves ensuring compliance of Aeronautical Center drinking water with the Safe Drinking Water Act.
2.04	Water Pollution & Spill Prevention	This program covers compliance activities at the Aeronautical Center under the Clean Water Act, including discharges to sanitary and storm sewers, storm water pollution prevention program and the spill prevention, control and countermeasures (SPCC) planning.
2.05	Solid Waste Management	This program involves management of solid waste generated at MMAC in accordance with applicable regulatory requirements.
2.06	Hazardous Waste Management	This program involves management of hazardous wastes generated at MMAC in accordance with Resource Conservation and Recovery Act (RCRA) requirements.
2.07	Fuel Storage Tanks	This program involves management of fuel storage tanks associated with vehicle refueling and emergency generators (for both building backup and training purposes) at the MMAC in accordance with federal, state, and FAA regulations.

ESH Program Number	ESH Program Name	ESH Program Description
2.08	Emergency Planning & Community Right-To-Know	This program covers compliance activities at the MMAC under the Emergency Planning and Community Right-to-Know Act (EPCRA). This involves filing an annual inventory report regarding certain hazardous materials to the Local Emergency Planning Commission (LEPC).
2.09	Toxic Substances (PCB)	This program involves management of equipment at the MMAC which has been identified as containing or which could possibly contain PCBs in accordance with Toxic Substance Control Act (TSCA) requirements. Radon testing and mitigation is also included.
2.10	Pesticide Management	This program involves management of pesticides at the MMAC in accordance with the Federal Insecticide, Fungicide and Rodenticide Act.
2.11	Radioactive Materials	This program covers compliance activities at the MMAC under Atomic Energy Act (AEA) and Low-Level Waste Policy Act (LLWPA).
2.12	Natural Resources Management	This program covers compliance activities at the MMAC under sixteen federal laws including the Endangered Species Act and the North American Wetland Conservation Act.
2.13	Cultural & Historical	This program covers compliance activities at the MMAC under ten federal laws including the National Historic Preservation Act.
2.21	Hazardous Waste Operations	This program covers the safety of MMAC personnel involved in operations of hazardous waste as well as emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.
2.22	Ventilation	"Ventilation" specifically refers to Industrial Ventilation. Building comfort heating and cooling systems are not included in the scope of this program. This program involves ensuring that all systems engineered and installed to mechanically remove harmful air contaminants operate sufficiently and provide a level of protection to reduce/eliminate concentrations of gases, fumes, vapors, or particles that might otherwise exceed worker exposure limits.

ESH Program Number	ESH Program Name	ESH Program Description
2.23	Noise	This program seeks to identify work areas where hazardous noise exists. Once identified, these areas are evaluated first to determine if engineering controls can be used to eliminate or reduce the hazard, and secondly if administrative controls can eliminate or reduce the hazard. If neither of these methods work, personal protective equipment is used, and personnel are placed in the hearing conservation program.
2.24	Radiation	This program seeks to identify and control both ionizing and non-ionizing radiation.
2.25	Hazard Communication	The purpose of this program is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is accomplished by means of a comprehensive hazard communication program, which are to include container labeling and other forms of warning, material safety data sheets and employee training. Exposure monitoring is not included in the scope of this program.
2.26	Explosives	This program seeks to insure the safe handling and storage of explosive-type materials.
2.27	Respiratory Protection	This program is established to ensure all workers are provided with protection from respiratory exposures when respiratory protection is the final option. A Respiratory Protection Program will be established for work locations where it has been determined a potential for an exposure exists above established respiratory exposure limits.
2.28	Permit-Required Confined Space Entry	This program involves the development and implementation of a confined space entry program in accordance with OSHA 1910.146 and FAA Order 3900.19B.
2.29	Toxic and Hazardous Substances	Workers who handle toxic and hazardous substances must be provided with protection and the knowledge of how to protect themselves from these materials. Caring for the health of workers exposed to hazardous substances requires evaluating the potential for exposures through routes of entry including Inhalation, Ingestion, Absorption, and Injection.

ESH Program Number	ESH Program Name	ESH Program Description
2.30	Lockout/Tagout	This program is intended to prevent personal injuries from the unexpected energizing or start up of machines or equipment during installation, servicing or repairs.
2.31	Welding, Cutting and Brazing	The purpose of this program is to comply with regulations for welding, cutting and brazing, 29 CFR 1910, subpart Q.
2.32	Fire Protection	This program works to see that the correct type of extinguishers are available in work sites, that these extinguishers are inspected on a monthly basis, and that personnel are trained in their operation. Installation, operation, testing, inspection and maintenance of sprinkler and alarm systems also fall under this program. This program includes emergency evacuation programming and requirements under the Life Safety Code, NFPA 101.
2.33	Bloodborne Pathogens	This program protects employees whose jobs potentially expose them to occupational hazards from blood or other potentially infectious body fluids. CAMI has assumed responsibility for training required by this program.
2.35	Powered Industrial Trucks	This program deals with the control of forklifts and compliance with regulations for powered industrial trucks in accordance with OSHA 1910.178.
2.36	Hearing Conservation	This program involves protecting workers from noise-induced hearing loss resulting from hazardous noise (29 CFR 1910.95). It includes gathering information regarding noise levels that are hazardous, how monitoring is performed, information and training, medical surveillance, and record keeping.
2.37	Hoist/Sling	This program deals with the visual inspection and testing of material hoists. Deficiencies are identified and corrected to reduce the risk of hoist failure and resulting employee injury. Comply with regulations for inspection of hoists and cranes, 29 CFR 1910.179.
2.38	Emergency Operations	This program deals with the planning and management of national security emergencies and major disasters in accordance with AC 1900.12B and FAA Order 1900.1E.

ESH Program Number	ESH Program Name	ESH Program Description
2.39	Self Inspection Program	This program was set up to comply with Washington directive that specified that limited/moderate risk workplaces be inspected annually by designated inspectors. Increased risk workplaces are to be inspected twice a year.
2.40	Ergonomics	The goal of this program is to reduce the risk of musculoskeletal disorders (e.g., back injuries) from factors such as overexertion, prolonged repetition, and awkward posture. Both office (computer workstations) and industrial workstations are included under this program.
2.41	Spray Painting	This program addresses the application of flammable/combustible finishing materials applied as a spray. It also includes the NFPA, OSHA and FAA requirements for construction and management of spray booths and addresses and how to apply these requirements at MMAC. Furthermore, it includes the construction and management of dip tanks containing flammable and/or combustible materials.
2.42	Process Safety	This program contains OSHA requirements for preventing or minimizing the catastrophic releases of toxic, reactive, flammable, or explosive chemicals and applies to processes involving a chemical at or above specified threshold quantities. The MMAC does not have any process that meets or exceeds the specified threshold quantities.
2.43	Electrical Safety	This program addresses electrical safety requirements that are necessary for the practical safeguarding of employees in their workplaces and is divided into four major divisions. These divisions are (1) Design safety standards for electrical systems (2) Safety-related work practices (3) Safety-related maintenance requirements, and (4) Safety requirements for special equipment.
2.44	Walking, Working Surfaces	The goal of this program is to reduce the risk of falls while using permanent and temporary ladders, stairs, scaffolds, and personnel lifts while exposed to unguarded floor and wall openings. Applicable regulation is 29 CFR 1910 (Subparts D & F) and 29 CFR 1926 (Subparts L, M & X).
2.45	Shipping and Receiving Safety	This program deals with the management of hazards associated with shipping and receiving operations including the storage and handling of hazardous materials. The goal of this program is to reduce the risk of accidents involving trucks, docks, shipping containers, forklifts, materials handling equipment, packaging operations and rack storage systems.

ESH Program Number	ESH Program Name	ESH Program Description
2.46	Housekeeping and Sanitation	This program deals with the general construction and maintenance of employee toilets, drinking water, waste containment, food storage, and pest control. It also deals with general housekeeping to assure sanitary working conditions in permanent work places. Comply with regulations for housekeeping and sanitation safety, 29 CFR 1910.141.
2.47	First Aid	This program ensures the ready availability of trained first aid personnel and first aid materials when the CAMI clinic would be closed. AMP-10 maintains first aid kits and supplies.
2.48	Safety & Health in the Office	This program concentrates on the physical hazards that can be found in office space such as aisles and walkways, floors, stairs, doors, means of egress, file cabinets, and office machines and equipment. Also included are the lifting and moving of office equipment and fire evacuation routes.
2.49	Indoor Air Quality	This program includes the monitoring of airborne contaminants within buildings that are not generated as a result of industrial processes. This area is currently unregulated.
2.50	Asbestos Control and Construction	This program involves management of the asbestos-containing materials present in MMAC buildings in accordance with applicable regulations and FAA policy.
2.51	Lead Safety	This program is directed at the prevention of occupational exposure to lead (29 CFR 1910.1025). The program will consist of elements that will be designed to address known health concerns that Lead is capable of producing. The program will include determination of exposures, employee exposure determination, methods of compliance, personal protective equipment, hygiene facilities, medical consultation and surveillance, information and training, hazard identification, and record keeping requirements.
2.52	Hand and Power Tools	This program involves providing safe tools for our personnel to use and training on safe use of the tools. Proper guards on the tools and the correct personnel protective equipment are part of this program.

ESH Program Number	ESH Program Name	ESH Program Description
2.53	Compressed Gas Safety	There are several hazards associated with compressed gases, including oxygen displacement, fires, explosions, toxic effects from certain gases, as well as the physical hazards associated with pressurized systems. Special storage, use, and handling precautions are necessary in order to control these hazards.
2.54	Fall Protection	The goal of this program is to prevent falls and accidental injury to employees required to wear personal fall arrest equipment.
2.55	Machinery & Machine Guarding	This program assures that fixed machinery and equipment meets OSHA requirements by being properly guarded.
2.56	Contractor Safety	The goal of this program is to reduce the MMAC's risk of liability associated with on-site contractor accidents, and the prevention of injury and property damage to MMAC personnel and facilities exposed to contractor operations. Targeted contractors are those with the greatest exposure (i.e., facility construction, maintenance, scaffolding, electrical, excavation, etc.). The MMAC has the potential to be held liable for serious injury to contractor personnel if proven to have contributed to the cause of the accident either by negligence or project management error.
2.57	Medical Surveillance	This program involves maintaining medical surveillance of FAA employees exposed to hazardous chemicals and noise. Included in this program are the identification of specific exposures by testing, medical examinations to identify physiological changes in personnel which are related to workplace exposure, and medical examinations to determine fitness to wear respirators. The CAMI clinic has a vital role in this program.
2.58	Heat and Cold Stress	This program includes the prevention of thermal stress for those work environments where extremes of heat or cold pose harm to workers (29 CFR Section 5). The program will be directed at these stressors that affect a persons health by prescribing limitation recommendations to the amount of work that can be performed in these conditions.
2.59	Personal Protective Equipment	This program involves the selection, maintaining, and identification of personal protective equipment, in particular, eye and face protection, head protection, foot protection, electrical protective equipment, and hand protection.
2.60	Motor Vehicle Operation	This program involves the safe operation of vehicles through educational means.

ESH Program Number	ESH Program Name	ESH Program Description
2.61	Accident Investigation & Analysis	This program deals with the investigation, reporting and analysis of mishaps in accordance with FAA Order 3900.19B.
2.62	Design Review	This program deals with the identification and evaluation of OSH elements associated with proposed process and facility designs.
3.01	Environmental Assessments/Impact Statements (NEPA)	The goal of this program is to prepare environmental assessments and impact statements in accordance with the National Environmental Policy Act (NEPA). FAA Order 1050.1D addresses procedures for completing assessments.
3.02	Environmental Due Diligence Assessments	This program covers real property lease and lease termination activities under the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA).
3.03	Contract Review	This program involves review of MMAC contracts to ensure compliance with safety, and health requirements, including but not limited to hazard communication and construction safety.
4.01	Pollution Prevention	This program covers pollution prevention opportunity assessment and implementation under the Pollution Prevention Act and EO 12856.
4.02	Market ESH Tools	This program covers implementation of technologies and systems to increase delivery of services to existing and potential AVN-6 customers.
5.01	Organizational Structure	This program covers actions designed to increase organizational and personal effectiveness.
5.02	Commitment	This program covers actions designed to increase organizational and individual commitment to Environmental programs.
5.03	ESH Protection Programs	This program covers actions designed to increase Environmental program management effectiveness.

ESH Program Number	ESH Program Name	ESH Program Description
5.04	Formality of ESH Programs	This program covers actions designed to increase Environmental program formality.
5.05	Internal and External Communications	This program covers actions designed to increase awareness of Environmental program progress.
5.06	Staff Resources, Training and Development	This program covers actions designed to increase and enhance Environmental productivity through training and contractor leverage.
5.07	Program Evaluation, Reporting and Corrective Action	This program covers actions designed to develop and implement evaluation, report and corrective action tools need to properly assess the status of OSH programs.
5.08	Risk Management and ESH Planning	This program covers actions designed to identify risk, assess liability and allocate resources accordingly. It also covers implementation of Environmental procedures into organization operations and business plans.

APPENDIX 4.2

ESH PROGRAM COMPLIANCE RATINGS AND DEFINITIONS

Written Policy

Criteria	Points
Nothing written.	1
Rough draft or DOAI*, evaluation, assessment, etc., indicating applicability and impact to AVN.	2
"Operating" draft, i.e., draft in use and implemented, but not formalized.	3
Policy formally reviewed, adopted and published as order or handbook.	4
Formal policy includes beyond compliance elements as well as basic compliance.	5

Implementation

Criteria	Points
Nothing implemented by division or staff.	1
Level 3 written procedure, basic awareness of program and/or there is some degree of effort by staff and other responsible parties to comply.	2
Level 4 written procedure and division has more than basic awareness, but not fully "on-board".	3
Level 4 written procedure and division exerting good faith effort to meet their responsibilities.	4
Level 4 written procedure and division proactive.	5

Training

Criteria	Points
No training or training development.	1
Accomplishment of any one [Note: suggest two] of level 4 requirements.	2
Accomplishment of any four of level 4 requirements.	3
Training program includes all of the following: (a) JPRs identified (b) employees identified (c) curriculum complete (d) record-keeping in place (e) level four written policy.	4
Division manages own training, proactive in ensuring that its employees are trained.	5

A program must be at least at level four in all three areas in order for it to be declared "in compliance" with regard to achieving its goal statement, if the goal is to achieve compliance.

*DOAI = Determination of Applicability and Impact

APPENDIX 4.3
EXAMPLE FALL PROTECTION PROGRAM LIABILITY RISK ASSESSMENT

	A	B	C		
	Severity		Est. Liability		
Liability Category	Rating (0-10)	Probability	$(A/10)*D*B	Remarks	
Fines and penalties	0	0	0		
CPIPDEL*	10	0.04	40000		
Indirect cost related to accident	10	0.04	160000		
Corrective action cost	10	0.04	4000		
Total Est. Liability			$204,000		
		D			
	Minimum Severity	Maximum Severity			
Category	"0" rating	"10" rating			
			Mishap Probability/yr	Definition	
Fines and penalties	$0	$25,000	1	Likely to occur immediately or within a short period of time	
***Compensation for personal injury, property damage and economic loss**	$0	$1,000,000	0.5	Probably will occur in time (next two years)	
Indirect cost related to accident**	$0	$50,000	0.1	Possible to occur in time (next ten years)	
Corrective action cost** ***	$0	$340,000	0.01	Unlikely to occur (100 years)	
	$0	$4,000,000	0.05	18.6 years	
	$0	$100,000	0.04	18.7 years	

**** Maximum costs shown are tentative pending research needed to establish final numbers.**

***** Corrective action costs include costs incurred in response to an accident or finding by a regulatory agency and include only those costs that could be avoided through proactive program mgt. such as time spent communicating with regulatory officials during an enforcement action. Costs that would have been incurred anyway at some other time, such as writing a procedure or policy, should not be included.**

APPENDIX 4.4
EXAMPLE ESH PROGRAM PRIORITIZATION WORKSHEET

Priority	Goal No.	Program	Composite Compliance Rating (1-5)	Estimated Liability ($)	Overall Liability Risk (EL/CR)
1	2-36	Hearing Protection Program	1.00	$512,000	$512,000
2	2-40	Ergonomics Program	1.00	$510,000	$510,000
3	2-48	Office Safety	1.00	$357,000	$357,000
4	3-03	Contract Review	1.00	$257,650	$257,650
5	2-57	Medical Surveillance	1.00	$255,000	$255,000
6	2-60	Vehicle Safety	1.00	$251,000	$251,000
7	2-27	Respiratory Protection	1.00	$229,500	$229,500
8	2-51	Lead Safety	1.00	$229,500	$229,500
9	2-29	Toxic and Hazardous Substances	1.00	$204,000	$204,000
10	2-34	Laboratory Safety Standards	1.00	$204,000	$204,000
11	2-44	Ladders/Powered Platforms/Walking Surfaces	1.00	$204,000	$204,000
12	2-28	Confined Space	1.33	$255,000	$191,250
13	2-25	Employee Right-to-Know	1.00	$183,600	$183,600
14	2-31	Welding, Cutting and Brazing	1.00	$153,000	$153,000
15	2-54	Fall Protection	1.33	$204,000	$153,000
16	2-49	Indoor Air Quality	1.33	$204,000	$153,000
17	2-37	Hoist/Crane Inspections	1.50	$204,000	$136,000
18	2-22	Ventilation	1.00	$102,000	$102,000
19	2-30	Lock Out/Tag Out	2.67	$255,000	$95,625
20	2-06	Hazardous Waste	2.50	$148,610	$59,444
21	2-56	Contractor Safety	1.00	$51,000	$51,000
22	2-02	Asbestos	2.33	$102,320	$43,851
23	1-01	On-Site Cleanup, Non-Petroleum	2.00	$66,950	$33,475
24	1-02	On-Site Cleanup, Petroleum Product	2.00	$66,950	$33,475
25	2-04	Water Pollution and Spill Prevention	2.33	$54,900	$23,529
26	2-21	Hazardous Waste Operations (Hazwoper)	1.83	$40,400	$22,036
27	3-01	Environmental Assessments/Impact Statements	2.33	$50,000	$21,429
28	1-03	Off-Site Cleanup	1.67	$30,600	$18,360
29	4-01	Pollution Prevention	2.83	$30,000	$10,588
30	2-03	Safe Drinking Water Act	1.00	$10,000	$10,000
31	2-07	Fuel Storage Tanks	2.33	$17,250	$7,393
32	2-09	Toxic Substances (PCBs)	1.67	$11,250	$6,750
33	2-10	Pesticides	2.00	$7,525	$3,763
34	2-08	Emergency Planning and Community Right-to-Know	1.50	$5,500	$3,667
35	2-12	Natural Resources	1.33	$4,500	$3,375

04/30/04	APPENDIX 5 DESIGN REVIEW CHECKLIST	
PROTOCOL	**CRITERIA**	**COMMENT**
SAFETY ENGINEERING	A list of customer specific safety and health concerns (for example, confined spaces, back injury; repetitive motion, fall hazards, energy sources, hazardous materials, etc.) will he obtained, provided to the A/E	
SAFETY ENGINEERING	Develop a list of hazardous operations that are of concern and review the control methods that will be used.	
SAFETY ENGINEERING	Ensure that appropriate design safety reviews are conducted and recommendations/comments are provided to the project engineer or A/E firm.	
AMERICANS WITH DISABILITIES	Accommodate employees with disabilities to prevent injuries and illnesses. Provide "clean offices" for sensitized individuals. Provide computer assisted equipment and software.	
CONFINED SPACE	Eliminate all possible confined spaces from the design. Remaining confined spaces will be evaluated for accessibility, methods of isolation, maintenance, and inspection.	
CONFINED SPACE	For each remaining confined space, wherever possible, design the space for continuous human occupancy prompt egress, ease of ingress, and elimination of hazardous atmosphere wherever possible.	

PROTOCOL	CRITERIA	COMMENT
CONFINED SPACE	Design all confined spaces with multiple, large accesses, Access will be equipped with platforms, which are large enough to support all required equipment and personnel. Objects such as pipes or ducts must not restrict access. Locations of ladders and scaffold mounts inside the space will be identified. Consider fall protection issues such as anchorage points.	
CONFINED SPACE	Design isolation methods to isolate confined spaces from hazards. Isolation design considerations include planning for equipment removal through accesses, full isolation of confined space(s) from electrical, mechanical, hydraulic, pneumatic, chemical, thermal, radioactive, and other hazardous energy such as falling object(s); to provide for complete isolation of all flows into and out of the confined space (s) such as valve blocking, spools, double blocks and bleeds, flanges, and flushing connections.	
CONFINED SPACE	Design the confined space (s) so that maintenance and inspection can be performed from the outside or by self-cleaning systems. Position maintenance points for ease of access.	
ELECTRICAL SAFETY	Consider voltage and amperage levels, high-voltage effects, ground connections, and isolation. Design for safe operation, maintenance, and inspection.	

PROTOCOL	CRITERIA	COMMENT
ELECTRICAL SAFETY	Design ground fault circuit interrupter (GFCI) systems for all high humidity areas and areas where liquids are, or may be, used in applications such as spraying pooling, or any other use by personnel. Reduce voltage and amperage levels by substituting equipment or systems; fuses, circuit breakers, and line capacities to meet anticipated future requirements. Eliminate grounding conductions to gas or steam pipes, electrical conduits, and sprinkler system piping to prevent accumulation of static electricity. Engineer ground devices to ensure maximum protection for unique sites such as rooms with flammable atmospheres; to provide lightning protection on buildings and electrical structures.	
ELECTRICAL SAFETY	Design equipment or systems with consideration of combustible gases or vapors that may be encountered and account for differences in flash points, explosive limits and ignition temperatures.	
ELECTRICAL SAFETY	Design to accommodate for the effects caused by heat generation from equipment and to control the temperature for flammables stored near this equipment.	
ELECTRICAL SAFETY	Design to isolate indoor and outdoor high voltage equipment by using enclosure vaults, security fences, lockable doors and gates. Non-insulated conductors such as bus bars on panel boards, switchboards or high voltage equipment connections in accessible areas must be enclosed or protected to eliminate or reduce electrical hazards associated with maintenance and inspection.	

PROTOCOL	CRITERIA	COMMENT
ELECTRICAL SAFETY	Ensure all equipment and systems can be locked out. (See lockout/tagout section)	
ERGONOMICS	Design for the 5th and 95th percentiles (smallest and largest) such as clearances or the 95th percentile and visual fields for the 5th and 95th percentile. Determine the range of movement expected in the job or task and provide adjustable equipment whenever possible. Eliminate gender-specific tasks and consider future workforce (older population with more females), force requirements such as grip strength and reach envelope. Eliminate spatially restricted spaces that require kneeling and crawling.	
ERGONOMICS	Design layouts that do not require personnel to: twist and turn when moving an object from one conveyor belt, table or machine to another; lift an object from floor level to a conveyor, table or machine: work with elbows above waist level; use hands and elbows in a twisting motion while performing job tasks, hyper-exten or hyper-flex wrists while performing job tasks.	

PROTOCOL	CRITERIA	COMMENT
ERGONOMICS	Design for range-of-motion of the worker; for field of vision of worker; to reduce repetitive motions required per task, duration and pace of a task; to provide adequate support for back and legs (such a s back supports or floor mats); adjustable work surfaces that are easily manipulated from position of the work; delivery bins to accommodate height and reach limitations work platforms that move up and down for various operations; for powered assists to eliminate the use of extreme force for the use of suspense on devices for heavy tools; the use of diverging conveyors off main lines so that certain activities can be performed at slower rates.	
ERGONOMICS	Gender—Determine and understand which tasks negatively affect which genders. Age- Determine tasks that affect workers based on age. Anthropometry—Know the range of the work force. Work method—Design proper procedures for task accomplishment. Senses—Poor vision, hearing, and smell should be considered in ergonomic design. Physical strength—The strength required to accomplish a task must he considered. Weight—The weight of the work can affect the design of a workstation.	

PROTOCOL	CRITERIA	COMMENT
ERGONOMICS	Design: To eliminate the need for repetitive and/or prolonged activities; to eliminate forceful exertions with the hands such as reducing the number of hand pinch grips required in task accomplishment. Design out the need for prolonged static postures (add chairs, arm rests etc. where needed) and maintain symmetry between the worker and the task (avoid awkward postures). Eliminate the need to reach above the shoulders, reach behind the back, perform unusual twisting of wrists and other joints, maintain continued physical contact with work surfaces or use tools with excessive vibration in task accomplishment.	
ERGONOMICS	Design to maintain constant workstation temperatures and avoid excessive hot conditions or excessively cold conditions: for appropriate lighting; to eliminate excessive vibration. Consider the type of floor surface and platforms required for safety and stability at the workstation.	
FALL PROTECTION	Design stairways with standard guardrail instead of straight ladders where feasible; parapets or guardrails at roof edges; warning lines and cables to keep personnel away from fall hazards: for cranes or personnel lifts to provide safe access. Install supply and exhaust fan equipment at ground level or on roofs with sufficient space and protection to adequately perform testing and routine maintenance.	

PROTOCOL	CRITERIA	COMMENT
FALL PROTECTION	Design equipment so that fall hazards are minimized during maintenance repairs, inspection or cleaning. Consider future degradation of installed equipment in maintenance and inspection activities.	
FALL PROTECTION	Design the job or operation to eliminate work at heights. When not feasible provide prevention systems such as guardrails, catwalks, and platforms. Consider fall arrest issues such as anchorage points; compatibility of the control measures with the job tasks and work environment.	
FALL PROTECTION	Install anchorage points. Design horizontal cable I beam trolley systems in areas where employees require continuous mobility and where platforms or guardrails are not feasible. Ensure proper test methods are used to ensure systems are capable of proper support.	
FIRE PROTECTION	The National Fire Protection Association – National Fire Codes provides detailed guidance for the incorporation of fire protection engineering measures in the design and construction of FAA/AVN facilities. The codes can be used in the purchase and preparation of facilities planning and engineering studies and design documents used for the procurement of facilities construction.	

PROTOCOL	CRITERIA	COMMENT
FIRE PROTECTION	Design so standpipe fire suppression equipment is protected against mechanical damage and located to facilitate prompt use of hose valves, hoses, and other equipment at the time of a fire or other emergency. Locate hose outlets and connections high enough above the floor to avoid being obstructed and to be accessible to employees. Ensure that reels and cabinets are conspicuously identified.	
FIRE PROTECTION	Total flooding systems should provide a pre-discharge employee alarm which is capable of being perceived above ambient light or noise levels before the system discharges, giving employees time to safely exit from the discharge area.	

PROTOCOL	CRITERIA	COMMENT
FIRE PROTECTION	Design doors and pathways of sufficient size to allow complete dispersal of employees from a specific department or location. Consider safe areas inside of primary facilities for personnel who cannot escape. Design internal evacuation routes so that during an emergency occupants will readily know the direction of escape from any point. Provide means of egress remote from each other to prevent the blocking of any single exit due to fire or smoke. Discharge exits directly into the street, or yard, court, or other open space that gives access away from the facility and allows for adequate space to accommodate the discharge of occupants. Mark and arrange every exit so it is clearly visible and immediately recognized as an exit in order to minimize the possibility of confusion during and evacuation. Provide adequate and reliable illumination at all exit locations with exit signs at the point of exit from the building. Mark doors, passageways, or stairways which are not (or do not lead to) to an exit by a sign reading "Not an Exit" or by a sign indicating its actual character, such as "To Basement," "Storeroom," "Linen Closet," etc.	

PROTOCOL	CRITERIA	COMMENT
HAZARDOUS MATERIALS	Design storage facilities to maintain and separate both hazardous and non-hazardous storage; emergency ingress and egress points from hazardous materials storage areas. Determine whether underground or above ground storage is best for the site. Locate compatible waste streams in the same region of the site to reduce potential widespread contamination. Define well installation requirements (if necessary). Consider waste compatibility, hazard classes, fire suppression guidelines, containment requirements and recovery actions needed to properly store and dispose of hazardous materials.	
HAZARDOUS MATERIALS	Design diking between incompatible materials; collection sumps under the acid and alkaline storage areas for leakage that can be drained after any incident and/or neutralized before disposal; explosion-proof rooms for Flammables/Combustibles. Design: floor drain passages; leak proofing method to prevent ground or ground water contamination; to eliminate chemical compatibility issues; to isolate materials; separate sumps for containment; eye wash and showers into appropriate locations; use a containment material to retain all emergency water.	

PROTOCOL	CRITERIA	COMMENT
HAZARDOUS MATERIALS	Design explosion-proof rooms for flammable and combustible materials storage. Utilize spark resistant equipment, fire doors, blow-out walls, etc. Review all fire extinguishing requirements. Store fuels away and separate from oxidizers.	
HAZARDOUS MATERIALS	Place loading docks on opposite side of prevailing winds. Ensure all dock areas are designed with a sprinkler system. Provide dikes and/or containment systems for loading/off loading areas for tankers loading areas for tankers or rail cars.	
HAZARDOUS MATERIALS	Provide secondary containment; spill prevention controls; overfill prevention controls; diking for tank farms. Design to protect from corrosion; leak detectors; all tanks to be grounded.	

PROTOCOL	CRITERIA	COMMENT
HAZARDOUS MATERIALS	Design alarm systems to provide sufficient time for escape from the facility; alarms that are capable of being perceived above ambient noise or light levels by all personnel in the affected portions of the workplace; alarms that are distinctive and recognizable as a signal to evacuate the work area or to perform emergency actions; standardized systems to eliminate confusion in an emergency; to allow maintenance of alarm systems. Install redundant systems in areas with corrosive atmospheres or where devices are subject to unusual wear or possible destruction. Incorporate tactile devices in areas where personnel would not otherwise be able to recognize an audible or visual alarm.	
LIGHTING	Incorporate supplement lighting a round moving machinery. conveyors, steps and stairwavs. Consider color perception changes under yellow sodium vapor lights. Design lighting that is comfortable to the eve; provides adequate security; and adequate for the work to be performed.	
LIGHTING	Provide emergency lighting where necessary for personnel to remain at machines or stations to shut down equipment in case of power failure, at stairways, passageways, or aisle wavs used for emergency egress.	

PROTOCOL	CRITERIA	COMMENT
LIGHTING	Determine NFPA C]ass and Division ratings for the location where lighting is considered. Ensure all associated switces and electrical equipment are approved for the location. Portable baftery powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids must be of the type approved for the hazardous location.	
LIGHTING	Locate outdoor lamps below all live power line conductors, transformers, or other electric equipment unless adequate clearances or other safeguards are provided. Eliminate high contrast light and dark areas that may contribute to accidents from people or vehicles entering or leaving lighted or non-lighted areas.	
HAZARDOUS ENERGY CONTROL	Specify or design energy isolation devices capanle of being locked out. Layout machinery and equipment to ensure safe access to lockout devices and provide each machine/equipment with independent disconnects. Specify lockout devices that will hold the energy isolating devices in a "safe" or "off" position.	
HAZARDOUS ENERGY CONTROL	Ensure equipment and utilities have lockout capability and that any replacement, major repair renovation, or modification of equipment will still accept lockout devices. Design emergency and non-emergency shutoff controls for easy access and usability. Integrate actuation controls with warning lights and alarms to prevent personnel exposure to hazards.	

PROTOCOL	CRITERIA	COMMENT
HAZARDOUS ENERGY CONTROL	Ensure selected devices are capable of withstanding the environment to which they are exposed and are standardized within the facility.	
MACHINE GUARDING	Design guards to be affixed to the machine whenever possible. and ensure the guard does not itself create a hazard. Utilize structural barriers such as exterior or interior walls to isolate moving parts of machines. Specify guards that are interlocked with the source of power to the machine to prevent them from being removed by unauthorized personnel. Use vibration isolators to dampen or eliminate noise transmission and mechanical failure.	
MACHINE GUARDING	Ensure revolving barrels, containers, and drums are elevated and/or guarded by an enclosure which is interlocked with the drive mechanism.	
MACHINE GUARDING	Anchor all machines to prevent movement or vibration. Ensure the floor surface is appropriate for the weight and stress.	
MACHINE GUARDING	Design maintenance access points to be located outside guards and are accessible. Provide adequate space between pieces equipment.	

PROTOCOL	CRITERIA	COMMENT
MACHINE GUARDING	Mark maximum rated limits on all machines, hoists, etc. Design out the ability for "quick-starts" to reduce mechanical stress. install bumpers, shock absorbers, springs or other devices to lessen the effects of repeated impacts.	
MATERIALS HANDLING	Consider load-handling factors for optimum storage and movement. Determine container specifications. Ensure equipment maximum load specifications are displayed prominently and that the size, weight, and center of gravity of the load are considered. Analyze types and quantities of materials to be staged indoors. Design receiving points and material handling processes to accept just-in-time deliveries.	
MATERIALS HANDLING	Combine compatible operations to reduce multiple handling. Minimize transport distances in the facility by analyzing material routing techniques and necessary movement. Automate process if possible.	

PROTOCOL	CRITERIA	COMMENT
MATERIALS HANDLING	Bring workers into the design process. Plan for objects to be between shoulder and knee height. Plan for adjustable work heights. Minimize travel distances. Place items within reach distance (plan for a range. Eliminate unnecessary handling. Choose proper containers for the task. Optimize equipment/material layout. Consider relationship of worker to work station (reduce twisting. bending: reaching). Minimize negative environmental factors. Insure load stability: in movement.	
MATERIALS HANDLING	Automate load movement by using mechanical lift tables, lifting platforms, lift trucks, cranes, hoists, etc. Have material delivered at proper height. Increase unit quantity and load per movement. Reduce weight and size for easier handling. Change load movement to pushing and pulling operation.	
MATERIALS HANDLING	Use industrial trucks when load movement is intermittent over long distances, or over a van able path.	
MATERIALS HANDLING	Consider use of monorails and cranes when the load transfer is required from one point to another in the same general area. Consider use of hoists to facilitate the positioning, lifting, and transferring of material within a small area.	
MATERIALS HANDLING	Consider driverless, automatically guided vehicles (AGV) for small load applications. Consider automated retrieval systems (ARS) for parts and storage retrieval.	

PROTOCOL	CRITERIA	COMMENT
MATERIALS HANDLING	Plan for storage areas that can be kept free of tripping, fire and other hazards. Determine and observe height limitations when stacking materials; stacking limitations for lumber, blocks, bags and bundles. Design to allow drums, barrels, and kegs to be symmetrically stacked.	
MATERIALS HANDLING	Minimize heating and cooling losses through the use of suspended dividing flaps or other doorway enclosure techniques. Install self-leveling docks, truck levelers, fork lifts, cranes, and other devices to maximize efficiency and reduce manual material movement and handling. Provide separate receiving points for hazardous and non-hazardous materials.	
MATERIALS HANDLING	Provide adequate width for material transport without the removal of guardrails and toe-boards. Ensure that the slope of any gangway, ramp, or runway does not exceed specifications and rise to run ratio. Construct floor with maximum loading as a prime consideration and so that floor cannot tip, sag, or collapse under maximum anticipated loads.	
NOISE CONTROL	Evaluate size and shape of rooms, departments, and proposed layout of equipment; work stations, break areas, surface materials (e.g., ceiling/steel; walls/cinder block; floor/concrete) and noise from other (spill over noise).	

PROTOCOL	CRITERIA	COMMENT
NOISE CONTROL	Separate personnel from noise sources by the greatest reasonable distance. Install noise barriers between the source and the operators. Locate equipment and workstations so that the greatest sources of noise are not facing the operators. Take advantage of reflective walls and floor surfaces to properly channel sound. Use building construction materials that absorb sound energy. Design an enclosed room for the equipment operator. Mount equipment that may vibrate on solid foundations. Locate noisy equipment in sound enclosures to reduce ambient noise levels. Install insulating material over surfaces creating r transmitting excessive noise. Provide noise absorbent linings on air duds and mufflers on openings.	
NOISE CONTROL	Select equipment with low vibration and noise characteristics. Stipulate permissible maximum noise levels in specifications for new equipment. Use equipment with low velocity fluids or gas flows. Where possible, lower machine or conveyor speeds or high—pressure air exhausts.	

PROTOCOL	CRITERIA	COMMENT
NOISE CONTROL	Design for maintenance minimization of vibration and noise. Use slow-acting valves or accumulators in water systems to eliminate water hammer. Substitute high-noise processes with lower noise producing processes, such as squeezing processes instead of drop hammer processes; welding processes instead of riveting processes; chemical cleaning processes instead of high-speed grinding/polishing processes.	
TOXIC MATERIALS	Review Material Safety Data Sheets (MSDS) for toxic material selected for use. Consider current Threshold Limit Values (TLVs) in the selection of materials. Design for "daily use" and use of toxic materials on site to limit the type of substances, amount (dose) of exposure, and the number of entry routes to the body. Reduce the possibility of reactivity of chemicals in the same work area. Incorporate toxic material source reduction techniques in the design phase through closed process systems when extremely hazardous materials are used, eliminate or minimize flanges, connections, pump seals, valves, valve stems, etc. and closed process control rooms for operators. Incorporate shower and change rooms to prevent contamination outside of the facility. Ensure standardized labeling and marking of equipment, tanks, lines, etc. Ensure access ports are of adequate size to permit entry while using personal protective equipment (PPE). Provide deluge showers and eyewash fountains.	

PROTOCOL	CRITERIA	COMMENT
TOXIC MATERIALS	**Gases:** Design ventilation systems capable of handling routine and emergency releases; safe and adequate storage and staging facilities or workstations where gases are used. Consider line systems fed to work stations to eliminate indoor gas storage and staging. Install emergency shut-off controls for maximum accessibility during emergencies and systems to detect and warn building occupants of threatening air concentrations.	
TOXIC MATERIALS	**Vapors**: Install spring-loaded covers where possible on open surface tanks to reduce evaporation; fusible links on covers of all open surface tanks not having spring-loaded covers. Install systems to detect and warn building occupants of threatening air concentrations.	
TOXIC MATERIALS	**Fumes:** Install proper ventilation in areas where hot work (welding, cutting, brazing, etc.) is performed. Design ventilation systems capable of meeting indoor air quality standards.	

TOXIC MATERIALS	**Air Particulates**: Install HVAC and other control systems capable of meeting indoor air quality standards; systems to warn against concentrations reaching lower level explosive limits (LEL) or other specified action level.	
TOXIC MATERIALS	**Acids and Bases**: Design facilities to incorporate separate staging and storage of opposing PH material and ventilation systems so that different hazard classes do not mix in the air streams.	
TOXIC MATERIALS	**Metals:** Design to reduce, eliminate, control, or substitute noncarcinogens for carcinogens such as lead acetate and cadmium. Limit employee contact through the use of rollers, grappling devices, etc. Incorporate the use of dust filters at the point-of-operation in process to limit the spread of metal dusts through proper ventilation.	
TOXIC MATERIALS	**Solvents:** Select process solvents carefully, many different hazard types exist (flammable, acidic, alkaline, etc). Select solvents that satisfy process requirements, and reduce engineering controls and PPE. Incorporate solvent filtration units to reduce handling and extend life if possible.	

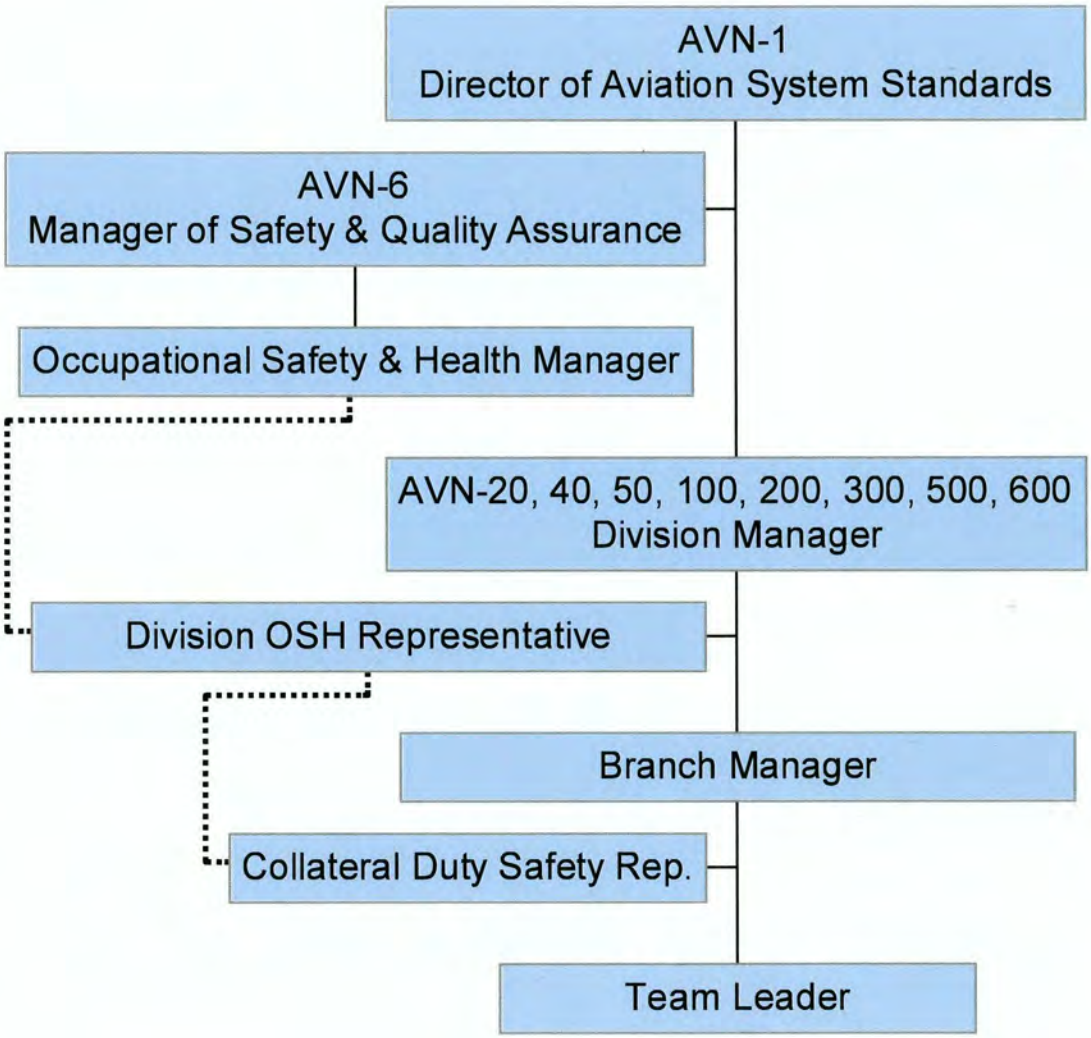
PROTOCOL	CRITERIA	COMMENT
TOXIC MATERIALS	**Asbestos:** Perform an asbestos survey including sampling and testing of suspected asbestos containing materials (ACM), for all areas of the project to be demolished, renovated or disturbed. The work will be conducted under a safety and health plan and in full compliance with all applicable safety, health and worker protection regulations.	
TOXIC MATERIALS	**Lead:** Perform a lead-containing paint (lead 0.5 percent by weight dry film) survey, including sampling and testing of painted surfaces, on all areas of the project to be renovated or disturbed. The number of samples to be taken will vary according to the conditions, but sufficient samples will he taken to assure that all lead containing paint that may be disturbed as part of this project is identified and documented. Each sample will he removed cleanly to the substrate. The sample will include only, paint scrapings and must not be contaminated with material such as rust or mill scale, wood, concrete or any part of the substrate. Each sample will he sealed in a separate plastic bag or container that will not contaminate the sample, and will be identified with the following information; project site, date, and location of sample, name and signature of person taking the sample. The sample bags or containers will he sealed and sent to a laboratory certified by the Environmental Lead Laboratory Accreditation Program (ELLAP).	

PROTOCOL	CRITERIA	COMMENT
INDUSTRIAL VENTILATION	Characterize each constituent to determine specific requirements. Review ways to reduce personal interaction with the source reviewed, personnel location, and work practices. Determine incompatible air streams (cyanides and acids, etc.). Consider effects of outside wind speed and direction: weather and seasons.	
INDUSTRIAL VENTILATION	Review Material Safety Data Sheets (MSDS) to determine specific hazards of chemicals used in the process; exposure limits; use most conservative exposure limit determined. Mass-balances considered to determine actual loss rates. Comply with manufacturer recommendations for venting.	
INDUSTRIAL VENTILATION	Ensure concentrations are below the levels specified and flammable or explosive limits are controlled by using intrinsically safe equipment. Incorporate explosion-venting techniques into ventilation and collection systems.	
INDUSTRIAL VENTILATION	Install gauges to measure pressure drop at exhaust ducts. Design controls that are easily accessible to operators and maintenance crews.	

PROTOCOL	CRITERIA	COMMENT
INDUSTRIAL VENTILATION	Ensure automatic controls are installed to provide audible or visual alarms if ventilation systems fail and provide sufficient time for safe escape from the facility. Automatically shut down operation if ventilation fails. Ensure alarms are designed that are capable of being perceived above ambient interference and that tactile devices are used where personnel would not he able to recognize an audible/visual alarm.	
INDUSTRIAL VENTILATION	Design and orient to ensure ventilated materials will fall or be projected into the hoods in the direction of the, airflow and that minimum airflow specifications are achieved at any point in the capture zone. Ensure airflow specifications are strong enough to overcome other forces acting on the contaminants (doors, HVAC, etc.).	
INDUSTRIAL VENTILATION	Design inlet and exhaust ductwork: to be adequately supported throughout its length and is sized in accordance with good design practice(s). Provide inspection or clean-out doors in ducting as required. Provide drains as required.	
INDUSTRIAL VENTILATION	Provide clean "dedicated" fresh make-up air.	

APPENDIX 6
ORGANIZATIONAL CHART

AVN Occupational Safety and Health Organization



APPENDIX 7

JOB HAZARD ANALYSIS

Job:		Date:
Work Location:	Division/Branch/Section:	Phone:
Requested By: Site Contact:	Supervisor:	Page Of

Task	Hazard(s) - (Actual or Potential)	Risk Level	Control(s) & Recommendations	Residual Risk Level

THIS JHA WAS COMPLETED WITH THE BEST INFORMATION AVAILABLE AT THE TIME. IF FURTHER INFORMATION BECOMES AVAILABLE, IT WILL BE REVISED.
THE CONTENTS OF THIS JHA SHOULD BE SHARED WITH NEW EMPLOYEES PRIOR TO THE INITIATION OF THEIR WORK ASSIGNMENT.

Analysis Performed By:		Analysis Reviewed By:		Analysis Approved By:	
Date:	Phone:	Date:	Phone:	Date:	Phone:

APPENDIX 7.1
JOB HAZARD ANALYSIS IMPLEMENTATION GUIDELINE

GOALS AND OBJECTIVES:

The primary goal of a Job Hazard Analysis (JHA) is to break down potentially hazardous jobs into their basic sequential job tasks in order to better identify which tasks are most closely associated with the hazard(s).

When the hazards have been identified, then the associated steps will be reviewed to determine what can be done to make them safer to perform.

The responsibility for conducting JHA's rests with technically qualified safety personnel.

Supervisors and other applicable personnel, at the worksite or facility, shall participate since they have the best knowledge of day-to-day job tasks and any related problems.

STEPS IN THE JHA PROCESS:

Select the job(s), tasks, operations or processes to be analyzed by applying program risk assessment. Program risk assessment takes into consideration a review of injury and illness data. Initial JHA's should be scheduled for those with the highest risk.

Break the job down into individual steps and list each step.

Prior to breaking the job down into individual steps, the evaluator should examine the location where the job is being performed to determine if there are any apparent hazards, such as poor lighting, live electrical contacts, improperly stored materials or waste, adjacent operations that may affect the safe operation of the job under review, etc. These should be annotated on the JHA Worksheet.

A critical component of this step is to list all of the tasks required to perform the job on the JHA Worksheet (see figure A7-1). The evaluator should start by interviewing appropriate personnel who are familiar with the job and/or equipment. The intent of the interviews is to determine the orderly sequence of job tasks and any perceived hazards. Note: OSHA Publication 3071, Job Hazard Analysis, provides useful examples of the level of detail needed in a JHA.

Visual observations shall be made, where possible, of employees performing the actual job tasks.

Identify all hazards and potential hazards associated with each step and thoroughly document the findings on the JHA Worksheet.

Assign Risk Values to each identified actual or potential hazard. Apply Operational Risk Management Guidelines to determine risk values.

Review the JHA Worksheet to ensure it is thorough, accurate, and that the job is broken down into a sufficient number of steps.

Evaluate the hazards and develop solutions.

Once the hazards are identified, they will be evaluated to determine what control measures are necessary.

Apply the Hierarchy of Control Measures. These are approaches that can be taken to reduce or eliminate hazards. They should be considered in the following order of precedence.

1. Engineering controls are the most reliable and effective type of controls. These are design changes that directly eliminate (ideally) or limit the severity and/or likelihood of the hazard, e.g. reduction in pressure/amount of hazardous material, substitution of less hazardous material, reduction of noise produced, fail-safe design, leak before burst, fault tolerance/redundancy, ergonomics, etc. Although not as reliable as true engineering controls, this category also includes protective safety devices such as guards, barriers, interlocks, grounding and bonding systems, pressure relief valves to keep pressure within a safe limit, etc. These items typically seek to reduce indirectly the likelihood of the hazard. These controls are often linked with caution and warning devices like detectors and alarms that are either automatic (do not require a human response) or manual (require a human response);

2. Administrative controls that significantly limit daily exposure to hazard by control or manipulation of the work schedule or manner in which work is performed, e.g., job rotation;

3. Work Practice controls, a type of administrative control that includes workplace rules, safe and healthful work practices, and procedures for specific operations. Work Practice controls modify the manner in which an employee performs assigned work. This modification may result in a reduction of exposure through such methods as changing work habits, improving sanitation and hygiene practices, or making other changes in the way the employee performs the job.

4. Personal protective equipment should be considered when other control measures are not feasible or as an interim control until one of the other described controls can be implemented. For more information, see Chapter 25, FAA Personal Protective Equipment.

Following the identification and entry of recommended controls, determine and enter a residual risk value based on the risk assessment code matrix.

Repeat the JHA process as necessary, by evaluating new equipment or work processes, reviewing accident records, and periodically reevaluating the suitability of previously selected personal protective equipment and/or engineering controls.

APPENDIX 8
RISK ASSESSMENT CODE MATRIX

			Probability				
			Frequent	Likely	Occasional	Seldom	Unlikely
			A	B	C	D	E
Severity	Catastrophic	1	1	2	6	8	12
	Critical	2	3	4	7	11	15
	Moderate	3	5	9	10	14	16
	Negligible	4	13	17	18	19	20
			Risk Levels				

Severity Categories

CATASTROPHIC—Complete mission failure, death, or loss of system
CRITICAL—Major mission degradation, severe injury, occupational illness or major system damage
MODERATE—Minor mission degradation, injury, minor occupational illness, or minor system damage
NEGLIGIBLE—Less than minor mission degradation, injury, occupational illness, or minor system damage

Probability Categories

FREQUENT
Individual item—Occurs often in the life of the system
Fleet or inventory—Continuously experienced
Individual Airman—Occurs often in career
Airmen exposed—continuously experienced

LIKELY
Individual item—Occurs several times in the life of the system
Fleet or Inventory—Occurs regularly
Individual Airman—Occurs several times in a career
All Airmen exposed—Occurs regularly

OCCASIONAL
Individual item—Will occur in the life of the system
Fleet or Inventory—Occurs several times in the life of the system
Individual Airman—Will occur in a career
All Airmen exposed—Occurs sporadically

SELDOM
Individual item—May occur in the life of the system
Fleet or Inventory—Can be expected to occur in the life of the system
Individual Airman—May occur in a career
All Airmen exposed—Occurs seldom

UNLIKELY
Individual item—So unlikely you can assume it will not occur in the life of the system
Fleet or Inventory—Unlikely but could occur in the life of the system
Individual Airman—So unlikely you can assume it will not occur in a career
All Airmen exposed—Occurs very rarely

APPENDIX 9
ABATEMENT IMPLEMENTATION GUIDELINE

Risk Value	3900-1 Posting Required?	Completion Schedule
1-5	Yes	Immediately
6-10	Yes	Within 30 days
11-15	No	Within 90 days
16-20	No	Within 120 days

APPENDIX 10
ROOT CAUSE ANALYSIS IMPLEMENTATION GUIDELINES

Root cause analysis is a tool used to identify causal factors associated with mishaps, safety violations and management systems.

Root cause analysis involves the examination of the fundamental elements that make up the interaction between worker, equipment, materials and environment in the performance of work.

The performance of root cause analysis requires employee and management interviews, physical surveys and sometimes-forensic evaluations.

The 5-M Model. The 5-M model, **Figure 1.**, provides a basic framework for analyzing systems and determining the relationships between composite elements that work together to perform the mission.

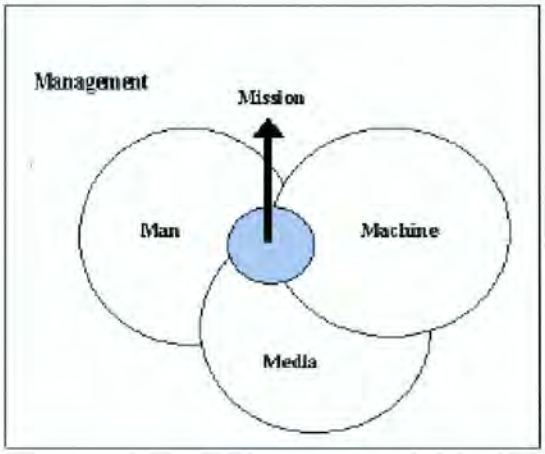


Figure 1.

The 5-M's are Man, Machine, Media, Management, and Mission. Man, Machine, and Media interact to produce a successful Mission or, sometimes, an unsuccessful one. The amount of overlap or interaction between the individual components is a characteristic of each system and evolves as the system develops. Management provides the procedures and rules governing the interactions between the various elements.

Figure 1. is a generalized model of a mission system. There is significant overlap between Man, Machine, and Media, because these elements interrelate directly, but the critical element is Management because it defines how the other elements interact. When a Mission is unsuccessful or a Mishap occurs, the system must be analyzed: the inputs and interaction between the 5-Ms must be thoroughly reassessed. Management is often the controlling factor in mission success or failure. Military safety centers and the National Safety Council cite the management processes in as many as 80 percent of reported mishaps.

Successful missions, or mishaps, do not just happen; they are indicators of how well a system is functioning. The basic cause factors for mishaps fall into the same categories as the contributors to successful missions and they are Man, Media, Machine, and Management.

Man: Area of greatest variability and thus the majority of risks.

- *Selection*: Right person psychologically/physically, trained in event proficiency, procedural guidance, habit pattern.
- *Performance:* Awareness, perceptions, task saturation, distraction, channelized attention, stress, peer pressure, confidence, insight, adaptive skills, pressure/workload, fatigue (physical, motivational, sleep deprivation, circadian rhythm).
- *Personal Factors*: Expectancies, job satisfaction, values, families/friends, command/control, discipline (internal and external), perceived pressure (over tasking) and communication skills.

Media: External, largely environmental forces.

- *Climatic:* Ceiling, visibility, temperature, humidity, wind, precipitation.
- *Operational:* Terrain, wildlife, vegetation, man made obstructions, daylight, darkness.
- *Hygienic*: Ventilation/air quality, noise/vibration, dust, contaminants.
- *Vehicular/Pedestrian*: Pavement, gravel, dirt, ice, mud, dust, snow, sand, hills, curves.

Machine: Used as intended, limitations, interface with man.

- *Design:* Engineering reliability and performance, ergonomics.
- *Maintenance*: Availability of time, tools, and parts, ease of access.
- *Logistics:* Supply, upkeep, repair.
- *Tech data*: Clear, accurate, useable, available.

Management: Directs the process by defining Standards, Procedures, and Controls. Be aware that while management provides procedures and rules to govern interactions, it cannot completely control the system elements. For example: weather is not under management control and individual decisions affect off-duty personnel much more than management policies.

- *Standards:* Doctrine statements, various criteria, policy, and AVN Policy Directives.
- *Procedures:* Checklists, work cards, T.O.'s, multi-command manuals, etc.
- *Controls:* Crew rest, altitude/airspeed/speed limits, restrictions, training rules/limitations, rules of engagement (ROE), lawful orders.

Mission: The desired outcome.

- *Objectives:* Complexity understood, well defined, obtainable.
- The results of the interactions of the 4-M's (Man, Media, Machine, and Management).

APPENDIX 11
MANAGEMENT FOLLOW-UP REPORT OF UNSAFE CONDITION

(Submit to the Division OSH Representative & affected employee(s) within 15 days of survey)

Date Received by Management	
Risk Assessment Value	
Survey Date	
Corrective Action Administered & Date	

APPENDIX 12
CHECKLIST OF INFORMATION TO BE INCLUDED IN THE ACCIDENT INVESTIGATION REPORT

When preparing the narrative investigation report of the accident/incident, the following should be considered for inclusion:

_____ Region, Organizational Routing Symbol
_____ Unit Name
_____ Location of Accident/Incident
_____ Date and Time of Accident/Incident
_____ Name of Individual(s) Involved in Accident/Incident
_____ SSN, Age, Sex
_____ Grade and Job Title
_____ Task assigned during incident (if applicable)
_____ Total experience in the field
_____ Experience in this area
_____ Nature of Injury/Illness
_____ Part of body affected
_____ Severity
_____ Narrative of events, including cause. Also include or consider:
_____ Facility Type
_____ Equipment Involved
_____ Contaminants (if applicable)
_____ Weather (if applicable)
_____ Phase of Operation
_____ Seat belt used? (If applicable)
_____ Was personal protective equipment used? (if applicable)
_____ Was fatigue a factor?
_____ Were drugs or alcohol involved?
_____ Any other human behavior factors involved?
_____ Number of personnel exposed (if applicable)
_____ Did injured party attend safety training? If so, when?
_____ Name of individual operating equipment/vehicle other than injured party
_____ Operator's total experience
_____ Operator's total experience with type of equipment/vehicle
_____ Actual Days Off
_____ Actual Days Restricted
_____ Were Forms CA-1, CA-2, and CA-6 completed and processed?
_____ Personnel costs
_____ Government property involved (ID/serial number) and estimated damages
_____ Additional property involved (ID/serial number) and estimated damages
_____ Liability Claimed
_____ Operational days lost
_____ Corrective Action Taken or Planned
_____ Name and Title of individual preparing the report
_____ Report Date