

Ames Laboratory Fire Safety Baseline 2009

This plan depicts the existing conditions at the Ames Laboratory and describes the fire safety programs utilized to ensure an appropriate level of protection for the facility.

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1.0 REVISION/REVIEW LOG

This document will be reviewed every five years as a minimum.

| Revision Number | Effective Date | Contact Person | Pages Affected | Description of Revision |
|-----------------|----------------|----------------|----------------|-------------------------|
| 0 | 06-01-09 | G. Jones | All | Original document |

2.0 PURPOSE AND SCOPE

In 1992, the Department of Energy launched a review process of Ames Laboratory by a review team called the Tiger Team. One aspect of that team was fire safety. One finding was the need for a fire hazards assessment to evaluate the fire safety standing of the Laboratory, and the Laboratory contracted with the Systems Research and Applications Corporation (SRA) to conduct that review. It was completed in 1992, and updated in 1994 by Science Applications International Corporation (SAIC), and again in 1999, by Excalibur Associates, Incorporated (under contract with ORAU).

In following years, the Manager of Facilities Services has sought input annually from Ames Laboratory entities, including Environment, Safety, Health and Assurance (ESH&A), to measure changes to Laboratory processes against the results of these reviews. In particular, changes in chemical volumes/types, process changes (new experiments or retired processes) and building changes are evaluated against the earlier documents, and used to evaluate Laboratory compliance for emergency management issues.

During 2008, a Topical Appraisal was conducted of Laboratory compliance with the requirements of NFPA 801, *Standard for Fire Protection in Facilities Handling Radioactive Materials*. One opportunity for improvement was identified during the Appraisal, which reads,

“While sufficient for this Topical Appraisal, the Fire Hazards Assessment should be re-written. The base document was created in 1992, re-worked in 1994 and 1999, and has been annually updated since to maintain some currency, but sixteen years have passed: the base document should be re-written to reflect current conditions. This has been identified as a Level 3 Finding.”

This document is designed to provide an updated Fire Safety Baseline for Ames Laboratory, and to establish a process for periodic review and update, as well.

3.0 Facility Attributes

3.1 Facility Description and Mission

The Ames Laboratory is a government-owned, contractor-operated national laboratory of the United States Department of Energy’s Office of Science. Iowa State University is the contractor and the Laboratory is physically located on the University campus. The majority of the Laboratory's principal investigators hold joint appointments at ISU as faculty members in departments that correspond with

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their scientific disciplines. Furthermore, a major contribution to the Laboratory's technical effort is made by the approximately 200 Iowa State University graduate students who work at the Laboratory at any given time. The Ames Laboratory conducts no classified research, there is no classified information on the site, and no classified information will be received on site.

Ames Laboratory operates in government-owned buildings that are located on approximately 10 acres of University land that has been leased to the Federal government on a long-term (99 year) basis. The Laboratory occupies approximately 325,000 gross square feet (gsf) in government-owned buildings. Over 70% of this space is contained in 3 major research-use buildings built between 1949 and 1960. An office-use building (less than 15% of total) was built in 1994 which consolidated most administrative and support functions in one location for improved efficiency, allowing space in other buildings to be redirected to research activities. The balance of the space is contained in several small auxiliary buildings constructed primarily during the 1960's. These buildings provide space for support functions such as storage, records handling and storage, material receiving areas, warehouse functions and shop facilities. The Laboratory is integrated into the ISU campus in such a way that ISU provides and maintains the site-wide infrastructure (e.g. heating plant, chilling plant, roads, etc.). In addition to space in the Federally-owned buildings, the Laboratory also utilizes space in University-owned buildings adjacent to the main site for research activities.

Fire protection responsibilities have been given to the Fire Safety Committee (FSC), a sub-committee of the Safety Review Committee (SRC). The FSC reports to the SRC, which reports to the Ames Laboratory Director. FSC membership has been limited to three voting members; the Chair is appointed by Environment, Safety, Health and Assurance, with the Manager of Facilities Services and the Manager of Engineering Services serving as well. A fourth Attending Member has been designated, with voting rights in the absence of a full member. This provides representation from the engineering disciplines, and ESH&A.

Topical Appraisals are conducted by Subject Matter Experts (SMEs) from ESH&A as part of the Ames Laboratory Oversight and Assurance Program (Plan 10200.034). The list of fire protection-related Appraisals completed to-date includes:

- Hotwork Procedures (2002, 2005, 2007)
- NFPA 704 postings (2003)
- NFPA 10 (fire extinguishers) (2004)
- Fire prevention practices (2006)
- NFPA 601 (integration of fire and security in Plant Protection Section) (2007)
- NFPA 232 (records) (2008)
- NFPA 801 (rad. materials protection) (2008)

3.2 General Facility Description

Construction

In general, the Ames Laboratory buildings are considered to be Type I construction, defined by NFPA 220, *Types of Building Construction* (2009), defined as-

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“**4.3.1 Type I and Type II Construction.** Type I (442 or 332) and Type II (222, 111, or 000) construction shall be those types in which the fire walls, structural elements, walls, arches, floors, and roofs are of approved noncombustible or limited-combustible materials. [5000:7.2.3.1]”.

Underground Passages

The Development Building and Wilhelm Hall are connected to Spedding Hall by underground passageways, one under Pammel Drive, the other under the parking lot separating Spedding and Wilhelm Halls. TASF sits between Spedding Hall and Iowa State University’s Gilman Hall, and these three buildings are connected by adjoining doors on four floors, Ground through Third.

Hotwork Permits

Hotwork permits are described in the Ames Laboratory Safety Manual. Permitting at Ames Laboratory is usually performed by Facilities Services staff, in the completion of repair and remodeling efforts. Permits are approved by individuals in Facilities Services, Engineering Services and ESH&A who have been trained in hazards recognition and are familiar with the typical hazards and procedures involved. Permits are presented to Plant Protection Section, who can bypass the appropriate fire annunciation for the building involved with the permit. The individual requesting the bypass must remain in the building until the bypass is cancelled, typically by the requestor. This practice is in-place to prevent false fire evacuations by occupants. Procedures for bypass are maintained in Plant Protection Section.

Unwanted and Waste Chemicals

Unwanted chemicals are collected weekly and transferred to B55 Spedding Hall, where organic solvents are bulked into 55-gallon drums and stored in rated flammable liquid storage cabinets. All unwanted chemicals are processed out by a chemical waste contractor every 180 days. B55 Spedding has a smoke detector installed, and is sprinkled. The door is locked at all hours, with the door monitored afterhours.

Radioactive Materials

The majority of the radioactive materials on the Ames Laboratory inventory are stored in locked, shielded chambers in B53 Spedding Hall. The room itself is locked and monitored 24/7, and only three people have access keys issued to them for this area. The majority of the material is in solid form and is not considered to have a specific fire risk, however some samples could be defined as finely divided powder; the largest is 25 grams, the rest are in individual gram quantities.

Fire Inspections

Fire inspections of the site are conducted daily by the PPS officers during their tours of the facility, during the Program/Department and Independent Walk-Throughs of the facility conducted annually, and during the Readiness Review process for activities, conducted every five years. Each process has documented provisions for remedial actions to correct conditions that might increase fire risk.

System Impairments

Procedures for sprinkler system impairments reside in Plant Protection Section, and address the need for posted signage and notification of interested parties, both prior to the impairment and after return-to-service.

All valves for the sprinkler systems are electronically monitored via the Simplex central station by Plant Protection Section, or (as is the case of the Post Indicator Valves) are padlocked and inspected weekly by PPS.

Central Station Monitoring

Plant Protection Section is a six-person, uniformed, unarmed force divided into three shifts of two people each. Shifts are based on straight eight work hours, with the on-coming officer(s) relieving the off-going officer(s) to maintain continuity. On-shift assignments are staggered to allow alternate week-ends off, with two-officer days typically occurring on week days. Primary responsibilities include attending to the central station to observe and respond to fire and security alarms, and touring the facility to observe and report conditions. Additional responsibilities involve reacting to alarms or observations as the site's temporary Emergency Coordinator until appointed personnel can respond to the scene.

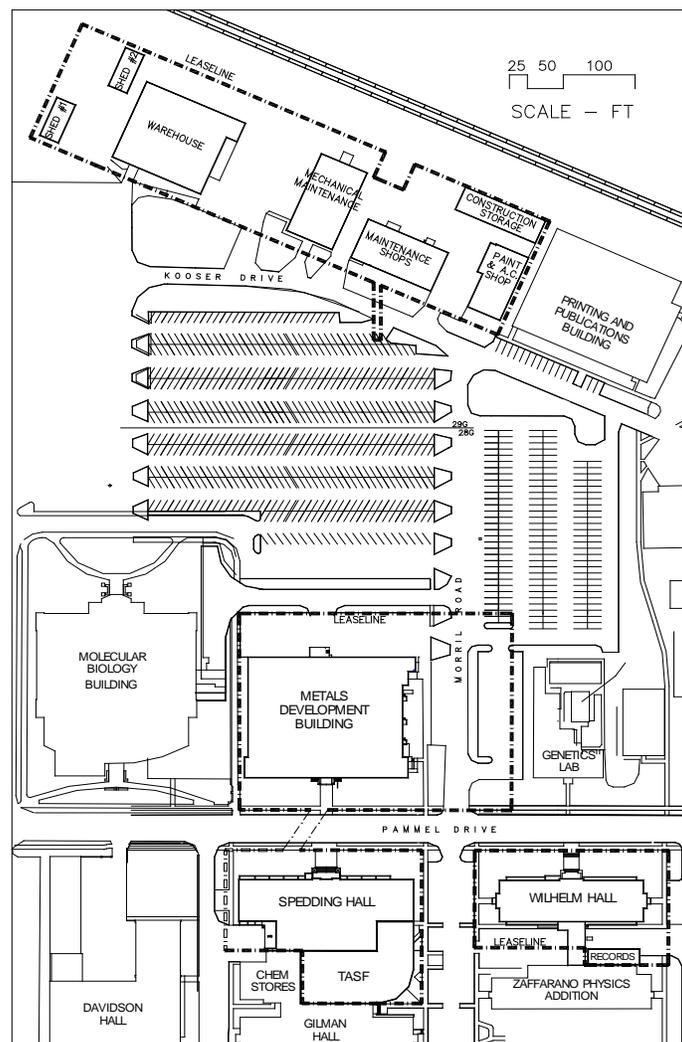


Figure 1

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3.3 Building Specifics

3.3.1 Spedding Hall

Built in 1953, Spedding Hall is a six-story laboratory facility with a small penthouse (containing two offices, and a utility bay as the sixth floor). The building is 244' long, 103' wide, and 55' high, with two stories built below ground level. With an area of 107,630 gsf, Spedding Hall houses ~160 laboratories and associated office space. The building is considered a Type I non-combustible structure, with reinforced concrete beams and a brick exterior, and masonry or sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$21,145,600. See Figure 1.

Spedding Hall was retrofitted with a wet pipe sprinkler system in 1994, in response to a fire safety concern raised by the Tiger Team. The facility has two Class I standpipe connections on all floors but the penthouse, which has one connection. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

Spedding Hall is provided with a Simplex automatic smoke detection system in hallways and selected rooms, with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a separate node, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by the officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

ABC dry chemical fire extinguishers are placed throughout the building, at distances established by NFPA 10, *Standard for Portable Fire Extinguishers*. The fire extinguisher program is administered by Plant Protection Section, with internal inspections and hydrostatic testing conducted by a fire extinguisher sub-contractor.

Maximum Credible Fire Loss (MCFL) in Spedding Hall would likely involve room 324 SPH, which contains a photoelectron spectrometer and related research equipment. The equipment would be damaged beyond repair, though the sprinkler system would bring the fire under control before it spread to adjacent areas. Estimated loss would be \$1,000,000.

Maximum Possible Fire Loss (MPFL) would likely result if a fire were to damage the entire third floor of Spedding Hall, or 1/5th the floor space; \$4,220,000 structural damage and >\$1,000,000 in equipment and materials losses. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.2 Wilhelm Hall

Built in 1949, Wilhelm Hall is a four-story laboratory facility with a small penthouse (containing a computer bay and a utility bay). The building is 200' long, 60' wide, and 52' high, with one story below ground level, and a sub-basement below that, housing utilities. With an area of 56,541 gsf, Wilhelm Hall houses ~120 laboratories and associated office space. The building is considered a Type I non-combustible structure, with reinforced concrete beams and a brick exterior, and masonry or

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sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$12,556,800. See Figure 1.

Wilhelm Hall was also retrofitted with a wet pipe sprinkler system in 1994, in response to a fire safety concern raised by the Tiger Team. A single Class I standpipe connection is on each floor in the center stairwell, except the sub-basement. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

Wilhelm Hall has a Simplex automatic smoke detection system in hallways and selected rooms, with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a separate node, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

ABC dry chemical fire extinguishers are placed throughout the building, at distances established by NFPA 10, *Standard for Portable Fire Extinguishers*. The fire extinguisher program is administered by Plant Protection Section, with internal inspections and hydrostatic testing conducted by a fire extinguisher sub-contractor.

MCFL in Wilhelm Hall would likely involve room 13-25 HWH, which contains computer cluster arrays and related equipment. The equipment would be damaged beyond repair, though the sprinkler system would bring the fire under control before it spread to adjacent areas. Estimated loss would be \$2,500,000.

Maximum Possible Fire Loss (MPFL) would likely result if a fire were to damage the entire second floor of Wilhelm Hall or 1/4th the floor space; \$3,140,000 structural damage and \$4,400,000 in equipment and materials losses. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.3 Metals Development Building

The Metals Development Building is a two-story structure built in 1961. A small basement area houses utility equipment. The building is 230' long, 175' wide, and 26' high. With an area of 69,663 gsf, Metals Development houses ~80 laboratories and associated office space, as well as the offices and shops for Engineering Services, and the offices for Facilities Services. The building is considered a Type I non-combustible structure, with reinforced concrete beams and a brick exterior, with masonry or sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$17,187,600. See Figure 1.

Metals Development was retrofitted with a wet pipe sprinkler system in 1994, in response to a fire safety concern raised by the Tiger Team. One Class I standpipe connection is on first floor in the main lobby, and one is on second floor immediately above, but none is in the basement area. Maintenance,

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testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

Metals Development is provided with a Simplex automatic smoke detection system in hallways and selected rooms, with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a separate node, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

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MCFL in Metals Development would likely involve 135 DEV, which contains a series of metal processing equipment, such as hydraulic presses, tensile testing equipment, swaging and drawing machines. The equipment would be damaged beyond repair, though the sprinkler system would bring the fire under control before it spread to adjacent areas. Estimated loss would be \$1,000,000.

MPFL would likely result if a fire were to damage a portion of the first floor of Metals Development, or 1/6th the floor space; \$2,860,000 structural damage and \$1,000,000 in equipment and materials losses. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.4 Technical and Administrative Service Facility (TASF)

Built in 1994, TASF is a four-story office building, with a basement containing utility equipment. The building is 160' long, 78' wide, and 55' high, and connects directly to Spedding Hall and ISU's Gilman Hall on four floors. With an area of 46,991 gsf, TASF houses the administrative offices, the Occupational Medicine department, and the Environment, Safety, Health and Assurance department. The building is considered a Type I non-combustible structure, with reinforced concrete beams and a poured concrete exterior, and sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$5,660,800. See Figure 1.

TASF was constructed with a wet pipe sprinkler system in 1994. There are two Class I fire department connections on each floor in the stairwells but the basement, which has one. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

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TASF is provided with a Simplex automatic smoke detection system in hallways and selected rooms, with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a separate node, which also reports to the central node located in TASF. The central node is located in G35 TASF, with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by the officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

ABC dry chemical fire extinguishers are placed throughout the building, at distances established by NFPA 10, *Standard for Portable Fire Extinguishers*. The fire extinguisher program is administered by Plant Protection Section, with internal inspections and hydrostatic testing conducted by a fire extinguisher sub-contractor.

MCFL in TASF would likely involve 336 TASF, which contains the administrative computer system. The equipment would be damaged beyond repair, though the sprinkler system would bring the fire under control before it spread to adjacent areas. Estimated loss would be \$380,000.

MPFL would likely result if a fire were to damage the third floor of TASF or 1/4th the floor space; \$1,410,000 structural damage and \$1,000,000 in equipment and materials losses. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.5 Records Storage Facility

Built in 1948 as a vehicle garage, the Records Storage Facility (RSF) is a one-story structure. The building is 72' long, 23' wide, and 12' high. With an area of 1,689 gsf, RSF houses some of the stored documents and records of the Ames laboratory, and a small office area. The building is considered a Type I non-combustible structure, with exposed steel beams and a brick exterior, and sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$271,000. See Figure 1.

RSF was also retrofitted with a wet pipe sprinkler system in 1994, in response to a fire safety concern raised by the Tiger Team. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

RSF also has a Simplex automatic smoke detection system in hallways and selected rooms, with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by the Wilhelm Hall node, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by the officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

ABC dry chemical fire extinguishers are placed throughout the building, at distances established by NFPA 10, *Standard for Portable Fire Extinguishers*. The fire extinguisher program is administered by

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Plant Protection Section, with internal inspections and hydrostatic testing conducted by a fire extinguisher sub-contractor.

MCFL in Records Storage would likely involve 1/10th of the structure, and the boxed records that would be involved. Though the sprinkler system would bring the fire under control before it spread to adjacent areas, estimated loss would be \$27,000.

MPFL would likely result in loss of the entire structure and all associated boxed records. This would result in losses of \$270,000 for the building. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.6 Campus Warehouse

Built in 1966, the Campus Warehouse (CWH) is a one-story building, used to ship, receive and store equipment and materials for Ames Laboratory. The building is 134' long, 120' wide, and 15' high, with an area of 16,506 gsf. The building is considered a Type I non-combustible structure, with exposed steel beams and a brick exterior, and masonry or sheetrock interior walls. Replacement value is estimated by Facilities Services as being \$1,148,300. See Figure 1.

The CWH was built with a wet pipe sprinkler system. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

The CWH also has a Simplex automatic smoke detection system with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a node for the buildings at the north end of site, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by the officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

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MCFL in the Campus Warehouse would likely involve the area where new equipment/materials are received and staged prior to delivery. Assuming the receipt of ten new desktop units prior to the fire, the estimated loss would be \$45,000.

MPFL for the Campus Warehouse would result from a fire/explosion of flammable gases in the storage area external to the northeast corner of the structure. The rolling fire door at the halfway point in the building would reduce the damage to the east portion, and only one-half of the structure would be a

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total loss. \$575,000 structural damage and \$1,000,000 in equipment and materials losses are estimated. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.7 Mechanical Maintenance Building

The Mechanical Maintenance Building (MMB) is also known as the Garage, and was built in 1964. It is a one-story building, used to store vehicles and construction materials and supplies. The building also houses the Radioactive Waste Disposal Facility, a room used to process radioactive waste into shipping containers. The building is 123' long, 69' wide, and 15' high, with an area of 18,540 gsf. The building is considered a Type I non-combustible structure, with exposed steel beams and a brick exterior, and masonry interior walls. Replacement value is estimated by Facilities Services as being \$700,600. See Figure 1.

The MMB was built with a wet pipe sprinkler system. Maintenance, testing and inspection of the sprinkler system is conducted by the Facilities Services Group of Ames Laboratory, in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

The MMB also has a Simplex automatic smoke detection system with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a node for the buildings at the north end of site, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by the officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

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MCFL in the Mechanical Maintenance Building would likely involve a vehicle parked in the structure. The equipment would be damaged beyond repair, though the sprinkler system would bring the fire under control before it spread to adjacent areas. Estimated loss would be \$60,000.

MPFL would likely result in the loss of the entire structure, or \$700,000 structural damage and \$150,000 in equipment and materials losses. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.8 Maintenance Shop Building

The Maintenance Shop Building (MSB) was built in 1967. It is a one-story building, used as a shop area for plumbing, carpentry, electrical, HVAC and sheet metal projects, and to store materials and supplies. The building is 122' long, 61' wide, and 15' high, with an area of 7,503 gsf. The building is considered a Type I non-combustible structure, with exposed steel beams and a brick exterior, and masonry interior walls. Replacement value is estimated by Facilities Services as being \$1,445,700.

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The MSB is not sprinklered. See Figure 1.

The MSB also has a Simplex automatic smoke detection system with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a node for the buildings at the north end of site, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

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MCFL and MPFL for the Maintenance Shop Building are identical, as the structure is not sprinklered; a fire door between the sheet metal shop and the rest of the building would limit the loss to the east end, causing \$964,000 loss. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.9 Paint and Air Conditioning Shop

The Paint and Air Conditioning Shop, (PAC) was built in 1967. It is a one-story building, used as a shop area for HVAC and painting projects, and to store materials and supplies. The building is 101' long, 50' wide, and 15' high, with an area of 4,998 gsf. The building is considered a Type I non-combustible structure, with exposed steel beams and a brick exterior, and masonry interior walls. Replacement value is estimated by Facilities Services as being \$1,002,300. See Figure 1.

The PAC is sprinklered in the paint side of the building, but not the HVAC portion.

The PAC also has a Simplex automatic smoke detection system with klaxons and strobes located throughout the structure. Manual pull stations are located throughout the building, primarily at or near exits. The building is served by a node for the buildings at the north end of site, which also reports to a central node located in the Technical and Administrative Services Facility (TASF). This is located in a center with 24/7 occupancy by Plant Protection Section, who also conduct watch tours through the facility in accordance with NFPA 601, *Standard for Security Services in Fire Loss Prevention*. Alarms are received by officers of Plant Protection Section, who notify the University Police dispatch, who notify the off-site fire service agency, the City of Ames Fire Department.

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MCFL in the Paint and Air Conditioning Shop would likely involve the paint storage room, with the fire contained to this one room. Loss can be estimated as one-fourth the value of the contents, or \$5,000.

MPFL would also include the paint storage room, and involve the south end of the building. Due to the concrete construction and sprinkler system, it is expected that the loss would involve the total volume of stored paint/product only, or \$20,000. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

3.3.10 Storage Sheds

The Ames Laboratory has three metal storage buildings, the largest of which is 4,440 gsf. The buildings are not heated, and are used for storing equipment and supplies, including office and laboratory fixtures and furnishings. All three are not sprinklered. Each building has heat detectors, which report to the area node and central node. Replacement value is estimated by Facilities Services as being \$213,900, for all three structures. See Figure 1.

ABC dry chemical fire extinguishers are placed throughout the buildings, at distances established by NFPA 10, *Standard for Portable Fire Extinguishers*. The fire extinguisher program is administered by Plant Protection Section, with internal inspections and hydrostatic testing conducted by a fire extinguisher sub-contractor.

An event would involve one shed, not all three, due to the physical separation of the structures. For the purpose of this estimation, the largest shed is considered; as an unprotected building, the MCFL and MPFL would be the same, the complete loss of the structure, or \$131,000. Costs associated with clean-up, reconstruction and replacement are not included in this estimate.

4.0 Fire Service Information

The Ames Fire Department is a professional fire department, with three stations distributed around the community. The nearest station is ~0.57 miles south of the Ames Laboratory complex, with the second-nearest station located ~1.39 miles east-northeast. The AFD is equipped with three Engines, one Ladder, two medium Rescues, one Rescue, one Hazardous Materials Response Vehicle, and a Command Vehicle.

The Ames Fire Department consists of fifty-two uniformed personnel; one Chief Officer, two Deputy Chiefs, three Captains, nine Lieutenants, thirty-six Fire Fighters and one Fire Inspector. The Ames Fire Department has been expanding its' duties over the years due to the changing needs of the Ames community. The majority of the department has been licensed as First Responders due to the increase in medical calls to which they respond. Auto Extrication is another area of extensive training. The department also has a Hazardous Materials Support Unit, and all A.F.D. personnel are registered as HAZ-MAT Technicians. In addition to these areas of specialization, the department is trained in high angle rope rescue, confined space rescue, ice rescue and trench rescue.

Ames Laboratory invites the Ames Fire Department to tour the facility annually, to allow new officers to gain a pre-incident view of the facility, and to refresh experienced officers with the layout.

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The Department has also participated in table-top exercises conducted by the Laboratory's Emergency Preparedness Committee, contributing to the awareness of off-site response to local events.