

**REVIEW OF SELECTED FIRE PROTECTION SYSTEMS
AT
THE US EMBASSY IN IRAQ
(DRAFT)**

KITCHEN SUPPRESSION SYSTEMS

Prepared For:

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January 21, 2008

1.0 INTRODUCTION

The new US Embassy Compound in Baghdad, Iraq contains twenty six buildings including seven residential buildings (~680 units), five office buildings, two warehouses, a gym, a pool, a commissary, a power generation building, a water-treatment plant, VIP residences, and security buildings.

Hughes Associates, Inc. (HAI) was requested by First Kuwaiti Trading and Contracting Co. (FKTC) to provide 3rd party acceptance evaluation of selective fire alarm and suppression systems within the US Embassy compound in Iraq for compliance with applicable project specifications and codes. The reviews were limited to the following buildings:

Chief Mission Residence*	Recreation Facilities*
New Office Annex*	Water Treatment Plant
Deputy Chief Mission Residence*	New Office Building
Utility Building	Apartment A1 (SDA1)
GSO Annex	Apartment A2 (SDA2)
MSGQ*	Apartment A3 (SDA3)
Interim Office Building	Apartment A4 (SDA4)
Warehouse	Apartment A5 (SDA5)
Motor Pool (GMP)	Apartment A6 (SDA6)

* Contain kitchens

2.0 APPLICABLE CODES, STANDARDS, & SPECS

The following codes and standards are applicable to the project as defined by HAI's scope of work.

2.1 Applicable Project Specifications (13 May, 2005):

- SECTION 13921 - FIRE PUMP ASSEMBLIES
- SECTION 02510 - WATER DISTRIBUTION
- SECTION 13851 - FIRE ALARM SYSTEMS
- SECTION 13916 - FIRE SPRINKLER SYSTEMS

2.2 NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances (2002 ed.)

2.3 NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection (2003 ed.)

2.4 NFPA 13, Standard for the Installation of Sprinkler Systems (2002 ed.)

2.5 NFPA 72, National Fire Alarm Code (2002 ed.)

- 2.6 NFPA 17A, Standard for Wet Chemical Extinguishing Systems (2002 ed.)
- 2.7 NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations (2004 ed.)

3.0 SCOPE OF SERVICES

The fire alarm and suppression system review is intended to determine if the system documentation and installation complies with the mandated codes/standards and contract specifications. The review is also intended to determine if the systems are ready for final turnover to the State Department.

HAI's review was strictly limited to the following systems:

- Underground Fire Water Supply System
- Sprinkler Systems.
- Notifier Fire Alarm Systems.
- Kitchen Suppression systems (Equipment, Hoods, Ducts, & Ansul Chemical Extinguishment).

HAI's review did not examine other life safety or fire protection related systems including:

- Egress components as described in chapter 7 of the Life Safety Code, NFPA 101.
- Stairwell pressurization.
- Atrium Smoke Control.
- Fire Barriers installation evaluation.
- Emergency Preparedness/Response.

HAI performed onsite evaluation of the fire protection systems during the period of 11/17 through 12/17/2007. Full access to all documentation, personnel, and facility locations (with the exception of secured portions of NOB building) was provided to HAI personnel during the conduct of this evaluation. At the time of the surveys, the systems installation had been mostly completed. In most cases, ceilings had been already installed and visual access to system components was conducted using ladders and removing portions of the ceiling panels. HAI's review was not intended to serve as a quality-assurance or quality-control (QA/QC) review, which is typically required during the system installation.

This report only addresses the Kitchen Suppression Systems. Reports for other systems are provided separately.

4.0 KITCHEN SUPPRESSION SYSTEMS REVIEW

HAI evaluated the kitchen suppression systems within the REC, NOX, MSGQ, CMR, & DCMR. The evaluation incorporated the kitchen hood, associated exhaust ductwork, and the Ansul kitchen fire suppression systems.

Overall, the kitchen suppression systems were not ready for final inspection at the time of HAI's site visit. HAI provided a code compliance evaluation and a checklist to allow FKTC to perform a self-audit prior to final inspection. At the time of HAI's departure from the site, FKTC was in the process of addressing applicable concerns. Progress of compliance with applicable NFPA 96 requirements varied amongst the different kitchens, and included the following issues:

1. Data sheets for all cooking appliances were not provided for all equipment to ensure compliance with applicable code requirements (e.g., info for deep fat fryer high limit switch 475°F).
2. Ansul Systems not ready for testing.
3. Hoods are not installed per NFPA 96 §5.1
 - Documentation showing hood material is at least 20-gauge stainless steel.
 - Hood seams do not have a liquid tight continuous weld.
 - Penetrations in hoods are not sealed by devices that do not detract from the hoods or ducts structural integrity.
4. Lack of testing and balancing (TAB) documentation showing that exhaust air volumes for hoods meet the design to provide for capture and removal of grease-laden cooking vapors.
5. Exhaust fans installed within 10 feet of make-up/supply fans.
6. Kitchen exhaust ductwork not installed per NFPA 96, Chapter 7
 - Several Ducts are constructed of at least 16-gauge carbon steel or 18-gauge stainless steel.
 - Duct to duct connections are typically butt-welded and do not comply with NFPA 96 – flange edge weld; flange filled weld; telescoping joint; or bell-type joint.
 - A UL listed design for the fire rating of the duct wrapping has not been provided.
7. Duct access for cleaning and inspection does not meet NFPA 96, §4.1.8, Chapter 7, and Chapter 8
 - Openings for cleaning are not provided on each floor level of vertical stack.
 - Openings for cleaning are not provided at all changes of direction and at 12 ft intervals.
 - Access panels are sometimes obstructed and are not properly labeled.
 - Access panels do not have a gasket or sealant that is rated for 1500 °F and are not grease tight.

4.1 Conclusion

HAI evaluated the kitchen suppression systems within the US embassy compound in Iraq during the period of 11/29–12/15/2007. The evaluation incorporated the kitchen hood, associated exhaust ductwork, and the Ansul kitchen fire suppression systems. Overall, the kitchen suppression systems were not ready for final inspection at the time of HAI's site visit. HAI provided a code compliance evaluation and a checklist to allow FKTC to perform a self-audit prior to final inspection. At the time of HAI's departure from the site, FKTC was in the process of addressing applicable concerns.

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