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TECHNICAL REPORT
TR-2346-ENV

NOFOAM SYSTEM TECHNOLOGY FOR AIRCRAFT HANGAR FIRE SUPPRESSION FOAM SYSTEM – FINAL REPORT

By
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July 2011

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14. ABSTRACT

Currently, Department of Defense (DoD) policy requires periodic aircraft hangar fire suppression foam system nozzle discharge checks ensuring that the fire suppression foam delivery system remains ready to go when the times arises. However, these foam system discharge checks generate significant amount of foam laden wastewater. Despite its wide use and effectiveness, aqueous film forming foam (AFFF) poses an environmental concern and raises questions about its long-term continued use. The environmental concerns are fish toxicity, biodegradability, treatability in wastewater treatment plants, and nutrient loading when foam laden wastewater reaches natural or domestic water systems. Also, the United States Environmental Protection Agency (USEPA) has highlighted a potential problem by placing glycol ether and ethylene glycol (common solvent constituents of AFFF) on the list of hazardous air pollutants under the 1990 Clean Air Act amendments.

Waste handling, collection, disposal, and waste management of the foam laden wastewater are burdensome and disposal is a liability. Due to environmental concerns, and prohibitive disposal and treatment costs of the foam laden wastewater, many facilities are not performing the required periodic aircraft hangar fire suppression foam system nozzle foam discharge checks. The failure to perform the required aircraft hangar fire suppression foam system checks is jeopardizing and, in some cases, reducing the ability of facilities to meet their mission requirements.

The NoFoam System technology provides DoD facilities a tool for eliminating foam laden wastewater from periodic aircraft hangar fire suppression foam system nozzle discharge checks, while verifying the fire suppression foam delivery system (theoretical water and surrogate flow).

15. SUBJECT TERMS

NoFoam; aqueous film forming foam (AFFF); AFFF wastewater; aircraft hangar; fire suppression foam system

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FINAL REPORT

NoFoam System Technology for Aircraft Hangar Fire Suppression Foam System

ESTCP Project WP 200525

Rance T. Kudo
Naval Facilities Engineering Command
Engineering Service Center

Version 1

July 2011

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ACRONYMS AND SYMBOLS

AFFF	Aqueous film forming foam
ARFF	Aircraft rescue and fire fighting
ANG	Air National Guard
BOD	Biological oxygen demand
COD	Chemical oxygen demand
CWA	Clean Water Act
DoD	Department of Defense
ESTCP	Environmental Security Technology Certification Program
gpm	Gallons per minute
IMSO	International Military Student Office
IWTP	Industrial Wastewater Treatment Plant
MCAF	Marine Corps Air Facility
MCB	Marine Corps Base
NAVFAC ESC	Naval Facilities Engineering Service Center
NFPA	National Fire Protection Association
NESDI	Naval Environmental Sustainability Development to Integration
NPDES	National Pollution Discharge Elimination System
ppm	Parts per million
USEPA	United States Environmental Protection Agency

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We wish to thank the Environmental Security Technology Certification Program (ESTCP) for funding and sponsoring this project under the Sustainable Infrastructure Facilities tasking.

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EXECUTIVE SUMMARY

BACKGROUND

The fire fighting agent aqueous film forming foam (AFFF), utilized in aircraft hangar fire suppression foam systems, is widespread and very effective. The ability of foam to rapidly extinguish flammable liquid spill fires has undoubtedly saved lives, reduced property loss, and helped minimize global pollution that can result from the uncontrolled burning of flammable fuels, solvents, and industrial liquids.

Currently, Department of Defense (DoD) policy requires periodic aircraft hangar fire suppression foam system nozzle discharge checks ensuring that the fire suppression foam delivery system remains ready to go when the time arises. However, these foam system discharge checks generate significant amount of foam laden wastewater. Despite its wide use and effectiveness, AFFF poses an environmental concern and raises questions about its long-term continued use. The environmental concerns are fish toxicity, biodegradability, treatability in wastewater treatment plants, and nutrient loading when foam laden wastewater reaches natural or domestic water systems. Also, the U.S. Environmental Protection Agency (USEPA) has highlighted a potential problem by placing glycol ether and ethylene glycol (common solvent constituents of AFFF) on the list of hazardous air pollutants under the 1990 Clean Air Act Amendments.

Waste handling, collection, disposal, and waste management of the foam laden wastewater are burdensome and disposal is a liability. Due to environmental concerns, and prohibitive disposal and treatment costs of the foam laden wastewater many facilities are not performing the required periodic aircraft hangar fire suppression foam system nozzle foam discharge checks; the failure to perform these required checks is jeopardizing and, in some cases, reducing the ability of facilities to meet their mission requirements.

The technology utilizes a surrogate fluid in lieu of the AFFF concentrate, non-intrusive flow meters (clamped onto the external piping system) measuring the fire suppression piping system and nozzle discharge flow, and the recorded flow data was compared to the theoretical piping and nozzle flow. A retrofit module design provided the isolation of the AFFF concentrate from flowing into the aircraft hangar fire suppression foam system and re-piped that portion of the piping into the AFFF concentrate piping.

The innovative technology demonstration and validation were accomplished at two DoD host facilities: Hangar 12 at Arizona Air National Guard, Tucson, Arizona, and Building 5069 Corrosion Control Hangar at Marine Corps Base Hawaii, Kaneohe, Hawaii. A disposal cost savings of $50,000 per aircraft hangar every two years was shown, which translate to over $25 million in saving every two years for DoD. Additionally over 4.6 million dollars will accrue in cost avoidance every two years because the facilities will not have to procure AFFF concentrate to replenish the fire suppression foam system nozzle discharge checks. The technology requires minimal training and use. It is applicable within the private sector and may be used as a highly reliable and viable diagnostic tool.

OBJECTIVE OF THE DEMONSTRATION

The performance objective of the project was to demonstrate and validate an innovated application of aircraft hangar fire suppression foam system nozzle discharge checks to reduce and or eliminate generated foam laden wastewater at DoD activities. More specifically it was shown that:

- the generated AFFF wastewater was eliminated during nozzle discharge checks
- operation was optimized to eliminate AFFF wastewater
- design, cost, and performance data was developed

The primary quantitative performance object which was met was to reduce and or eliminate the generated foam laden wastewater.

DEMONSTRATION RESULTS

The technology demonstration and validation were accomplished at two DoD host facilities: Hangar 12 at Arizona Air National Guard, Tucson, Arizona, and Building 5069 Corrosion Control Hangar at Marine Corps Base Hawaii, Kaneohe, Hawaii. The innovative technology eliminated the generated foam laden wastewater and required minimal training and use. It provided both DoD activities a tool for eliminating foam laden wastewater from periodic aircraft hangar fire suppression foam system nozzle discharge checks, while verifying the fire suppression foam delivery system. Also, the technology is applicable within the private sector and may be used as a highly reliable and viable diagnostic tool trouble shooting the fire suppression foam system.

IMPLEMENTATION ISSUES

The environmental impact issues and the technology addressed by the NoFoam System have been recognized and are addressed in NFPA 11, 2005 Edition, “Standard For Low-, Medium-, and High-Expansion Foam”, Annex F - *Foam Environmental Issues*, paragraph F.3.3 System Tests, outlining the methodology used by the NoFoam System technology and indicating, with the approval of the authority having jurisdiction, that the test method is valid.

1.0 INTRODUCTION

1.1 BACKGROUND

Aqueous film forming foam (AFFF) used in aircraft hangar fire suppression foam systems is widespread and very effective. The ability of foam to rapidly extinguish flammable liquid spill fires has undoubtedly saved lives, reduced property loss, and helped minimize global pollution that can result from the uncontrolled burning of flammable fuels, solvents, and industrial liquids.

Current Department of Defense (DoD) policy requires periodic aircraft hangar foam discharge checks to ensure that the fire suppression foam delivery systems remain functional [Reference 1]. Fire suppression foam system performance checks require the use of a firefighting agent that meets Military Specification MIL-F-24385 [Reference 2].

Significant amounts of AFFF wastewater is generated during periodic discharge checks which pose significant environmental concern. Resistance to biodegradation, toxicity constituents, high biological oxygen demand (BOD), high chemical oxygen demand (COD), and the extreme foaming associated with periodic discharge checks can be harmful to, or cause environmental damage. In addition, the extreme foaming characteristics make AFFF wastewater recovery and treatment difficult. In many regions the DoD is no longer allowed to discharge AFFF wastewater into industrial wastewater treatment plants (IWTP) due to plant fouling. Discharge restrictions and potential lawsuits against facilities that must dispose of AFFF wastewater result in additional costs associated with waste collection, handling, and disposal.

This project demonstrated and validated the effectiveness of the NoFoam System technology for existing aircraft hangar fire suppression foam systems. The NoFoam System eliminated foam laden wastewater and AFFF concentrate replenishment handling while providing a valid nozzle array discharge check that ensures proper system operation. The technology did not alter the function or capabilities of the fire suppression foam system. A retrofit module similar to one installed in the Aircraft Rescue and Fire Fighting (ARFF) vehicle NoFoam Unit that was demonstrated and validated under Environmental Security Technology Certification Program (ESTCP) project number PP-0026 [Reference 3, currently WP-200026] was provided.

During the demonstrations and validations the operators performed normal fire suppression foam system discharge check procedures; however, water will be used as a surrogate fluid in place of AFFF concentrate. Water was pumped into the fire suppression system and isolated from AFFF concentrate tank to prevent cross contamination. Flow and pressure sensors installed on the fire pump and AFFF pump inlet, outlet, and discharge piping. Sensor data were collected throughout the demonstration and validation by visually monitoring local flow meter, using a data logger, and downloading to a computer for data storage and analysis.

1.2 OBJECTIVES OF THE DEMONSTRATION

The objective of the project was to demonstrate and validate the effectiveness of the NoFoam System technology at two DoD host sites. Existing aircraft hangar fire suppression foam systems at each DoD aircraft hangar fire suppression foam system facilities were used as the demonstration platforms. The system was evaluated on aircraft hangars at U.S. Air Force and U.S. Marine Corps facilities. Successful demonstration will lead to DoD-wide implementation

of the NoFoam System and eliminate AFFF wastewater generated during periodic nozzle discharge checks of the fire suppression foam system, thereby alleviating the facilities cost associated with waste collection, handling, disposal, and AFFF concentrate replenishment.

1.3 REGULATORY DRIVERS

Government regulations concerning the quality of wastewater discharged from a facility exist at the federal, state, and local levels. Regulations have been developed and implemented under the Clean Water Act (CWA) and administered by the United States Environmental Protection Agency (USEPA) at the federal level. The CWA established the National Pollutant Discharge Elimination System (NPDES). As authorized by the CWA, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharge goes directly to surface waters. Under the CWA, DoD agencies must meet NPDES requirements. Wastewater discharge from military installations throughout the United States is typically regulated by local water treatment districts. AFFF is regulated due to its toxicity, ability to interfere with wastewater treatment plant operations, and its potential impact on surface waters. Each local district maintains its own contaminant limits based on regulations imposed for effluent release quality. For example, the Hampton Roads District in Norfolk, Virginia prohibits the discharge of AFFF wastewater into its plant unless the AFFF concentration is less than 50-parts per million (ppm). Although individual limits for sites will vary, there is overall need at most sites to minimize the contaminant concentrations released. The NoFoam System provides a means for reducing/eliminating levels of AFFF wastewater released.

2.0 TECHNOLOGY DESCRIPTION

2.1 TECHNOLOGY OVERVIEW

The current method for field testing on existing aircraft hangar fire suppression foam systems requires nozzle discharge with foam followed by the collection of foam samples in accordance with National Fire Protection Association (NFPA) 11 [Reference 4] and NFPA 412 [Reference 5]. Once the sample is collected, a hand held refractometer or conductivity meter is typically utilized to validate the foam quality. The procedure for validating foam quality requires the generation of large volumes of AFFF wastewater. Depending on fire suppression foam system capacity, a 10-minute foam discharge test followed by a 10-minute water flush will generate between 80,000 and 400,000 gallons of AFFF wastewater. The 10-minute foam discharge test followed by 10-minute water flush is a general guideline for new fire suppression foam systems and the time requirement is also applied for future nozzle discharge checks. In addition, the collection of foam samples and reading the refractometer (or conductivity meter) is difficult, cumbersome, and time consuming.

Current guidelines and policies [Reference 1] require that foam discharge checks are performed on all aircraft hangar fire suppression foam systems every two years or whenever the fire suppression foam system is repaired to ensure foam delivery systems remain functional. However, fire departments and local authorities frequently do not conduct foam discharge checks as often as required due to large disposal costs of the generated AFFF waste and local environmental concerns. DoD facilities risk system failures and compromise mission readiness when fire suppression foam systems are not checked with frequencies mandated by local current policies and established guidelines. Proper functioning of critical fire response systems cannot be ensured if periodic testing of system components is not performed.

The proposed innovative aircraft hangar fire suppression NoFoam System technology eliminates these problems while providing a valid nozzle array discharge check that ensures proper operation of the fire suppression foam system. The technology does not alter the function of the fire suppression system capabilities. It incorporates the ARFF vehicle NoFoam Unit technology illustrated in Figures 1 and 2. Figure 1 shows the NoFoam Unit for ARFF vehicle performing a typical roof and bumper turret dye-water discharge. Figure 2 is the NoFoam Unit diagram of a model P19 ARFF vehicle, whereby the mobile/stationary-mounted hardware consists of a control panel with monitor, flow sensor piping, and a 400 gallon storage tank as the AFFF concentrate surrogate. The flow sensor is a paddlewheel that measures the flow rate of the surrogate fluid as it flows from the 400 gallon storage tank to the ARFF vehicle foam distribution system. The flow sensor has no measurable head loss and is readily removable from the sensor piping system for inspection and cleaning. The surrogate fluid is either water or dye-water. The fire fighter simply drives the ARFF vehicle to the NoFoam Unit, trailer or stationary, and attaches a hose from the unit to the vehicle. The vehicle AFFF concentrate fluid tank is isolated during testing by closing the AFFF concentrate valve. Although the AFFF concentrate valve is closed, concentrated AFFF is present downstream of the valve and this fluid must be removed. The fluid is removed by opening the vehicle's foam distribution system drain valves and collecting the fluid into a polyethylene bottle. The captured AFFF concentrate fluid is either reused or recycled.

Figure 1. P19 NoFoam System Roof and Bumper Discharge.

The fire fighter then goes through the typical fire fighting discharge procedures. A sensor installed in the unit measures the flow of the surrogate fluid and the results are displayed on the rate meter in GPM. The fire fighter reads the rate meter and can quickly determine the vehicle's AFFF delivery system performance. The monitored flow represents the flow rate of the AFFF concentrate into the foam distribution system. Also, the fire fighter has the option to visualize a dye-water solution discharge, giving the fire fighter a higher confidence level of the vehicle's fire fighting performance. The dye concentrate is environmentally benign, biodegradable, and certified by the National Sanitation Foundation International. The NoFoam Unit is battery powered (12 volts) and recharged by a solar photo voltaic panel. The NoFoam System will accommodate 15 ARFF vehicles before refilling the 400 gallon tank and any model of ARFF vehicle with minimal vehicle airfield duty down time.

The NoFoam System technology is applicable not only within DoD but also within the private sector.

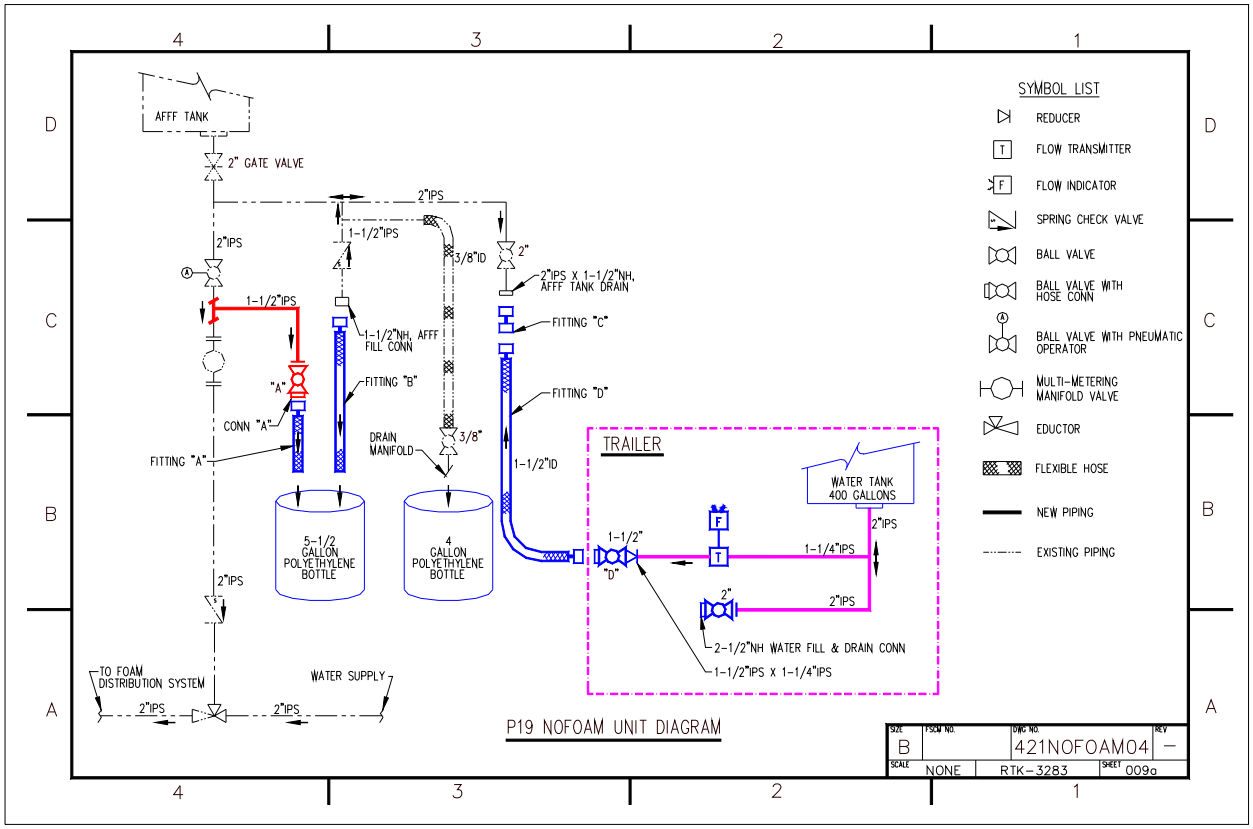

Figure 2. P19 NoFoam System Piping Diagram.

2.2 TECHNOLOGY DEVELOPMENT

No previous testing of the NoFoam System technology for aircraft hangar fire suppression foam system has been performed. However, the NoFoam technology described in this effort is an extension of a previous NoFoam Kit for ARFF vehicle that was designed, built, and tested by Naval Facilities Engineering Service Center (NAVFAC ESC) in 1996. Six naval facilities were host sites for the NoFoam Kit demonstrations. The demonstration results showed that the kit provided a method to reduce and/or eliminate AFFF waste generated during vehicle onboard foam distribution system nozzle discharge checks. The data collected from the demonstrations closely matched actual AFFF concentrate flows.

Also, the NoFoam Unit for ARFF vehicle demonstrated and validated under ESTCP project number WP-200026 [Reference 3] showed that a mobile or stationary platform with a retrofit module connection provided a method eliminating generated AFFF waste during vehicle onboard foam distribution system discharge checks. The data collected from the demonstration closely matched theoretical AFFF concentrate flows. Four DoD facilities were host sites for the demonstration of the NoFoam Unit technology. In addition to the 4 DoD facilities, 28 other facilities received the NoFoam System technologies.

2.3 ADVANTAGES AND LIMITATIONS OF THE TECHNOLOGY

NoFoam System technology advantages include:

- Eliminates generation of foam laden wastewater
- Eliminates foam laden wastewater management
- Allows facilities to comply with federal pollution and waste minimization regulations
- Effectively checks the fire suppression foam system
- Maintains facilities confidence level in mission readiness
- Minimal maintenance requirement
- Simple operation
- Reduced aircraft hangar down time from one or more days to within one-hour after discharge checks
- Highly applicable in the private sector

The NoFoam System technology limitation was the initial set-up time required on the existing aircraft hangar fire suppression foam system.

3.0 PERFORMANCE OBJECTIVES

New and existing aircraft hangar fire suppression foam system are similar in nozzle types, positions, risers, mixing valves, valves, gauges, pumps, etc., but are not similar in arrangement lay-out due to the capacity of the aircraft hangar fire suppression foam system. From hangar to hangar the fire suppression foam system fire pump capacity may vary anywhere from 600 to 5,000 gallons per minute (gpm). The foam systems are built and installed differently from hangar to hangar, but are similar in function: A water and foam source are supplied, combined at a specific point at a specific flow rate, and discharged through the various nozzles. It is similar to ARFF vehicles; however, ARFF vehicles have several manufacture and models with various fire pump capacities. The water and foam tanks are piped, arranged to combine at a specific point at a specific flow rate, and discharged through the various nozzles on the ARFF vehicle. The NoFoam System for ARFF vehicle [Reference 1] designed a universal connection between the vehicle and the NoFoam System trailer. Similarly, with the aircraft hangar a retrofit module was provided for existing aircraft hangar fire suppression foam system. No impact is anticipated with the NoFoam System technology on non-traditional aircraft materials in use today or in the foreseeable future.

Performance objectives were included in Table 1. These objectives gauged whether project objectives (Section 1.2) were met. Methods for measuring parameters that were keyed to evaluating whether the NoFoam System goals were met are included in Table 3. Project costs and cost comparisons with current practices are discussed in Section 7.0.

Table 1. Performance Objectives.

Performance Objective	Metric	Data Requirements	Success Criteria	Results
Quantitative Performance Objectives				
Reduce/eliminate emissions	AFFF waste	Visual effluent discharge data for AFFF wastewater	No AFFF wastewater	No AFFF wastewater nozzle released
Feed stream flow	Surrogate flow and nozzle flows	Pump, surrogate, and nozzles flow data	Flow Mach Table 3	Collected flow data follows Table 3, + 5% - 5% of flow
Qualitative Performance Objectives				
Ease of use	Ability of a technician-level individual to use the technology	Feedback from the technician on usability of the technology and time required to use	A single field technician able to effectively take measurements with minimal training	Minimal operator training required

Table 2. Discharge Log.

HANGAR: _____ sheet no.: _____

date: _____ AFFF: _____

by: _____ **DISCHARGE TABLE**

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	WATER DISCHARGE TIME (SEC)			COMMENTS / PROBLEMS
Pump:					water press = _____psi
AFFF:					AFFF press = _____psi
Nozzles:					
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					

3.1 REDUCE EMISSIONS

The performance objective was to reduce and or eliminate foam emissions during the periodic nozzle discharge checks using water as the surrogate fluid in lieu of AFFF concentrate. Since Arizona Air National Guard and Marine Corps Base Hawaii fire suppression foam system pump capacities and piping layout are different, two retrofit modules were designed and installed. Appendix C shows the retrofit module design for both NoFoam System technology host sites. Similar to the NoFoam System for ARFF vehicles [Reference 1], the AFFF concentrate was isolated during the demonstration and surrogate fluid was introduced.

3.2 FEED STREAM FLOW

The performance object was to simulate nozzle discharge flow utilizing water as the surrogate fluid for AFFF concentrate. The aircraft hangar fire suppression foam system theoretical AFFF concentrate flow rates, Table 3, were the established baseline for comparison. Table 3 theoretical flow rates were derived from Military Specification MIL-F-24385 [Reference 2]. Section 1.2 of the specification identifies two types of AFFF concentrates and is as follows:

- Type 3 – to be used as 3 parts concentrate to 97 parts water by volume solution
- Type 6 – to be used as 6 parts concentrate to 94 parts water by volume solution

Both Arizona Air National Guard and Marine Corps Base Hawaii utilizes Type-3 (or typically called 3 percent) AFFF concentrate. Comparison of the recorded flow data with the theoretical flow values, the recorded flow data matches within the + 5 percent and – 5 percent of the

theoretical flow values closely for both Arizona Air National Guard and Marine Corps Base Hawaii. The flow data for each nozzle was recorded and compared to the manufacture rated flow; once more, both flow values matched closely within the +5 percent and –5 percent manufacture rate flow.

Table 3. Theoretical Flow Values.

EXPECTED AFFF FLOW RATES		
	THEORETICAL AFFF FLOW RATES	
WATER PUMP (GPM)	3% AFFF (GPM)	6% AFFF (GPM)
600	18	38
800	24	51
1000	31	64
1200	37	77
1400	43	89
1600	49	102
1800	57	115
2000	62	128
2200	68	140
2400	74	153
2600	80	166
2800	87	179
3000	93	191
3200	99	204
3400	105	217
3600	111	230
3800	117	242

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3.3 EASE OF USE

The performance objective was the ease of use of the NoFoam System technology. The external ultrasonic clamp-on flow meters were read locally and remotely. This reading was for demonstration and validation in order to monitor the fire pump, AFFF concentrate, and nozzle discharge flow rate. Flow meters were nonintrusive and clamp on the exterior of the pipe. After the flow meters were installed, no additional configuration or adjustment was required.

After the retrofit module was installed the ball valves were aligned for the fire suppression foam system or NoFoam System by turning the ball valve handles 90 degrees from the original position. No additional configuration or adjustment was required.

The mechanics that maintain the aircraft hangar fire suppression foam system at Arizona Air National Guard and Marine Corps Base Hawaii inquired, “Is this all to operate the NoFoam System and perform maintenance on the NoFoam System?” indicating that the NoFoam System technology is straight forward as well as easy to operate and maintain.

Also, with the NoFoam System, moping-up and returning the aircraft hangar to the tenant command or squadron was done within one hour at both Arizona Air National Guard and Marine Corps Base Hawaii. Typically, it would take at least a full day or more before the squadron was allowed back into the aircraft hangar due to the foam (AFFF wastewater) that has built-up in the hangar. The presence of build-up required collecting and disposing of the foam that is in the trench, holding tank, and holding pond. Replenishing AFFF concentrate takes time before the hangar is operational.

4.0 SITE/PLATFORM DESCRIPTION

4.1 TEST PLATFORMS/FACILITIES

Telephone interviews were conducted with U.S. Army, U.S. Air Force, U.S. Navy, and U.S. Marine Corps fire departments and environmental personnel to identify appropriate sites for the demonstration and validation. Interviews were conducted to determine the number and type of aircraft hangar fire suppression foam systems present at each facility; the frequency of system discharge checks, environmental concerns associated with AFFF waste generation (environmental regulatory issues), and whether or not the facility was willing to host the demonstration and validation. In addition, an initial aircraft hangar fire suppression foam system inspection was performed at each facility. Two facilities were selected that represents the type of aircraft fire suppression foam system in-service and are present in the following sections.

4.1.1 Arizona Air National Guard

The Arizona Air National Guard (ANG) based in Tucson, Arizona, is home to the Air National Guard's premier fighter pilot training organization. It sits on 92 acres next to the Tucson International Airport. The ANG is home to F-16 training for the U.S. Air Force, Air National Guard, Air Force Reserve, and international countries.

Three flying squadrons comprise the Wing: under the 162nd Operation Group are the 152nd, the 195th, the 148th Fighter Squadrons and International Military Student Office (IMSO). Supporting these units are the Mission Support Group, the Maintenance Group, the Medical Group, Headquarters Squadron, the Civil Engineer Squadron, the Communication Flight, and the Services Flight.

4.1.2 Marine Corps Base Hawaii

Marine Corps Base (MCB) Hawaii, Kaneohe Bay, maintains key operations, training, and support facilities, providing services that are essential for the readiness and global projection of ground combat forces and aviation units. The Marine Corps Air Facility (MCAF) operates a 7,800-foot runway that accommodates both fixed wing and rotary-winged aircraft. Navy and Marine Corps units headquartered at MCB Hawaii, Kaneohe Bay, include air, ground and combat service support elements; non-operational tenants include a branch health care clinic, a judicial court, a commissary facility, veterinary services, and various Marine Corps schools and academies.

MCB Hawaii is located on Mokapu Peninsula on the windward side of Oahu, approximately 12 miles northeast of Honolulu. Whether seen from the vantage points of the steep-sided Koolaupoko mountain range, from the air or from the open sea, Mokapu Peninsula stands out as a place of great beauty. Before the Hawaiian Island's exposure to the Western world in 1778, the spiritual beliefs and cultural practices of the Hawaiian people were intricately bound to the physical landscape of this place.

The base serves as the devoted steward of the cultural and natural resources of the entire peninsula. The Environmental Department, staffed by both active duty Marines and civilian experts in various fields, has established and maintained a program that has regularly won national awards in multiple categories from the Secretary of the Navy and the Department of

Defense. Their mission statement is to carry out the functions of compliance, pollution prevention, conservation, installation restoration, training, education, and outreach at MCB Hawaii in order to contribute to the combat readiness of Marines, protect human health and the environment. Measures are taken daily to protect Mokapu Peninsula's natural and cultural resources. Frequent consultations and exercises are held with city, state, and federal agencies to ensure rapid response capabilities to possible accidents and natural disasters.

4.2 PRESENT OPERATIONS

4.2.1 Arizona Air National Guard

Currently, aircraft hangar fire suppression foam system nozzle discharge checks are performed by a base contractor. Yearly nozzle discharge checks are performed by discharging water in lieu of foam in five hangars. In other words, not all parts of the fire suppression foam system are checked ensuring the system is operational. The contractor also verifies AFFF concentrate quality. It is estimated that more than 150,000 gallons of water total are used to perform the yearly checks. Since the nozzle discharge during system checks is water, the wastewater is released into the sewer.

Figure 3 locates Hangar 12 at Arizona ANG for the NoFoam System technology demonstration. Seven oscillating turret nozzles are installed in the aircraft hangar. Each nozzle is rated at 352 gpm with a 100 degree rotation or sweeping angle. Two fire pumps installed in the fire suppression foam system, one is electric motor driven and the other is diesel driven, which is used as a back-up pump. The foam system fire pumps are rated at 3,500 gpm with a 1,200 gallon AFFF concentrate tank capacity.

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Figure 3. Aerial View of Arizona Air National Guard Hangar 12.

4.2.2 Marine Corps Base Hawaii

Currently, MCB Hawaii Public Works Department does not perform aircraft hangar fire suppression foam system nozzle discharge checks. The aircraft hangar has released foam through the nozzles two times since it was completely built in 1990, first as an acceptance fire suppression foam system test and second on an accidental foam release one year later. However, system valves, piping, and AFFF concentrates quality are inspected quarterly.

Figure 4 locates Hangar B5069, Corrosion Control Hangar at MCB Hawaii for the NoFoam System technology demonstration. The generated AFFF wastewater is pumped into an external 2,500 gallon holding tank and the overflow wastewater is released to a holding pond design to capture the excess wastewater. However, the holding pond is not to standard regulations, the pond is a hole in the ground with no lining to prevent the wastewater from leaching into the surrounding ground.

Four oscillating turret nozzles are installed with overhead sprinklers in the corrosion aircraft hangar. Each nozzle is rated at 322 gpm with a 63 degree rotation or sweeping angle. Two fire pumps installed in fire suppression foam system, one is electric motor driven and the other is diesel driven, which is used as a back-up pump. The foam system fire pumps are rated at 2,500 gpm with two 1,600 gallon AFFF concentrate tank, which one tank is used as a reserve tank.

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Figure 4. Aerial View of Marine Corps Base Hawaii Building 5069.

4.3 SITE-RELATED PERMITS AND REGULATIONS

No permits were required for this demonstration and validations. The NoFoam System technology assisted the activities in meeting UFC-3-600-2 [Reference 1] aircraft hangar foam discharge checks without generated AFFF wastewater.

5.0 TEST DESIGN

New and existing aircraft hangar fire suppression foam systems are similar in nozzle types, positions, risers, mixing valves, valves, gauges, pumps, etc., but are not similar in lay-out arrangement due to the capacity of the aircraft hangar fire suppression foam system. From hangar to hangar the fire suppression foam system fire pump capacity may vary anywhere from 600 to 5,000 gpm. The foam systems are built and installed differently from hangar to hangar but are similar in function whereby a water and foam source are supplied and combined at a specific point at a specific flow rate and discharged through the various nozzles. It is similar to ARFF vehicles, where several ARFF vehicles are from manufacturers and models with various fire pump capacity. The water and foam tanks are piped and arranged to combine at a specific point at a specific flow rate and discharged through the various nozzles on the ARFF vehicle. The NoFoam System for ARFF vehicle [Reference 3] designed a universal connection between the vehicle and the NoFoam System trailer. Similarly, the aircraft hangar a retrofit module was provided for existing aircraft hangar fire suppression foam system. No impact is anticipated with the NoFoam System technology on non-traditional aircraft materials in use today or in the foreseeable future.

5.1 CONCEPTUAL TEST DESIGN

The experimental conceptual design demonstrated the NoFoam System technology use in the aircraft hangar fire suppression foam system application. The demonstration showed that the NoFoam System technology is an acceptable technology for nozzle discharge checks in the aircraft hangar fire suppression foam system and that nozzle discharge checks can be performed without generating AFFF wastewater. A surrogate fluid was used in place of actual AFFF concentrate. To monitor the demonstration, flow meters was installed at several locations within the system. The installed flow meters monitored the water stream and surrogate fluid flow throughout the piping system. The flow meter was installed and monitored as shown in Figure 5 and 6:

- on surrogate fluid piping
  - from water main supply
  - to water main supply
- on water main piping
  - to surrogate fluid
  - from surrogate fluid
- on nozzle discharge piping

Measured flow rates were manually recorded in Table 2 and compared to theoretical values included in Table 3. A minimum of two nozzle discharge runs was required for at least one minute duration or in accordance with the facility required nozzle discharge time.

5.2 BASELINE CHARACTERIZATION

The aircraft hangar fire suppression foam system theoretical AFFF concentrate flow rates, Table 3, was the established baseline for comparison. Table 3 theoretical flow rates were derived from Military Specification MIL-F-24385 [Reference 2], Section 1.2 Classification, which identifies AFFF concentrates:

- Type 3– to be used as three parts concentrate to ninety-seven parts water by volume solution
- Type 6– to be used as six parts concentrate to ninety-four parts water by volume solution

5.3 DESIGN AND LAYOUT OF TECHNOLOGY COMPONENTS

Working drawings for the NoFoam System technology for aircraft hangar fire suppression foam system is provided in Appendix C. Figure 5 and 6 are the NoFoam System technology piping diagrams for Arizona Air National Guard and Marine Corps Base Hawaii, respectively.

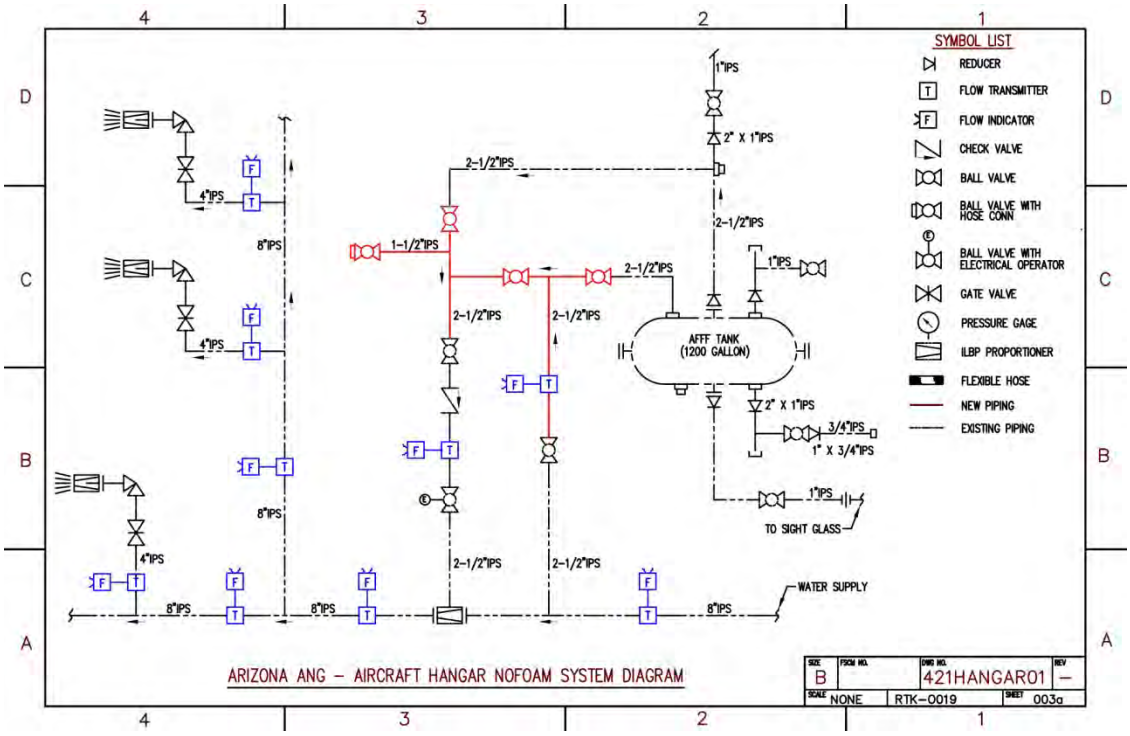

Figure 5. Arizona Air National Guard NoFoam System Diagram.

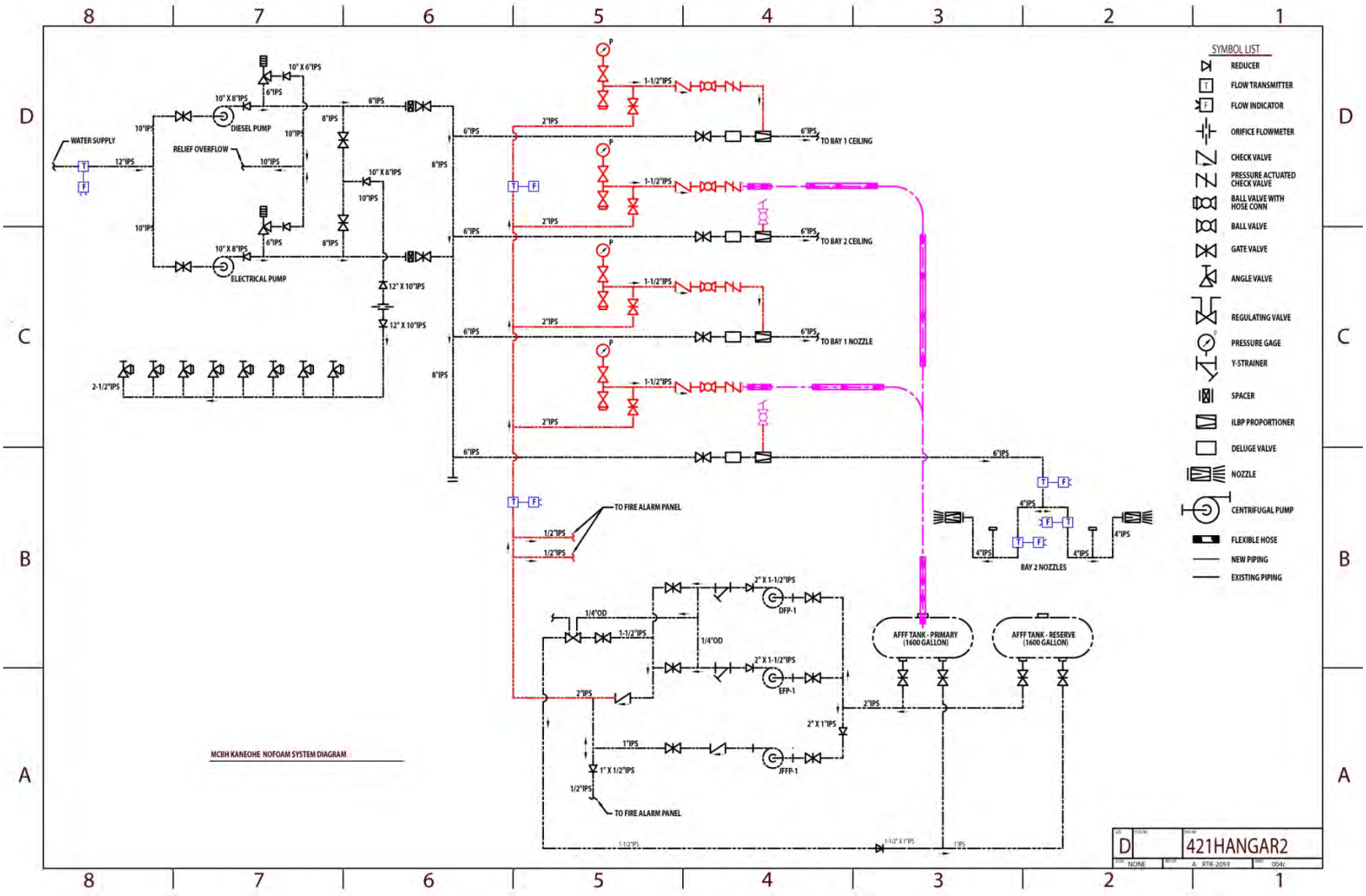

Figure 6. Marine Corps Base Hawaii NoFoam System Diagram.

5.4 OPERATIONAL TESTING

Since the objective of this project was to install and demonstrate and validate a full-scale NoFoam System, no demobilization was necessary. The technology was left with Arizona Air National Guard for their continued use after the demonstration and validation period. As for Marine Corps Base Hawaii the facility engineering decided not to accept the NoFoam System technology. The fire suppression foam system was returned to the original piping configuration after the demonstration and validation period due to future concerns maintaining the technology.

5.5 SAMPLING PROTOCOL

Although the ability to determine NoFoam System performance is critical, no laboratory analytical testing was performed for this effort. NoFoam System performance was gauged by measuring AFFF surrogate flow rates through the aircraft hangar fire suppression foam system during nozzle discharge checks. Performance tests included visual observations of nozzle discharge spray patterns. Surrogate AFFF flow rates measured during the demonstrations were recorded and compared to theoretical AFFF concentrate flow rates in the aircraft hangar fire suppression foam system. Theoretical AFFF concentrate flow rates are included in Table 3. Table 2 shows the discharge logs that were used during the demonstration and manually record the nozzle discharge flow result. The discharge log will be used by the facility to record future flow results when performing routine, two year nozzle discharge checks, or whenever the fire suppression system piping is dismantle for maintenance and repair.

The NoFoam System technology was intended as a substitute check for the foam proportioning system check as outlined in Table 2-9, Table 2-10, and Table 2-11 of UFC-3-600-02, [Reference 1], dated 1 January 2001, in order to alleviate generating foam during nozzle discharge checks.

5.6 SAMPLING RESULTS

Sampling results are included in Table 4 and in Table 5.

Table 4. Arizona Air National Guard Run-1.

HANGAR: 12 arizona Air National Guard Run-1 sheet no.: 01

date: 4 April 2008, Run-1 AFFF: 3%

by: Arizona Air National Guard & NFAC ESC

DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	WATER DISCHARGE TIME (SEC)			COMMENTS / PROBLEMS
Pump:	2739	158			water press = 100 psi
AFFF:	89	158			AFFF press = 80 psi
Nozzles:					
1.	322	158			
2.	336	158			
3.	363	158			
4.	345	158			
5.	354	158			
6.	322	158			
7.	363	158			
8.	345	158			
9.	336	158			
10.	---	---			
11.	---	---			

Table 5. Marine Corps Base Hawaii Run-1.

HANGAR: Building 5069 Run-1 sheet no.: 01

date: 30 December 2008, Run-1 AFFF: 3%

by: US Marine Corps Base Hawaii & NAVFAC ESC

DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	WATER DISCHARGE TIME (SEC)			COMMENTS / PROBLEMS
Fire Pump Riser:	674	121			water press = 110 psi
AFFF:	22	121			AFFF press = 76 psi
Nozzles:					
1.	322	121			
2.	315	121			

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6.0 PERFORMANCE ASSESSMENT

6.1 PERFORMANCE CRITERIA

Performance criteria are included in Table 6.

Table 6. Performance Criteria.

Performance Criteria	Description	Primary or Secondary
Hazardous Contaminant	-None	Primary
Process Waste	-Disposition as non-hazardous waste	Secondary
Factors Affecting Technology Performance	-No significant change in flow rate and pressure during nozzle discharge	Secondary
Reliability	-Sensitive ambient operating temperature	Secondary
Ease of Use	-A technician operator required	Primary
Versatility	-Applicable to DoD facilities with hangar fire suppression foam system -Applicable to private sector	Secondary
Maintenance	-Minimal training -Minimal maintenance	Primary
Scale-Up Constraints	-No scale-up constraints	Secondary

6.2 PERFORMANCE CONFIRMATION METHODS

Criteria used to assess project performance are summarized in Table 7.

Table 7. Methods for Assessing Performance Confirmation.

Performance Criteria	Expected Performance (pre demo)	Performance Confirmation Method	Actual (post demo)
Primary Criteria (Performance Objectives) (Qualitative)			
Ease of Use	Minimal training	Operator experience	Minimal training
Primary Performance Criteria (Performance Objectives) (Quantitative)			
Cost	< $10K/year	Cost calculation	<$10K/year

Feed Stream - Flow rate - Contaminant concentration (after treatment) - Contaminant concentration (to be monitored)	-+ 5% - 5% Table 3 -None -None	-Visual, flow meter, data logger, discharge log	-+ 5% - 5% Table 3 -None -None
Target Hazardous Contaminant - % reduction - Regulator Standard - Resolution	 -None -None -None		 -None -None -None
Process Waste - Generated	 -None	 -Operator experience	 -None
Factors Affecting Performance - Throughput	-Volume reduction	-Operator experience	-Volume reduction
Secondary Performance Criteria (Qualitative)			
Reliability	-No breakdowns	Record keeping	No breakdowns
Safety - Hazards - Protective clothing	 -Nozzle discharge -Hearing protection	-Operator experience	 -Nozzle discharge -Hearing protection
Versatility - Intermittent operation - Remote monitoring	 -Yes -Yes	 -Operator experience -Operator experience	 -Yes -Yes
Maintenance - required - eliminated	 -Inspect flow meter -Replenish AFFF efforts	 -Operator experience -Operator experience	 -Inspect flow meter -Replenish AFFF efforts
Scale-up Constraints - engineering - flow rate - contaminant concentration	 -None -None -None		 -None -None -None

6.3 DATA ANALYSIS, INTERPRETATION, AND EVALUATION

Data analysis, interpretation, and evaluation of the demonstrations were based on nozzle discharge flow rates obtained during the demonstration as well as visual observations of nozzle discharge spray pattern and area coverage.

It is important that the proper amount of AFFF concentrate be delivered to the water stream to ensure that foam structure and fire retardant characteristics are correct. Table 3 lists the theoretical (designed) flow rates for AFFF concentrate as a function of water flow through the aircraft hangar fire suppression system. Actual surrogate flow rates measured during the demonstration were compared to Table 3 to verify that the correct percentage of surrogate fluid is introduced into the water stream. Surrogate fluid flow rates of + 5 percent and – 5 percent of the theoretical values included in Table 3 were considered acceptable. Flow rates that fall outside this limit result in an improper mix flow and were not acceptable. The proper amount of surrogate fluid delivered to the water stream will validate that the NoFoam System is correctly simulating the delivery of AFFF concentrate to the aircraft hangar fire suppression foam system.

The flow meter is a clamp-on ultrasonic transit time flow meter by Dynasonics, which indicates rates and total flow. Also, the flow rates were monitored locally and flow rates collected through a data logger. The clamp-on flow meter is simple to install and is recommended for full pipe, clean liquids applications such as water. The transit time flow meters utilize two clamp-on transducers that function as both ultrasonic transmitters and receivers and are clamped on the outside of a closed pipe system. The flow meter operates by alternately transmitting and receiving a frequency-modulated burst of sound energy between the two transducers. The burst is first transmitted in the direction of fluid flow and then against fluid flow. Since sound energy in a moving liquid is carried faster when traveling in the direction of fluid flow (downstream) than it does when it travels against fluid flow (upstream), a differential in the times of flight will occur. If the fluid is not moving, the time of flight difference will be zero and the flow meter will indicate zero flow. The flow rate is read locally and transmitted to data logger.

The flow meters wired to a data logger recorded flow rates during the nozzle discharge checks. The data logger is a Model CR3000 Micrologger by Campbell Scientific, Inc., a compact data logger housed in a portable self-contained data acquisition system. The CR3000 provides 4-Mbytes of battery backed Static Random Access Memory for data storage. Sensor connections are four 24-bite pulse channels measure frequency pulses. Real-time and historical data is displayed using the on-board graphical display or a PC. The PC connects to the CR3000 via a RS-232 cable or the Campbell Scientific inlet/outlet port and SC32b interface.

A visual inspection of the nozzle discharged was performed for both demonstration host sites and "NO" generated foam laden wastewater was released as shown in Figure 7 and 8 below. Disposition of generated process water during the nozzle discharges drained into the existing building drains. The drains lead to a holding pond or tank, or directly into the facilities sewer system. The holding pond or tank wastewater is transferred into a tanker truck for disposal.

Figure 7. Result of Arizona ANG NoFoam System Nozzle Discharge Check.

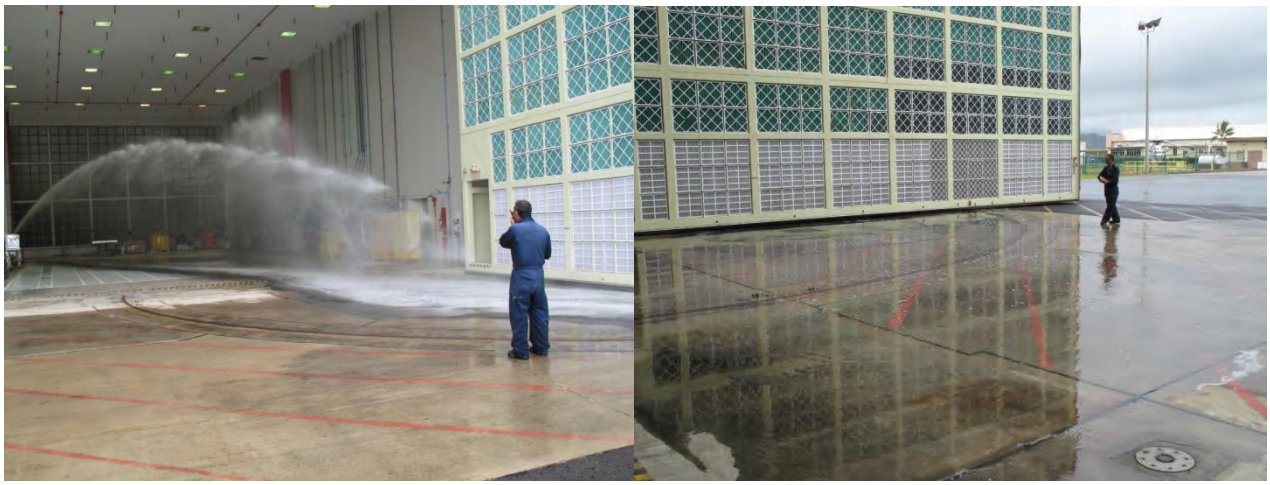

Figure 8. Result of MCB Hawaii NoFoam System Nozzle Discharge Check.

Appendix B is the collected recorded data at Arizona ANG and MCB Hawaii NoFoam System nozzle discharges. The data are summarized as a plot of time (in seconds) versus flow (in gpm) for Arizona ANG in Figures 9 thru 14 and MCB Hawaii in Figures 15 thru 18.

6.3.1 Arizona Air National Guard

Figures 9, 10, and 11, run-1 was for 158 seconds elasped time nozzle discharge check, the recorded fire pump flow is 2,739 gpm with AFFF pump flow of 89 gpm and the nine position hangar nozzles flow ranged from 322 gpm to 363 gpm.

Figures 12, 13, and 14, run-2, was for a 132 seconds elasped time nozzle discharge check, the recorded fire pump flow is 2,750 gpm with AFFF pump flow of 93 gpm and the nine position hangar nozzles flow ranged from 322 gpm to 363 gpm.

Both runs for the fire pump and AFFF concentrate (surogate) flow followed Table 3, theoreticl AFFF flow values, and the nine position nozzle discharge flows (nozzle 1 – 9) were within the manufacture design flow of 352 gpm.

6.3.2 Marine Corps Base Hawaii

Figures 15 and 16, run-1 was for 121 seconds elasped time nozzle discharge check, the recorded fire pump riser flow is 674 gpm with AFFF pump flow of 22 gpm and the two position hangar nozzles flow ranged from 315 gpm to 322 gpm.

Figures 17 and 18, run-2, was for a 117 seconds elasped time nozzle discharge check, the recorded fire riser pump flow is 707 gpm with AFFF pump flow of 24 gpm and the two position hangar nozzles flow ranged from 315 gpm to 326 gpm.

Both runs for the fire pump and AFFF pump followed Table 3, theoreticl AFFF flow values, and the two position nozzle discharge flow (nozzle 1 – 2) were within the manufacture design flow of 322 gpm.

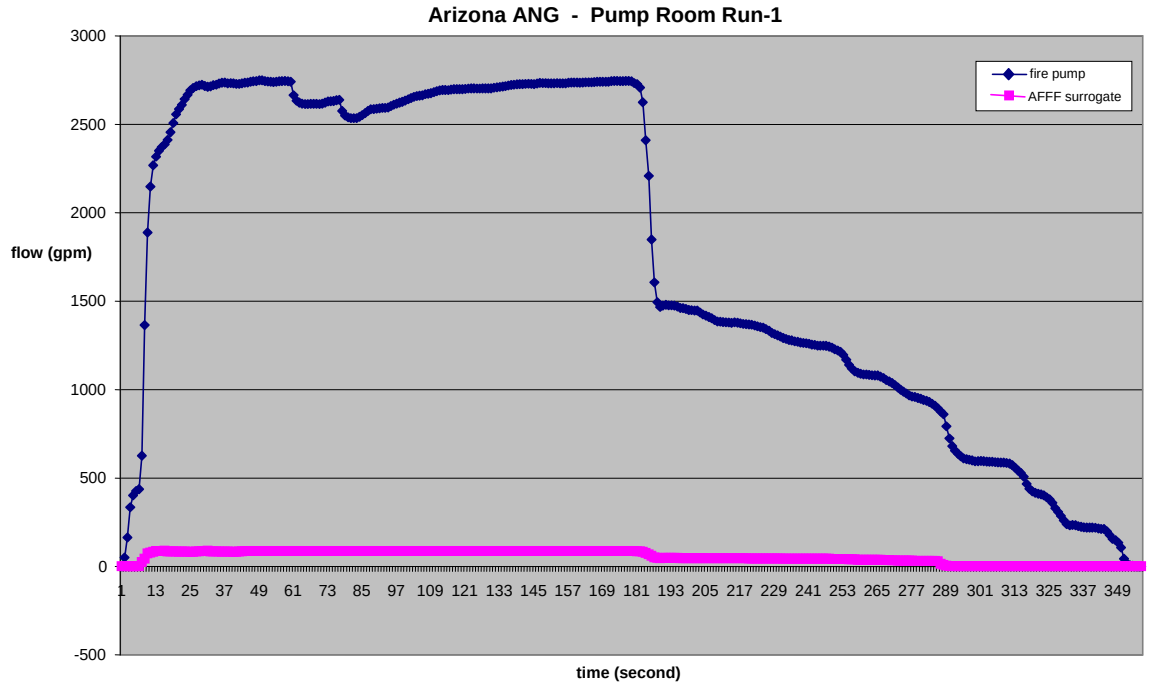

Figure 9. Arizona ANG, Pump Room Run-1.

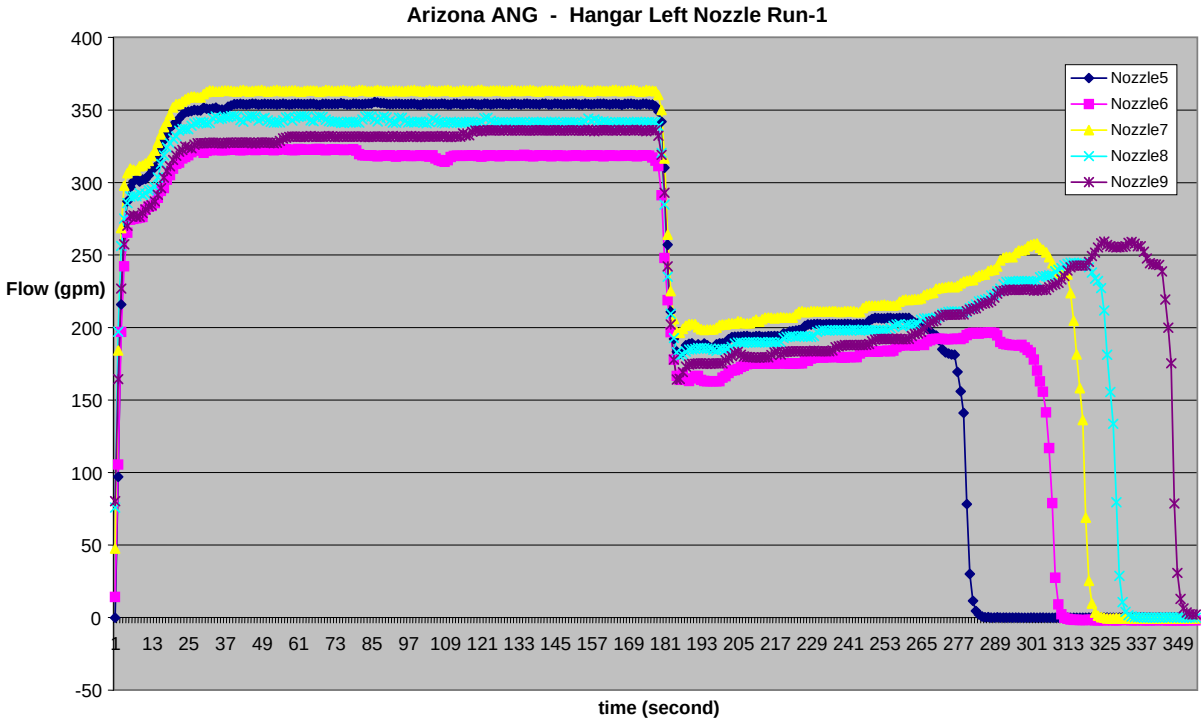

Figure 10. Arizona ANG, Hangar Left Nozzle Run-1.

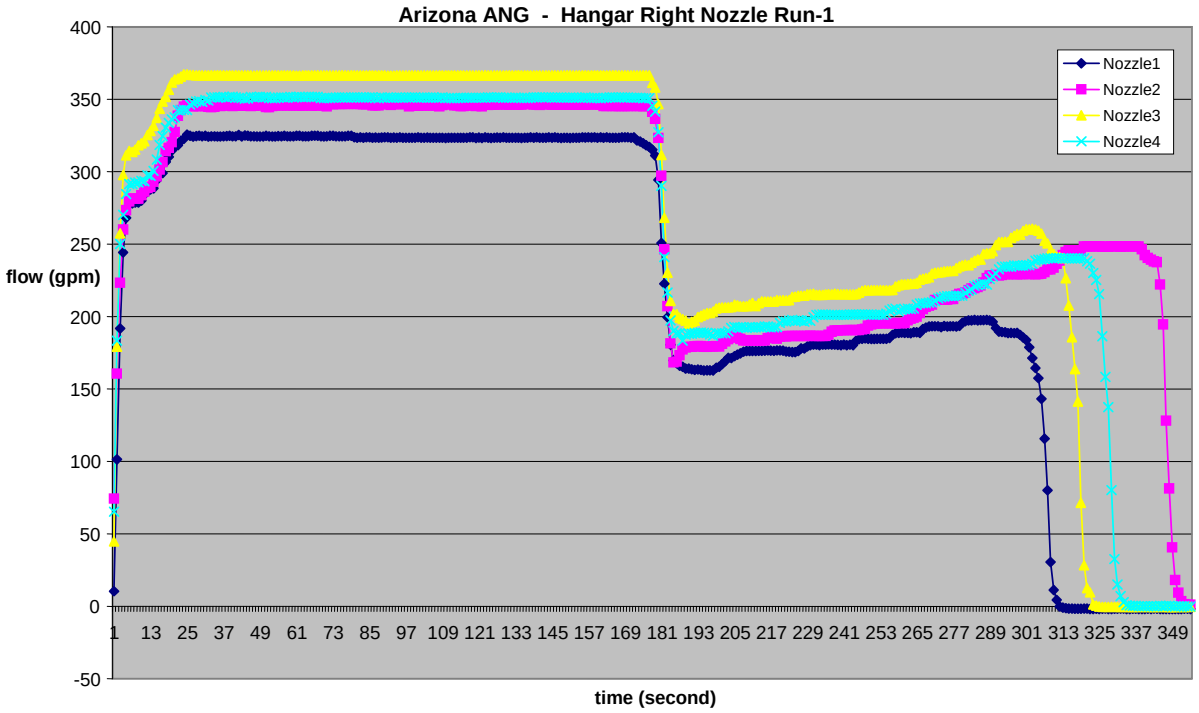

Figure 11. Arizona ANG, Hangar Right Nozzle Run-1.

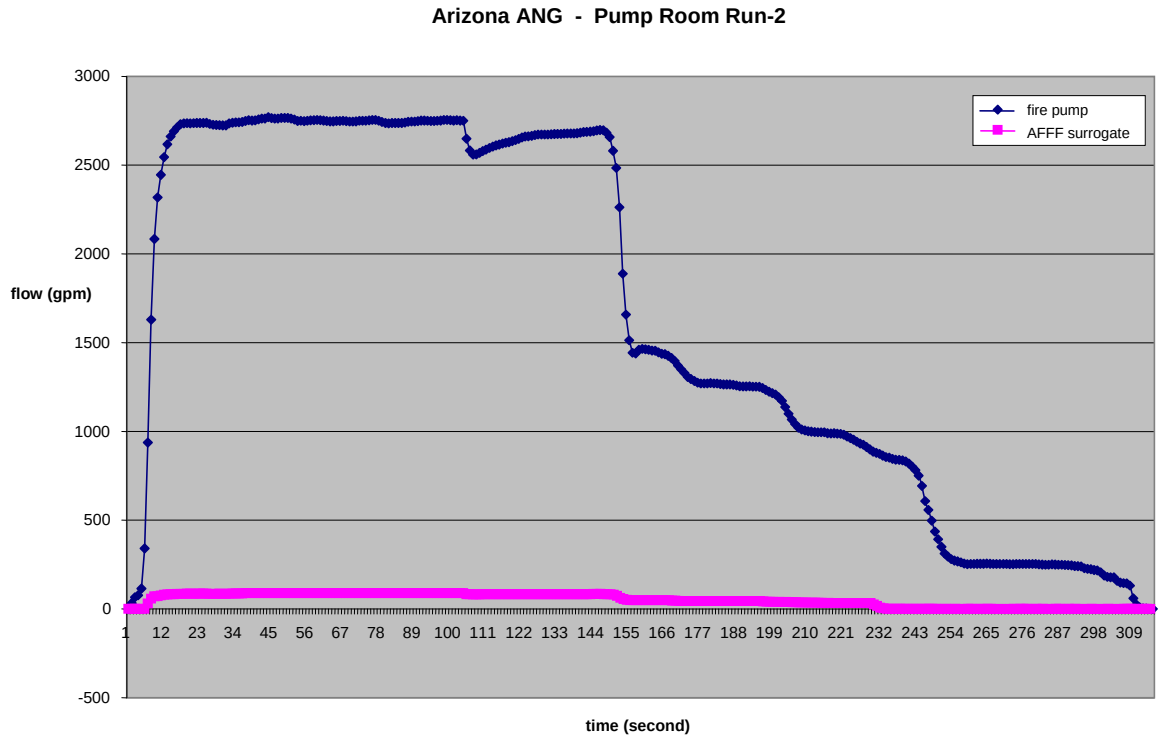

Figure 12. Arizona ANG, Pump Room Run-2.

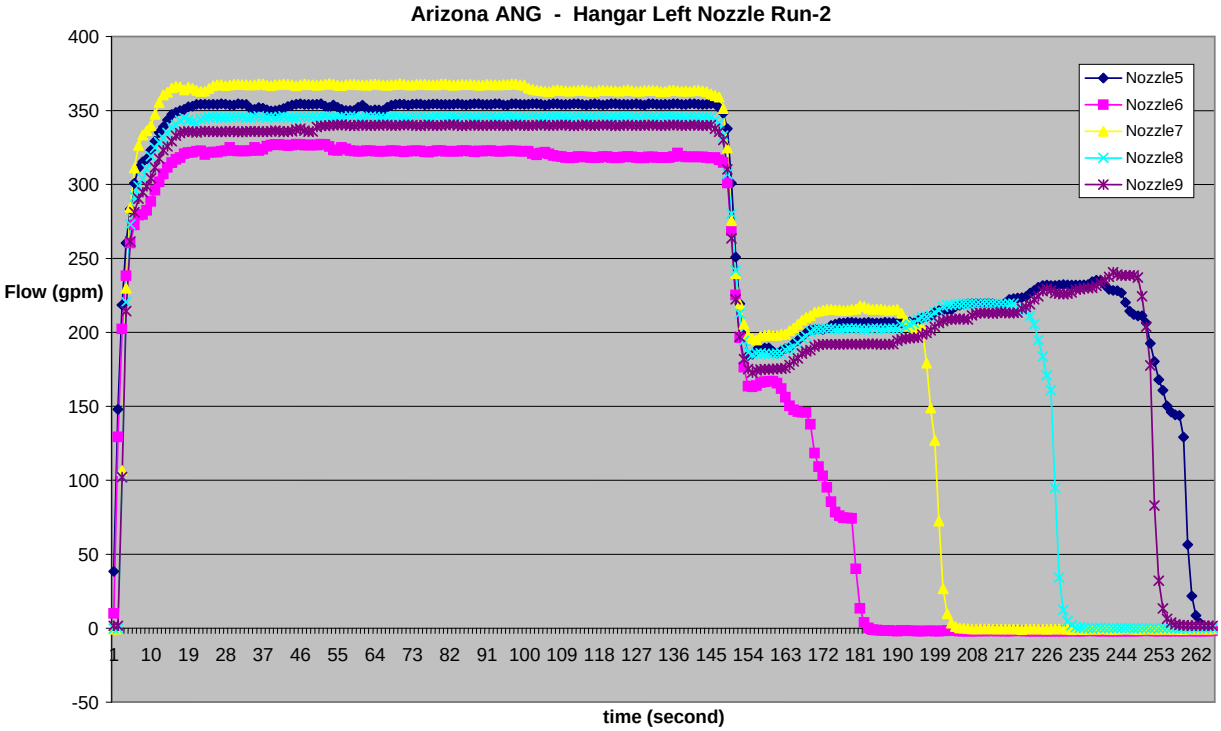

Figure 13. Arizona ANG, Hangar Left Nozzle Run-2

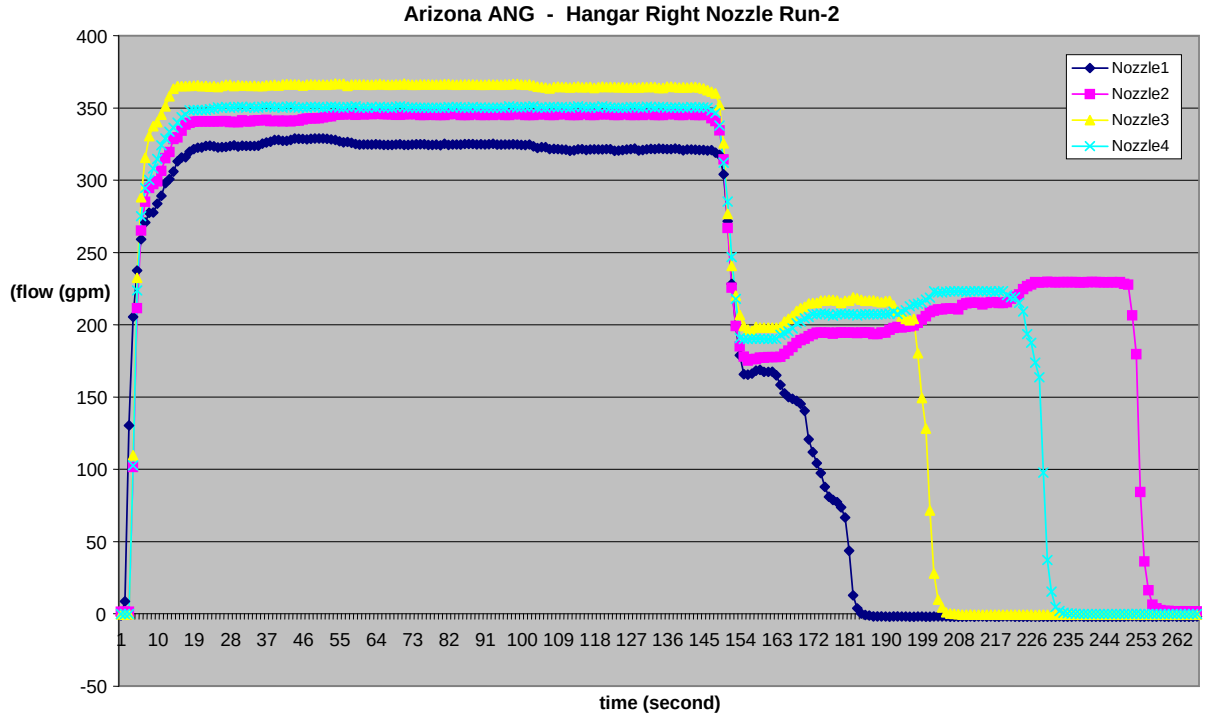

Figure 14. Arizona ANG, Hangar Right Nozzle Run-2.

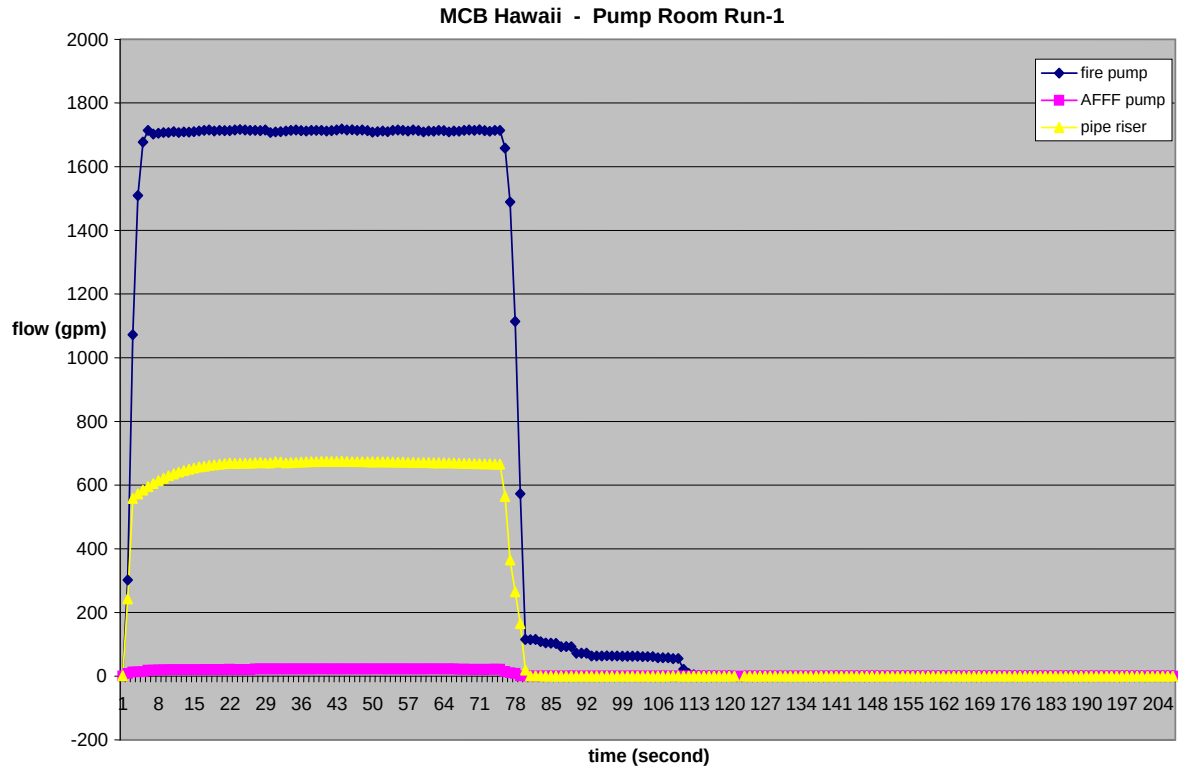

Figure 15. MCB Hawaii, Pump Room Run-1.

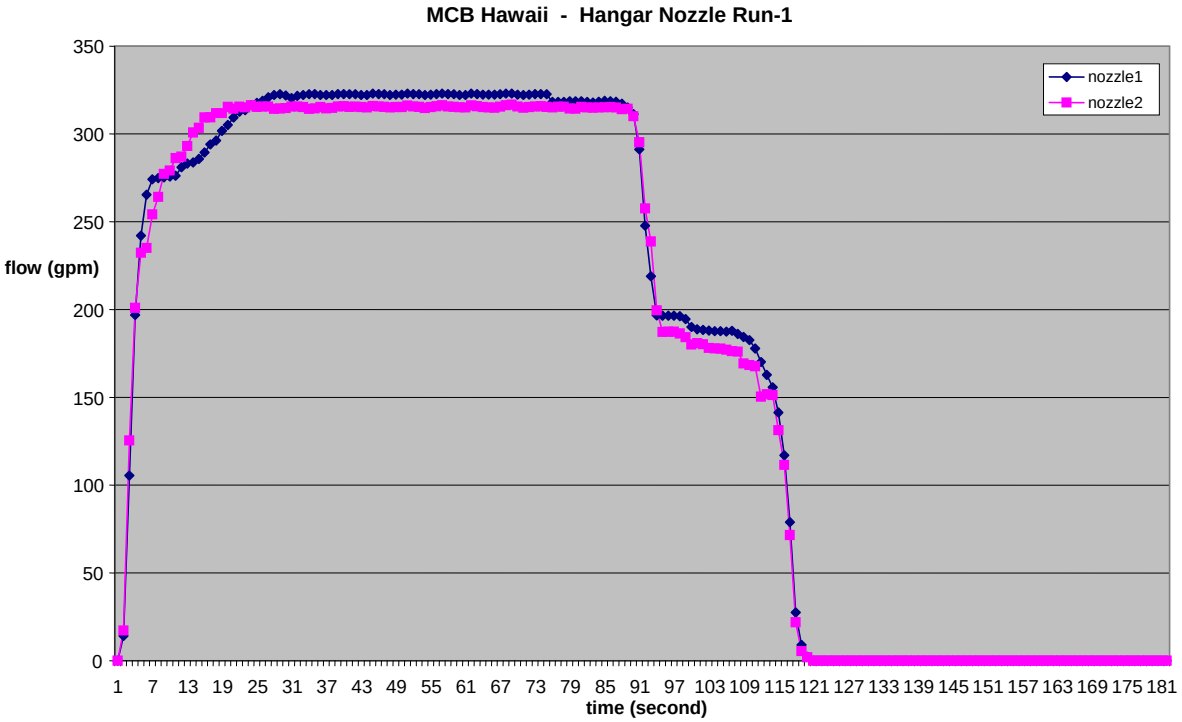

Figure 16. MCB Hawaii, Nozzle Run-1.

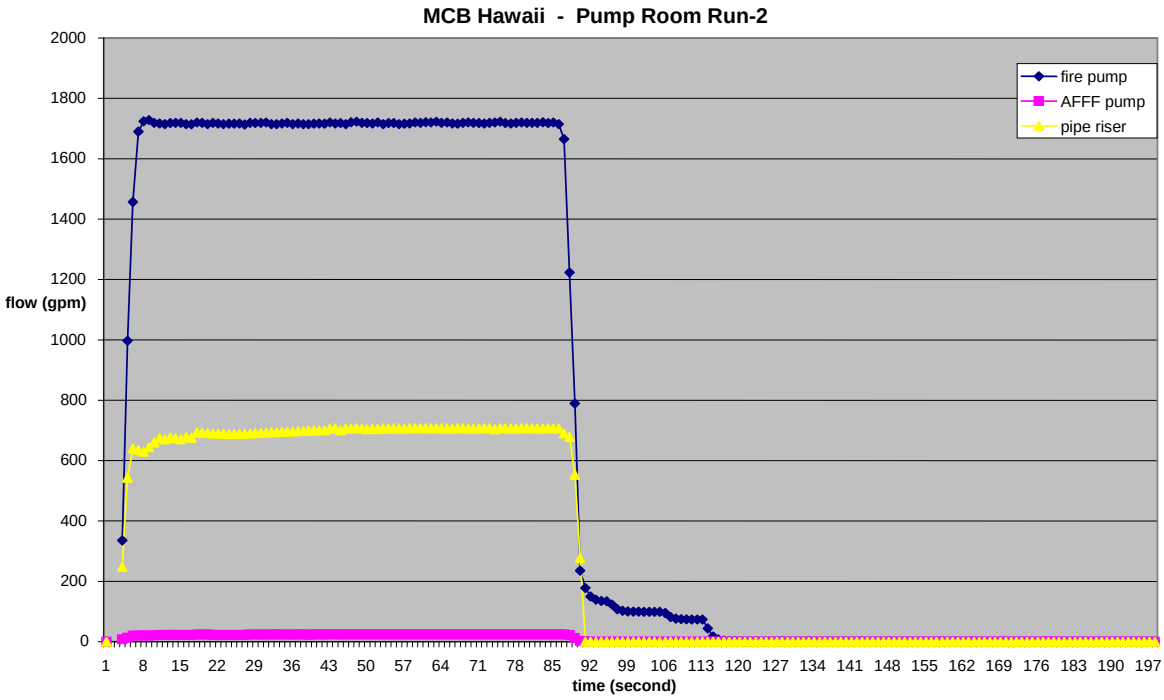

Figure 17. MCB Hawaii, Pump Room Run-2.

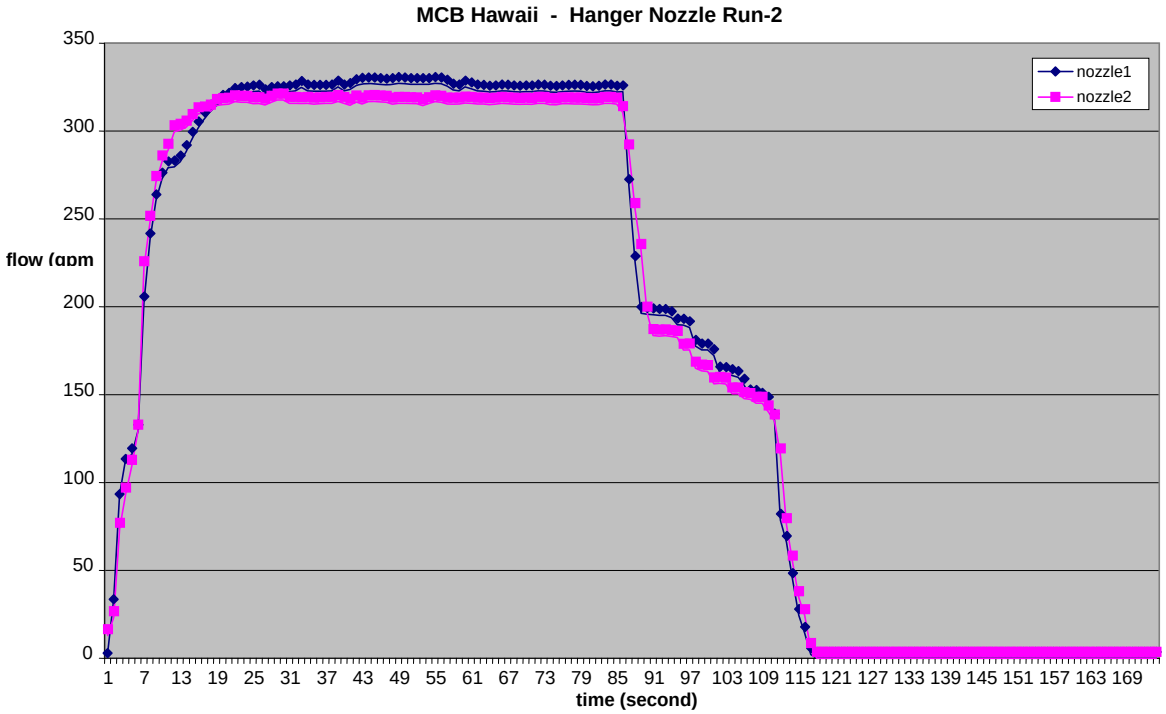

Figure 18. MCB Hawaii, Nozzle Run-2.

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7.0 COST ASSESSMENT

7.1 COST MODEL

The cost for energy efficient technology is discussed in Table 8.

Table 8. Cost Model for an Energy Efficiency Technology.

Cost Model for an Energy Efficiency Technology

Cost Element	Data Tracked During the Demonstration	Estimated Costs
Hardware capital costs	Estimates made based on component costs for demonstration	$14,000.00 (1-data logger, 6-flowmeter, retrofit module)
Installation costs	Labor and material required to install	$1,600.00 (two man-day)
Consumables	Estimates based on rate of consumable use during the field demonstration	$0.00
Facility operational costs	Reduction in energy required vs. baseline data	$8,500.00 per discharge check
Maintenance	-Frequency of required maintenance -Labor and material per maintenance action	$50.00 per quarter
Hardware lifetime	Estimate based on components degradation during demonstration	15-years life span
Operator training	Estimate of training costs	$100.00 per year

7.1.1 Hardware Capital Cost

Hardware cost of $14,000 is based on 6-flow meter, data logger, and retrofit module which include ball valves, pipes, and fittings.

Hardware cost of $14,000, which breaks down to $3,000 for a data logger, $1,200 for each flow meter (or $7,200 for six flow meter per hangar), and $3,800 for retrofit module.

7.1.2 Installation Cost

Hardware installation labor cost of $1,600 for one day installation for two people.

7.1.3 Facilities Operational Costs

The operating cost is $8,500 for an outside contractor performing nozzle discharge checks, but it is to be noted that the contractor performs these checks while excluding foam discharge and foam piping system checks.

7.1.4 Maintenance

Maintenance will be required for a monthly visual inspection of flow meters, ball valves, and piping, which is keeping in line with current recommended fire suppression foam system maintenance practice [Reference 1]. There should be no weeps and leak from piping, no damages to flow meter and other components, and verifying valves should be in the correct position.

7.1.5 Hardware Lifetime

Fifteen year life span is anticipated. The NoFoam System retrofit modules are same quality valves and piping materials as the original installed fire suppression foam system.

7.1.6 Operator Training

Operator training of $100.00 per year is anticipated if required. No special training is required for operating the NoFoam System. The system is operated with the aircraft hangar fire suppression foam system.

7.2 COST DRIVERS

No anticipated cost drivers at this time when selecting the technology for implementation. The NoFoam System components are standard commercial off-the shelf items and the same manufacturer as the existing components for aircraft hangar fire suppression foam system.

Due to the fact that each aircraft hangar fire suppression foam system is built differently, the hardware retrofit modules cost may either be high or low depending on the fire suppression foam system capacity.

7.3 COST ANALYSIS AND COMPARISON

The ECAM analysis for the NoFoam System technology (Appendix D) net present value is $670,414 at 15-year, with an internal rate of return of 281% at 15-year, and the discount payback of 0.36-year.

The disposal cost savings of $50,000 per aircraft hangar every two years is shown with the NoFoam System (25,000-gallon AFFF wastewater per hangar at $2 per gallon for disposal). There are more than 500 aircraft hangar fire suppression foam systems which translate to over $25 million in savings every two years for the DoD. Additionally, over 4.6 million dollars will accrue in cost avoidance every two years because the facilities will not have to purchase AFFF concentrate to perform foam distribution checks. This estimate is based on 773-gallons of AFFF concentrate per aircraft hangar at $12.00 per gallon.

7.3.1 Arizona Air National Guard

Arizona Air National Guard saw a disposal cost savings of over $53,000 every two years as required by Reference 1 (26,500-gallon AFFF wastewater per hangar at $2 per gallon for disposal) and a cost savings of over $4,900 for AFFF concentrate replenishment cost (410-gallon AFFF concentrate at $12 per gallon).

In this case Arizona Air National Guard benefits from this technology which includes the elimination of generated AFFF wastewater from foam distribution system checks; eliminating ground water contamination, eliminating waste treatment plant upsets, eliminating disposal costs,

reduced AFFF concentrate procurement, and greatly reduced the down time of the aircraft hangar (mopping-up and returning the aircraft hangar to the tenant command or squadron was done within an one hour). Additionally, it maximizes the facilities confidence level by ensuring that the aircraft hangar fire suppression foam system functions properly—allowing facilities to meet their mission.

7.3.2 Marine Corps Base Hawaii

MCB Hawaii will not receive any cost savings due to the fact that nozzle discharge checks are not performed hence "NO" foam laden wastewater is generated. Nor does it require AFFF concentrate replenishment cost. However, if nozzle discharge checks are performed every two years as required by Reference 1, Marine Corps Base Hawaii shall see a disposal cost savings of $22,000 every two years (10,900-gallon AFFF wastewater per hangar at $2 per gallon for disposal). Also, a cost savings of over $2,000 for AFFF concentrate replenishment cost (169-gallon AFFF concentrate at $12 per gallon).

In this case Marine Corps Base Hawaii will not benefit due to the current zero disposal cost savings and AFFF concentrate replenishment cost; this questions the operability of the fire suppression foam system when the time arises.

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8.0 IMPLEMENTATION ISSUES

The Clean Water Act, Resource Conservation and Recovery Act, and local pollution and waste minimization regulations apply to the NoFoam System technology. The technology eliminates generated foam laden wastewater from aircraft fire suppression foam system nozzle discharge checks with the use of water as the surrogate fluid. Also, no generated waste or by-products were generated from the aircraft hangar nozzle discharge checks. No new or additional permit was necessary.

No other regulatory issues are known at this time. The NoFoam System technology demonstration and validation were conducted on full-scale applications on U.S. Air Force National Guard and U.S. Marine Corps aircraft hangar fire suppression foam systems. The technology is widely applicable, not only within DoD, but also within the private sector. No proprietary technology is employed that would impact future NoFoam System procurement which consists of commercially available-off-the-shelf components such as, valves, pipes, pipe fittings, flow meters, and monitors.

Currently, NAVFAC ESC has a contract license with Kaare Holm (San Diego, CA) for rights to commercialize the NoFoam System technology for ARFF vehicles. Similar, Kaare Holm has expressed high interest on contract licensing to commercialize the NoFoam System technology for aircraft hangar fire suppression foam system.

The environmental impact issues and the technology addressed by the NoFoam System have been recognized and are addressed in NFPA 11 [Reference 4], Annex F - *Foam Environmental Issues*, paragraph F.3.3 System Tests, outlining the methodology used by the NoFoam System technology and indicating, with the approval of the authority having jurisdiction, that the test method is valid.

Also, UFC 4-211-01N [Reference 6] section 3-10.14.4 System Testing, recognizes the NoFoam System technology, which has a high potential for the technology to be built-in into future aircraft fire suppression foam systems.

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9.0 REFERENCES

[1] UFC 3-600-02, 1 January 2001, *"Operations And Maintenance: Inspection, Testing, And Maintenance Of Fire Protection Systems"*, Unified Facilities Criteria (UFC)

[2] Military Specification MIL-F-24835F, January 1992, *"Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate For Fresh And Seawater"*

[3] Rance T. Kudo, October 2003, *"Universal Stationary/Mobile NoFoam Unit (USNOFU) for Aircraft Rescue and Fire Fighting (ARFF) Vehicle"*, Naval Facilities Engineering Service Center, Technical Report, TR-2228-ENV

[4] NFPA 11, 2005 Edition, *"Standard For Low-, Medium-, and High- Expansion Foam"*, Nation Fire Protection Association

[5] NFPA 412, 2009 Edition, *"Standard For Evaluation Aircraft Rescue And Fire-Fighting Foam Equipment"*, National Fire Protection Association

[6] UFC 4-211-01N, 25 October 2004 with DRAFT Changes 4, 14 July 2009, *"Aircraft Maintenance Hangars: Type I, Type II and Type III"* , Unified Facilities Criteria (UFC)

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APPENDIX A

POINTS OF CONTACT

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POINT OF CONTACT	ORGANIZATION	Contact	Role in Project
Rance Kudo	NAVFAC ESC 1100 23rd Ave., EV-421 Port Hueneme, CA 93043	w: (805) 982-4976 fax: (805) 982-4832 email: rance.kudo@navy.mil	Project Engineer, Overall responsibility for project management
Dr. Richard Lee	NAVFAC ESC 1100 23rd Ave., EV-421 Port Hueneme, CA 94043	w: (805) 982-1670 fax: (805) 982-4832 email: richard.lee1@navy.mil	Quality Insurance Officer
Brad Hollan	NAVFAC ESC 1100 23rd Ave., EV-421 Port Hueneme, CA 94043	w: (805) 982-1320 fax: (805) 982-4832 email: brad.hollan@navy.mil	Project Assistant
Cheryl Settle	Arizona ANG DEMA/162nd Fighter Wing 1350 E. Perimeter Way Tucson, AZ 85706-6062	w: (520) 295-6579 fax: (520) 295-6064 email: cheryl.settle@aztucs.ang.af.mil	Site Coordinator
Carolyn Irvin	Marin Corps Base Hawaii Building 1360 Kaneohe, HI 96863	w: (808) 257-6920, ext 238 fax: (808) 257-2794 e-mail: carolyn.irvin@usmc.mil	Site Coordinator

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APPENDIX B

NOFOAM SYSTEM DISCHARGE DATA

- Arizona Air National Guard
  - Hangar 12

- Marin Corps Base Hawaii
  - Building 5069

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Arizona Air National Guard Hangar 12:

Run-1:

HANGAR: 12 Arizona Air National Guard Run-1 sheet no.: 01

date: 4 April 2008, Run-1 AFFF: 3%

by: Arizona Air National Guard & NFAC ESC

DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	WATER DISCHARGE TIME (SEC)			COMMENTS / PROBLEMS
Pump:	2739	158			water press = 100 psi
AFFF:	89	158			AFFF press = 80 psi
Nozzles:					
1.	322	158			
2.	336	158			
3.	363	158			
4.	345	158			
5.	354	158			
6.	322	158			
7.	363	158			
8.	345	158			
9.	336	158			

NOTE: Blank = NO DATA

24-apr-06, hangar.xls

Run-2:

HANGAR: 12 Arizona Air National Guard Run-2 sheet no.: 02

date: 4 April 2008, Run-2 AFFF: 3%

by: Arizona Air National Guard & NFAC ESC

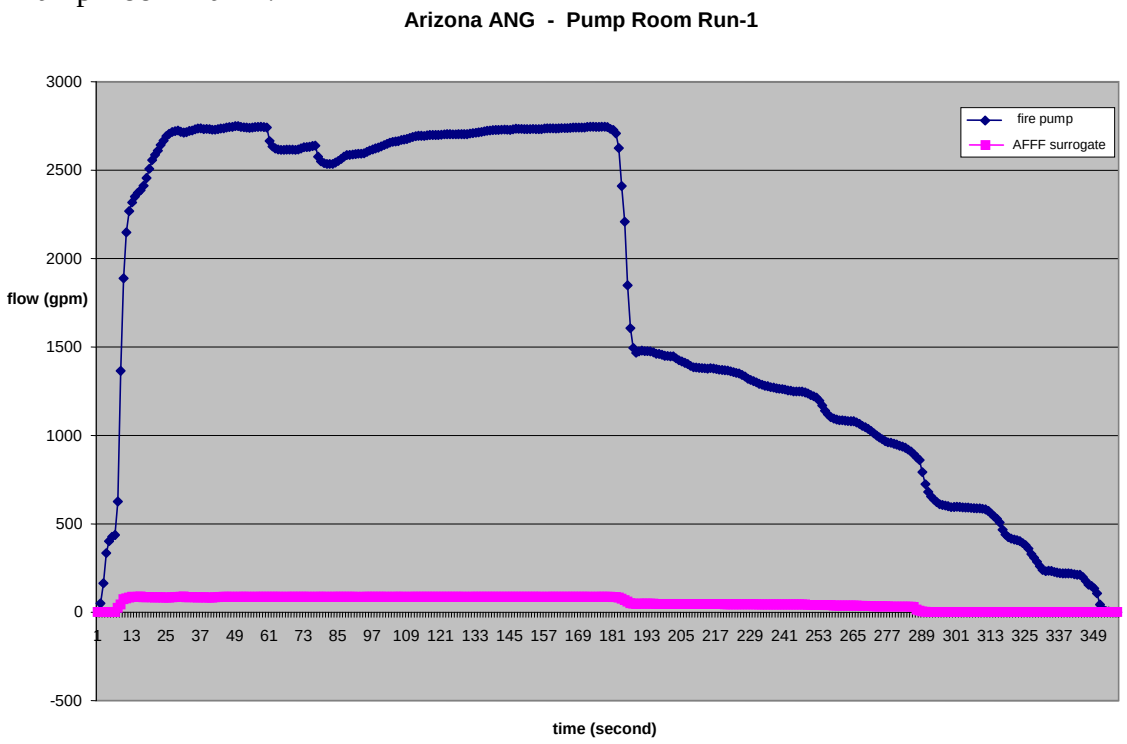
DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	WATER DISCHARGE TIME (SEC)			COMMENTS / PROBLEMS
Pump:	2750	132			water press = 100 psi
AFFF:	93	132			AFFF press = 80 psi
Nozzles:					
1.	322	132			
2.	336	132			
3.	363	132			
4.	345	132			
5.	354	132			
6.	322	132			
7.	363	132			
8.	345	132			
9.	340	132			

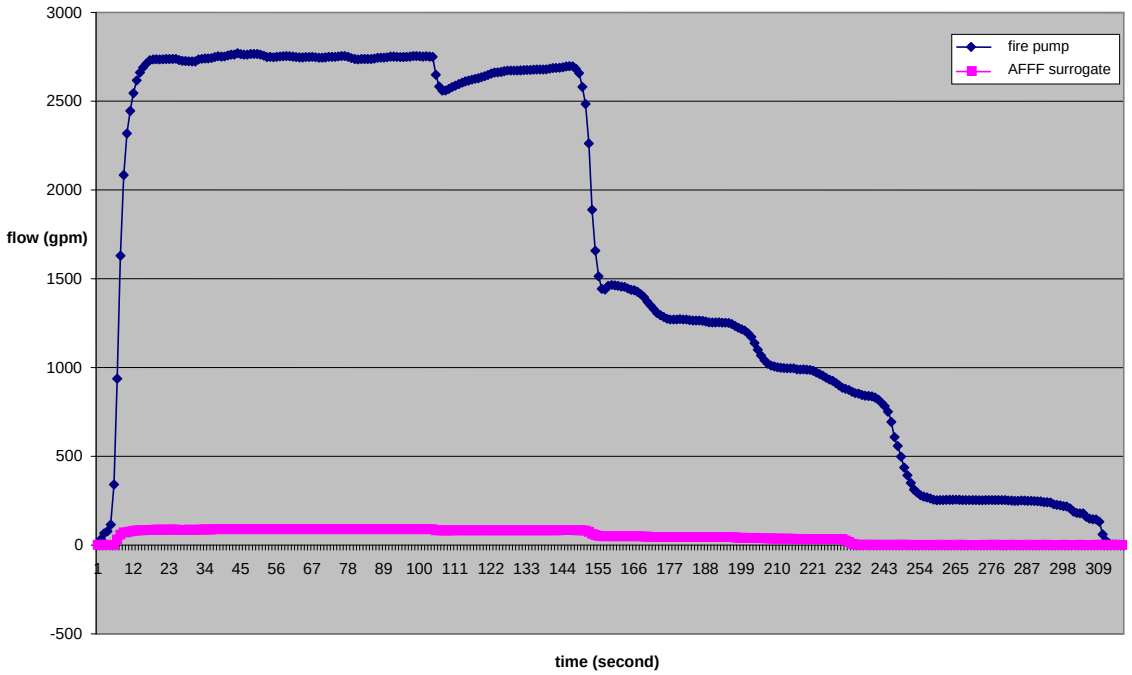
NOTE: Blank = NO DATA

24-apr-06, hangar.xls

Pump Room Run-1:



Pump Room Run-2:



Pump Room Run-1 and Run-2 Data:

TOA5	CR3000	CR3000		1571	CR3000.Std.05	CPU:1arizonapmprm.CR3
TIMESTAMP	RECORD	Batt_Volt	Measure		Measure_2	
TS	RN	Volts	mV		mV	
		Smp	Smp		Smp	

RUN-1:

4/4/2008 7:55	1945	13.23	-0.564	0.702
4/4/2008 7:55	1946	13.23	49.71	0.702
4/4/2008 7:55	1947	13.23	164.2	0.702
4/4/2008 7:55	1948	13.23	334.9	0.521
4/4/2008 7:55	1949	13.23	401.3	0.34
4/4/2008 7:55	1950	13.23	426.8	0.702
4/4/2008 7:55	1951	13.23	436.9	0.702
4/4/2008 7:55	1952	13.23	626.1	25.03
4/4/2008 7:55	1953	13.23	1365	43.47
4/4/2008 7:55	1954	13.23	1889	73.61
4/4/2008 7:55	1955	13.23	2148	78.44
4/4/2008 7:55	1956	13.23	2269	82.60
4/4/2008 7:55	1957	13.23	2318	87
4/4/2008 7:55	1958	13.23	2351	86.81
4/4/2008 7:55	1959	13.23	2372	87.47
4/4/2008 7:55	1960	13.23	2387	88.82
4/4/2008 7:55	1961	13.23	2412	83.81
4/4/2008 7:55	1962	13.23	2456	84
4/4/2008 7:55	1963	13.23	2508	85.11
4/4/2008 7:55	1964	13.23	2557	83.75
4/4/2008 7:55	1965	13.23	2587	82.92
4/4/2008 7:55	1966	13.23	2611	84.28
4/4/2008 7:55	1967	13.23	2642	83.74
4/4/2008 7:55	1968	13.23	2668	83.31
4/4/2008 7:55	1969	13.23	2693	82.87
4/4/2008 7:55	1970	13.23	2706	82.83
4/4/2008 7:55	1971	13.23	2716	84.61
4/4/2008 7:55	1972	13.23	2721	85.55
4/4/2008 7:55	1973	13.23	2724	85.83
4/4/2008 7:55	1974	13.23	2718	87.43
4/4/2008 7:55	1975	13.23	2713	88.82
4/4/2008 7:55	1976	13.23	2715	83.81
4/4/2008 7:55	1977	13.23	2722	84
4/4/2008 7:55	1978	13.23	2725	85.11
4/4/2008 7:55	1979	13.23	2731	83.75
4/4/2008 7:55	1980	13.23	2736	82.92
4/4/2008 7:55	1981	13.23	2737	84.28
4/4/2008 7:55	1982	13.23	2733	83.74
4/4/2008 7:55	1983	13.23	2734	83.31
4/4/2008 7:55	1984	13.23	2732	82.87

4/4/2008 7:55	1985	13.23	2729	82.83
4/4/2008 7:55	1986	13.23	2729	84.61
4/4/2008 7:55	1987	13.23	2733	85.55
4/4/2008 7:55	1988	13.23	2736	85.83
4/4/2008 7:55	1989	13.23	2737	87
4/4/2008 7:55	1990	13.23	2741	87.58
4/4/2008 7:55	1991	13.23	2744	87.54
4/4/2008 7:55	1992	13.23	2745	87.23
4/4/2008 7:55	1993	13.23	2749	85.84
4/4/2008 7:55	1994	13.23	2749	87.23
4/4/2008 7:55	1995	13.23	2745	87.47
4/4/2008 7:55	1996	13.23	2743	87.54
4/4/2008 7:55	1997	13.23	2741	87.46
4/4/2008 7:55	1998	13.23	2739	87.21
4/4/2008 7:55	1999	13.23	2741	86.85
4/4/2008 7:55	2000	13.23	2744	87.23
4/4/2008 7:55	2001	13.23	2745	87.74
4/4/2008 7:55	2002	13.23	2746	87.47
4/4/2008 7:55	2003	13.23	2744	87
4/4/2008 7:56	2004	13.23	2742	87
4/4/2008 7:56	2005	13.23	2665	87.27
4/4/2008 7:56	2006	13.23	2634	87.45
4/4/2008 7:56	2007	13.23	2623	87.53
4/4/2008 7:56	2008	13.23	2618	87.44
4/4/2008 7:56	2009	13.23	2615	87
4/4/2008 7:56	2010	13.23	2615	86.84
4/4/2008 7:56	2011	13.23	2616	87.27
4/4/2008 7:56	2012	13.23	2616	87.43
4/4/2008 7:56	2013	13.23	2616	87.42
4/4/2008 7:56	2014	13.23	2615	87.27
4/4/2008 7:56	2015	13.23	2617	87
4/4/2008 7:56	2016	13.23	2623	87
4/4/2008 7:56	2017	13.23	2630	87.47
4/4/2008 7:56	2018	13.23	2631	87.53
4/4/2008 7:56	2019	13.23	2632	87
4/4/2008 7:56	2020	13.23	2637	86.87
4/4/2008 7:56	2021	13.23	2639	87.25
4/4/2008 7:56	2022	13.23	2576	87.46
4/4/2008 7:56	2023	13.23	2550	87.45
4/4/2008 7:56	2024	13.23	2540	87.46
4/4/2008 7:56	2025	13.23	2536	87
4/4/2008 7:56	2026	13.23	2536	86.83
4/4/2008 7:56	2027	13.23	2536	87.25
4/4/2008 7:56	2028	13.23	2543	87.74
4/4/2008 7:56	2029	13.23	2552	87.47
4/4/2008 7:56	2030	13.23	2564	87
4/4/2008 7:56	2031	13.23	2576	87
4/4/2008 7:56	2032	13.23	2585	87.25
4/4/2008 7:56	2033	13.23	2587	87.25

4/4/2008 7:56	2034	13.23	2589	87.58
4/4/2008 7:56	2035	13.23	2591	87.46
4/4/2008 7:56	2036	13.23	2593	86.81
4/4/2008 7:56	2037	13.23	2594	86.81
4/4/2008 7:56	2038	13.23	2596	87.47
4/4/2008 7:56	2039	13.23	2604	87.47
4/4/2008 7:56	2040	13.23	2612	87.45
4/4/2008 7:56	2041	13.23	2618	87
4/4/2008 7:56	2042	13.23	2623	87.25
4/4/2008 7:56	2043	13.23	2628	87
4/4/2008 7:56	2044	13.23	2634	87.47
4/4/2008 7:56	2045	13.23	2643	87.77
4/4/2008 7:56	2046	13.23	2649	87.25
4/4/2008 7:56	2047	13.23	2656	86.87
4/4/2008 7:56	2048	13.23	2661	87
4/4/2008 7:56	2049	13.23	2663	87.33
4/4/2008 7:56	2050	13.23	2664	87.57
4/4/2008 7:56	2051	13.23	2671	87.32
4/4/2008 7:56	2052	13.23	2673	87.27
4/4/2008 7:56	2053	13.23	2677	86.81
4/4/2008 7:56	2054	13.23	2682	87.26
4/4/2008 7:56	2055	13.23	2688	87.57
4/4/2008 7:56	2056	13.23	2693	87.36
4/4/2008 7:56	2057	13.23	2695	87
4/4/2008 7:56	2058	13.23	2695	87
4/4/2008 7:56	2059	13.23	2694	87.26
4/4/2008 7:56	2060	13.23	2697	87.52
4/4/2008 7:56	2061	13.23	2699	87.73
4/4/2008 7:56	2062	13.23	2699	87.39
4/4/2008 7:56	2063	13.23	2699	87
4/4/2008 7:57	2064	13.23	2699	87
4/4/2008 7:57	2065	13.23	2700	87.28
4/4/2008 7:57	2066	13.23	2703	87.51
4/4/2008 7:57	2067	13.23	2704	87.35
4/4/2008 7:57	2068	13.23	2704	87.21
4/4/2008 7:57	2069	13.23	2703	87.22
4/4/2008 7:57	2070	13.23	2703	87
4/4/2008 7:57	2071	13.23	2704	87.53
4/4/2008 7:57	2072	13.23	2704	87.77
4/4/2008 7:57	2073	13.23	2704	87.28
4/4/2008 7:57	2074	13.23	2704	86.81
4/4/2008 7:57	2075	13.23	2707	87
4/4/2008 7:57	2076	13.23	2710	87.53
4/4/2008 7:57	2077	13.23	2712	87.53
4/4/2008 7:57	2078	13.23	2714	87.37
4/4/2008 7:57	2079	13.23	2717	87.26
4/4/2008 7:57	2080	13.23	2720	87
4/4/2008 7:57	2081	13.23	2723	87.27
4/4/2008 7:57	2082	13.23	2724	87.71

4/4/2008 7:57	2083	13.23	2727	87.53
4/4/2008 7:57	2084	13.23	2728	87
4/4/2008 7:57	2085	13.23	2728	87
4/4/2008 7:57	2086	13.23	2729	87.27
4/4/2008 7:57	2087	13.23	2730	87.36
4/4/2008 7:57	2088	13.23	2729	87.73
4/4/2008 7:57	2089	13.23	2728	87.36
4/4/2008 7:57	2090	13.23	2731	87
4/4/2008 7:57	2091	13.23	2735	87
4/4/2008 7:57	2092	13.23	2734	87.29
4/4/2008 7:57	2093	13.23	2734	87.58
4/4/2008 7:57	2094	13.23	2733	87.33
4/4/2008 7:57	2095	13.23	2732	87.24
4/4/2008 7:57	2096	13.23	2733	87.23
4/4/2008 7:57	2097	13.23	2734	87
4/4/2008 7:57	2098	13.23	2733	87.51
4/4/2008 7:57	2099	13.23	2732	87.53
4/4/2008 7:57	2100	13.23	2733	87.27
4/4/2008 7:57	2101	13.23	2736	86.84
4/4/2008 7:57	2102	13.23	2737	87
4/4/2008 7:57	2103	13.23	2737	87.23
4/4/2008 7:57	2104	13.23	2737	87.56
4/4/2008 7:57	2105	13.23	2736	87.36
4/4/2008 7:57	2106	13.23	2737	87.25
4/4/2008 7:57	2107	13.23	2738	87
4/4/2008 7:57	2108	13.23	2738	87.27
4/4/2008 7:57	2109	13.23	2738	87.33
4/4/2008 7:57	2110	13.23	2739	87.32
4/4/2008 7:57	2111	13.23	2741	87.21
4/4/2008 7:57	2112	13.23	2741	87
4/4/2008 7:57	2113	13.23	2742	87.25
4/4/2008 7:57	2114	13.23	2741	87.57
4/4/2008 7:57	2115	13.23	2742	87.73
4/4/2008 7:57	2116	13.23	2745	87.35
4/4/2008 7:57	2117	13.23	2746	87
4/4/2008 7:57	2118	13.23	2746	86.81
4/4/2008 7:57	2119	13.23	2745	87.35
4/4/2008 7:57	2120	13.23	2745	87.35
4/4/2008 7:57	2121	13.23	2746	87.34
4/4/2008 7:57	2122	13.23	2746	87
4/4/2008 7:57	2123	13.23	2744	87.21
4/4/2008 7:58	2124	13.23	2734	87
4/4/2008 7:58	2125	13.23	2728	85.71
4/4/2008 7:58	2126	13.23	2708	84.91
4/4/2008 7:58	2127	13.23	2625	82.94
4/4/2008 7:58	2128	13.23	2410	76.43
4/4/2008 7:58	2129	13.23	2209	68.17
4/4/2008 7:58	2130	13.23	1849	59.91
4/4/2008 7:58	2131	13.23	1606	51.47

4/4/2008 7:58	2132	13.23	1495	47.53
4/4/2008 7:58	2133	13.23	1468	47
4/4/2008 7:58	2134	13.23	1476	47.47
4/4/2008 7:58	2135	13.23	1480	47.96
4/4/2008 7:58	2136	13.23	1477	47.35
4/4/2008 7:58	2137	13.23	1477	47.34
4/4/2008 7:58	2138	13.23	1476	47.21
4/4/2008 7:58	2139	13.23	1470	47.17
4/4/2008 7:58	2140	13.23	1462	46.93
4/4/2008 7:58	2141	13.23	1461	46.93
4/4/2008 7:58	2142	13.23	1456	46.36
4/4/2008 7:58	2143	13.23	1450	46.17
4/4/2008 7:58	2144	13.23	1449	46.13
4/4/2008 7:58	2145	13.22	1447	46.11
4/4/2008 7:58	2146	13.23	1447	46.11
4/4/2008 7:58	2147	13.23	1436	46.11
4/4/2008 7:58	2148	13.23	1425	45.98
4/4/2008 7:58	2149	13.23	1418	45.73
4/4/2008 7:58	2150	13.23	1411	45.71
4/4/2008 7:58	2151	13.23	1404	45.37
4/4/2008 7:58	2152	13.23	1394	45.57
4/4/2008 7:58	2153	13.23	1385	45.25
4/4/2008 7:58	2154	13.23	1384	45.24
4/4/2008 7:58	2155	13.23	1382	45.24
4/4/2008 7:58	2156	13.23	1381	45.23
4/4/2008 7:58	2157	13.23	1380	45.22
4/4/2008 7:58	2158	13.23	1378	45.22
4/4/2008 7:58	2159	13.23	1381	45.21
4/4/2008 7:58	2160	13.23	1379	45.21
4/4/2008 7:58	2161	13.23	1375	45.21
4/4/2008 7:58	2162	13.23	1372	44.91
4/4/2008 7:58	2163	13.23	1371	44.91
4/4/2008 7:58	2164	13.23	1368	44.68
4/4/2008 7:58	2165	13.23	1367	44.25
4/4/2008 7:58	2166	13.23	1363	44.25
4/4/2008 7:58	2167	13.23	1358	44.24
4/4/2008 7:58	2168	13.23	1354	44.24
4/4/2008 7:58	2169	13.23	1350	44.24
4/4/2008 7:58	2170	13.23	1342	44.23
4/4/2008 7:58	2171	13.23	1333	44.23
4/4/2008 7:58	2172	13.23	1321	44.21
4/4/2008 7:58	2173	13.23	1314	44.21
4/4/2008 7:58	2174	13.23	1307	44.23
4/4/2008 7:58	2175	13.23	1300	43.71
4/4/2008 7:58	2176	13.22	1292	43.11
4/4/2008 7:58	2177	13.23	1287	43.11
4/4/2008 7:58	2178	13.22	1281	43.11
4/4/2008 7:58	2179	13.23	1278	43.12
4/4/2008 7:58	2180	13.23	1273	43.12

4/4/2008 7:58	2181	13.23	1270	43.11
4/4/2008 7:58	2182	13.23	1266	42.98
4/4/2008 7:58	2183	13.23	1264	42.97
4/4/2008 7:59	2184	13.23	1262	42.97
4/4/2008 7:59	2185	13.23	1259	42.97
4/4/2008 7:59	2186	13.23	1255	42.97
4/4/2008 7:59	2187	13.23	1253	42.95
4/4/2008 7:59	2188	13.23	1249	42.91
4/4/2008 7:59	2189	13.23	1249	42.91
4/4/2008 7:59	2190	13.22	1249	42.91
4/4/2008 7:59	2191	13.23	1248	42.89
4/4/2008 7:59	2192	13.23	1243	42.85
4/4/2008 7:59	2193	13.23	1237	41.13
4/4/2008 7:59	2194	13.23	1228	41.13
4/4/2008 7:59	2195	13.22	1221	41.15
4/4/2008 7:59	2196	13.23	1213	41.13
4/4/2008 7:59	2197	13.22	1197	41.09
4/4/2008 7:59	2198	13.23	1169	40.91
4/4/2008 7:59	2199	13.23	1140	39.51
4/4/2008 7:59	2200	13.23	1119	39.36
4/4/2008 7:59	2201	13.23	1103	39.29
4/4/2008 7:59	2202	13.23	1095	37.94
4/4/2008 7:59	2203	13.23	1089	37.53
4/4/2008 7:59	2204	13.23	1086	37.35
4/4/2008 7:59	2205	13.23	1086	37.34
4/4/2008 7:59	2206	13.23	1084	37.34
4/4/2008 7:59	2207	13.22	1082	37.34
4/4/2008 7:59	2208	13.22	1080	37.21
4/4/2008 7:59	2209	13.23	1080	37.17
4/4/2008 7:59	2210	13.22	1073	36.95
4/4/2008 7:59	2211	13.22	1065	36.35
4/4/2008 7:59	2212	13.23	1054	35.37
4/4/2008 7:59	2213	13.23	1046	35.17
4/4/2008 7:59	2214	13.23	1037	34.47
4/4/2008 7:59	2215	13.22	1026	34
4/4/2008 7:59	2216	13.23	1012	33.39
4/4/2008 7:59	2217	13.22	999	33.16
4/4/2008 7:59	2218	13.23	988	33.12
4/4/2008 7:59	2219	13.22	978	32.79
4/4/2008 7:59	2220	13.22	968	32.51
4/4/2008 7:59	2221	13.23	961	32.41
4/4/2008 7:59	2222	13.23	958	32.18
4/4/2008 7:59	2223	13.22	953	32.18
4/4/2008 7:59	2224	13.23	948	32.15
4/4/2008 7:59	2225	13.22	941	32.11
4/4/2008 7:59	2226	13.23	937	32.11
4/4/2008 7:59	2227	13.22	930	31.94
4/4/2008 7:59	2228	13.23	920	31.91
4/4/2008 7:59	2229	13.23	908	30.92

4/4/2008 7:59	2230	13.22	894	29.73
4/4/2008 7:59	2231	13.22	877	14.37
4/4/2008 7:59	2232	13.23	861	9.16
4/4/2008 7:59	2233	13.22	792.4	3.915
4/4/2008 7:59	2234	13.23	723.5	2.106
4/4/2008 7:59	2235	13.22	681.2	1.021
4/4/2008 7:59	2236	13.23	654.2	0.66
4/4/2008 7:59	2237	13.23	637.6	0.841
4/4/2008 7:59	2238	13.23	622.2	0.66
4/4/2008 7:59	2239	13.22	611.7	0.66
4/4/2008 7:59	2240	13.23	607	0.66
4/4/2008 7:59	2241	13.22	603.4	0.658
4/4/2008 7:59	2242	13.22	599.4	0.477
4/4/2008 7:59	2243	13.22	594.7	0.658
4/4/2008 8:00	2244	13.23	595.3	0.658
4/4/2008 8:00	2245	13.22	596.5	0.658
4/4/2008 8:00	2246	13.22	595.3	0.477
4/4/2008 8:00	2247	13.22	592.7	0.658
4/4/2008 8:00	2248	13.22	591.5	0.658
4/4/2008 8:00	2249	13.22	591.8	0.477
4/4/2008 8:00	2250	13.22	589.3	0.658
4/4/2008 8:00	2251	13.23	588.6	0.477
4/4/2008 8:00	2252	13.23	587.7	0.477
4/4/2008 8:00	2253	13.22	587.1	0.658
4/4/2008 8:00	2254	13.22	584.6	0.477
4/4/2008 8:00	2255	13.22	581.5	0.477
4/4/2008 8:00	2256	13.22	572.7	0.477
4/4/2008 8:00	2257	13.22	557.5	0.658
4/4/2008 8:00	2258	13.22	541.9	0.658
4/4/2008 8:00	2259	13.22	528.2	0.477
4/4/2008 8:00	2260	13.23	507.4	0.658
4/4/2008 8:00	2261	13.23	467.1	0.477
4/4/2008 8:00	2262	13.23	438.8	0.477
4/4/2008 8:00	2263	13.22	424	0.658
4/4/2008 8:00	2264	13.22	416.1	0.658
4/4/2008 8:00	2265	13.22	411	0.477
4/4/2008 8:00	2266	13.22	407.7	0.477
4/4/2008 8:00	2267	13.22	401.6	0.477
4/4/2008 8:00	2268	13.23	390.4	0.658
4/4/2008 8:00	2269	13.22	379.2	0.476
4/4/2008 8:00	2270	13.22	359.1	0.656
4/4/2008 8:00	2271	13.22	328.7	0.476
4/4/2008 8:00	2272	13.22	308.1	0.476
4/4/2008 8:00	2273	13.23	285.9	0.476
4/4/2008 8:00	2274	13.22	260.7	0.656
4/4/2008 8:00	2275	13.22	238.6	0.656
4/4/2008 8:00	2276	13.22	231.8	0.476
4/4/2008 8:00	2277	13.22	234.1	0.656
4/4/2008 8:00	2278	13.22	232.9	0.476

4/4/2008 8:00	2279	13.22	227.6	0.476
4/4/2008 8:00	2280	13.22	224	0.656
4/4/2008 8:00	2281	13.22	220.9	0.476
4/4/2008 8:00	2282	13.22	220	0.476
4/4/2008 8:00	2283	13.22	220	0.476
4/4/2008 8:00	2284	13.22	220	0.476
4/4/2008 8:00	2285	13.23	218.6	0.656
4/4/2008 8:00	2286	13.22	214.8	0.476
4/4/2008 8:00	2287	13.22	212.1	0.656
4/4/2008 8:00	2288	13.22	211.9	0.476
4/4/2008 8:00	2289	13.22	198.3	0.476
4/4/2008 8:00	2290	13.22	177	0.476
4/4/2008 8:00	2291	13.22	156.2	0.476
4/4/2008 8:00	2292	13.22	148.8	0.656
4/4/2008 8:00	2293	13.22	133.8	0.476
4/4/2008 8:00	2294	13.22	106.3	0.476
4/4/2008 8:00	2295	13.22	42.79	0.476
4/4/2008 8:00	2296	13.22	17.11	0.476
4/4/2008 8:00	2297	13.22	6.808	0.478
4/4/2008 8:00	2298	13.22	2.829	0.659
4/4/2008 8:00	2299	13.22	1.383	0.478
4/4/2008 8:00	2300	13.22	0.297	0.478
4/4/2008 8:00	2301	13.22	-0.064	0.478

RUN-2:

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4/4/2008 8:31	4145	13.21	33.18	0.629
4/4/2008 8:31	4146	13.21	65.37	0.629
4/4/2008 8:31	4147	13.21	77.31	0.629
4/4/2008 8:31	4148	13.21	114.4	0.448
4/4/2008 8:31	4149	13.21	341	0.448
4/4/2008 8:31	4150	13.21	938	30.37
4/4/2008 8:31	4151	13.21	1629	58.36
4/4/2008 8:31	4152	13.21	2084	70.54
4/4/2008 8:31	4153	13.21	2318	71.97
4/4/2008 8:31	4154	13.21	2446	76.49
4/4/2008 8:31	4155	13.21	2545	79.48
4/4/2008 8:31	4156	13.21	2617	81.29
4/4/2008 8:31	4157	13.21	2661	83.24
4/4/2008 8:31	4158	13.21	2691	83.36
4/4/2008 8:31	4159	13.21	2713	85.14
4/4/2008 8:31	4160	13.21	2731	85.53
4/4/2008 8:31	4161	13.21	2735	85.53
4/4/2008 8:31	4162	13.21	2736	86.53
4/4/2008 8:31	4163	13.21	2735	86.53
4/4/2008 8:32	4164	13.21	2736	85.53
4/4/2008 8:32	4165	13.21	2737	86.53
4/4/2008 8:32	4166	13.21	2738	86

4/4/2008 8:32	4167	13.21	2737	86.19
4/4/2008 8:32	4168	13.21	2739	86.17
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4/4/2008 8:32	4170	13.21	2727	85.43
4/4/2008 8:32	4171	13.21	2726	85.43
4/4/2008 8:32	4172	13.21	2725	85.81
4/4/2008 8:32	4173	13.21	2724	85.53
4/4/2008 8:32	4174	13.21	2724	85.54
4/4/2008 8:32	4175	13.21	2735	86.56
4/4/2008 8:32	4176	13.21	2739	86.56
4/4/2008 8:32	4177	13.21	2741	87.58
4/4/2008 8:32	4178	13.21	2741	87.35
4/4/2008 8:32	4179	13.21	2743	87.43
4/4/2008 8:32	4180	13.21	2749	88.47
4/4/2008 8:32	4181	13.21	2753	88.13
4/4/2008 8:32	4182	13.21	2751	88.54
4/4/2008 8:32	4183	13.21	2752	88.54
4/4/2008 8:32	4184	13.21	2758	88.59
4/4/2008 8:32	4185	13.21	2762	88.56
4/4/2008 8:32	4186	13.21	2763	88.51
4/4/2008 8:32	4187	13.21	2770	88.73
4/4/2008 8:32	4188	13.21	2765	88.53
4/4/2008 8:32	4189	13.21	2763	88.56
4/4/2008 8:32	4190	13.21	2763	88.51
4/4/2008 8:32	4191	13.21	2766	88.56
4/4/2008 8:32	4192	13.21	2766	88.57
4/4/2008 8:32	4193	13.21	2766	88.53
4/4/2008 8:32	4194	13.21	2762	88.53
4/4/2008 8:32	4195	13.21	2757	88.51
4/4/2008 8:32	4196	13.21	2749	88.47
4/4/2008 8:32	4197	13.21	2750	88.47
4/4/2008 8:32	4198	13.21	2748	88.47
4/4/2008 8:32	4199	13.21	2750	88.47
4/4/2008 8:32	4200	13.21	2752	88.47
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4/4/2008 8:32	4202	13.21	2754	88.47
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4/4/2008 8:32	4204	13.21	2751	88.46
4/4/2008 8:32	4205	13.21	2749	88.46
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4/4/2008 8:32	4207	13.21	2747	88.45
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4/4/2008 8:32	4209	13.21	2749	88.46
4/4/2008 8:32	4210	13.21	2750	88.47
4/4/2008 8:32	4211	13.21	2748	88.47
4/4/2008 8:32	4212	13.21	2746	88.46
4/4/2008 8:32	4213	13.21	2745	88.46
4/4/2008 8:32	4214	13.21	2747	88.46
4/4/2008 8:32	4215	13.21	2750	88.47

4/4/2008 8:32	4216	13.21	2750	88.47
4/4/2008 8:32	4217	13.21	2750	88.47
4/4/2008 8:32	4218	13.21	2752	88.47
4/4/2008 8:32	4219	13.21	2754	88.48
4/4/2008 8:32	4220	13.21	2754	88.48
4/4/2008 8:32	4221	13.21	2750	88.47
4/4/2008 8:32	4222	13.21	2743	88.43
4/4/2008 8:32	4223	13.21	2738	88.39
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4/4/2008 8:33	4225	13.21	2737	88.39
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4/4/2008 8:33	4231	13.21	2746	88.42
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4/4/2008 8:33	4233	13.21	2748	88.43
4/4/2008 8:33	4234	13.21	2751	88.45
4/4/2008 8:33	4235	13.21	2751	88.45
4/4/2008 8:33	4236	13.21	2750	88.45
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4/4/2008 8:33	4241	13.21	2754	88.46
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4/4/2008 8:33	4243	13.21	2753	88.46
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4/4/2008 8:33	4250	13.21	2559	82.31
4/4/2008 8:33	4251	13.21	2560	82.31
4/4/2008 8:33	4252	13.21	2569	82.31
4/4/2008 8:33	4253	13.21	2580	82.55
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4/4/2008 8:33	4256	13.21	2604	82.67
4/4/2008 8:33	4257	13.21	2611	82.69
4/4/2008 8:33	4258	13.21	2616	82.69
4/4/2008 8:33	4259	13.21	2622	82.71
4/4/2008 8:33	4260	13.21	2626	82.72
4/4/2008 8:33	4261	13.21	2629	82.73
4/4/2008 8:33	4262	13.21	2635	82.78
4/4/2008 8:33	4263	13.21	2641	82.91
4/4/2008 8:33	4264	13.21	2648	82.91

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4/4/2008 8:33	4271	13.21	2673	83.29
4/4/2008 8:33	4272	13.21	2673	83.29
4/4/2008 8:33	4273	13.21	2673	83.29
4/4/2008 8:33	4274	13.21	2674	83.29
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4/4/2008 8:33	4282	13.21	2680	83.36
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4/4/2008 8:34	4288	13.21	2695	83.93
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4/4/2008 8:34	4294	13.21	2484	80.14
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4/4/2008 8:34	4296	13.21	1889	61.95
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4/4/2008 8:34	4298	13.21	1514	50.75
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4/4/2008 8:34	4304	13.21	1460	48.98
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4/4/2008 8:34	4310	13.21	1426	48.71
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4/4/2008 8:34	4313	13.21	1372	46.71

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4/4/2008 8:34	4316	13.21	1307	44.84
4/4/2008 8:34	4317	13.21	1295	44.81
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4/4/2008 8:34	4319	13.21	1275	44.38
4/4/2008 8:34	4320	13.21	1271	44.36
4/4/2008 8:34	4321	13.21	1270	44.35
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4/4/2008 8:34	4323	13.21	1273	44.36
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4/4/2008 8:34	4325	13.21	1270	44.36
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4/4/2008 8:34	4328	13.21	1265	44.34
4/4/2008 8:34	4329	13.21	1265	44.34
4/4/2008 8:34	4330	13.21	1262	44.34
4/4/2008 8:34	4331	13.21	1259	44.33
4/4/2008 8:34	4332	13.21	1255	44.33
4/4/2008 8:34	4333	13.21	1253	44.33
4/4/2008 8:34	4334	13.21	1253	44.35
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4/4/2008 8:34	4336	13.21	1252	44.34
4/4/2008 8:34	4337	13.21	1252	44.34
4/4/2008 8:34	4338	13.21	1251	44.34
4/4/2008 8:34	4339	13.21	1244	44.34
4/4/2008 8:34	4340	13.21	1234	42.33
4/4/2008 8:34	4341	13.21	1224	41.31
4/4/2008 8:34	4342	13.21	1216	41.31
4/4/2008 8:34	4343	13.21	1208	40.29
4/4/2008 8:35	4344	13.21	1192	40.26
4/4/2008 8:35	4345	13.21	1173	40.12
4/4/2008 8:35	4346	13.21	1138	39.15
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4/4/2008 8:35	4349	13.21	1041	37.79
4/4/2008 8:35	4350	13.21	1022	37.14
4/4/2008 8:35	4351	13.21	1011	36.31
4/4/2008 8:35	4352	13.21	1006	36.11
4/4/2008 8:35	4353	13.21	1001	36.05
4/4/2008 8:35	4354	13.21	999	35.13
4/4/2008 8:35	4355	13.21	997	35.11
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4/4/2008 8:35	4358	13.21	996	33.92
4/4/2008 8:35	4359	13.21	990	33.41
4/4/2008 8:35	4360	13.21	989	33.56
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4/4/2008 8:35	4362	13.21	987	33.38

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4/4/2008 8:35	4366	13.21	963	33.31
4/4/2008 8:35	4367	13.21	953	33.15
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4/4/2008 8:35	4374	13.21	880	25.03
4/4/2008 8:35	4375	13.21	874	17.44
4/4/2008 8:35	4376	13.21	864	7.136
4/4/2008 8:35	4377	13.21	856	3.158
4/4/2008 8:35	4378	13.21	852	1.53
4/4/2008 8:35	4379	13.21	846	0.988
4/4/2008 8:35	4380	13.21	841	0.626
4/4/2008 8:35	4381	13.21	840	0.626
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4/4/2008 8:35	4383	13.21	831	0.626
4/4/2008 8:35	4384	13.21	819	0.626
4/4/2008 8:35	4385	13.21	801	0.445
4/4/2008 8:35	4386	13.21	782	0.626
4/4/2008 8:35	4387	13.21	751.5	0.626
4/4/2008 8:35	4388	13.21	692.7	0.445
4/4/2008 8:35	4389	13.21	607.5	0.626
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4/4/2008 8:35	4402	13.21	252	0.443
4/4/2008 8:35	4403	13.21	253.4	0.624
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4/4/2008 8:36	4405	13.21	254.3	0.443
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4/4/2008 8:36	4408	13.21	256.1	0.443
4/4/2008 8:36	4409	13.21	254.3	0.624
4/4/2008 8:36	4410	13.21	253.4	0.624
4/4/2008 8:36	4411	13.21	253.4	0.443

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4/4/2008 8:36	4413	13.21	253.8	0.443
4/4/2008 8:36	4414	13.21	253.6	0.443
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4/4/2008 8:36	4416	13.21	252.7	0.443
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4/4/2008 8:36	4419	13.21	253.3	0.624
4/4/2008 8:36	4420	13.21	252.9	0.624
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4/4/2008 8:36	4423	13.21	253.6	0.443
4/4/2008 8:36	4424	13.21	251.4	0.624
4/4/2008 8:36	4425	13.21	249.5	0.441
4/4/2008 8:36	4426	13.21	248.7	0.622
4/4/2008 8:36	4427	13.21	249.1	0.441
4/4/2008 8:36	4428	13.21	250.7	0.441
4/4/2008 8:36	4429	13.21	250.4	0.26
4/4/2008 8:36	4430	13.21	249.3	0.622
4/4/2008 8:36	4431	13.21	248.9	0.622
4/4/2008 8:36	4432	13.21	248	0.441
4/4/2008 8:36	4433	13.21	246.4	0.26
4/4/2008 8:36	4434	13.21	245.3	0.622
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4/4/2008 8:36	4436	13.21	240.8	0.622
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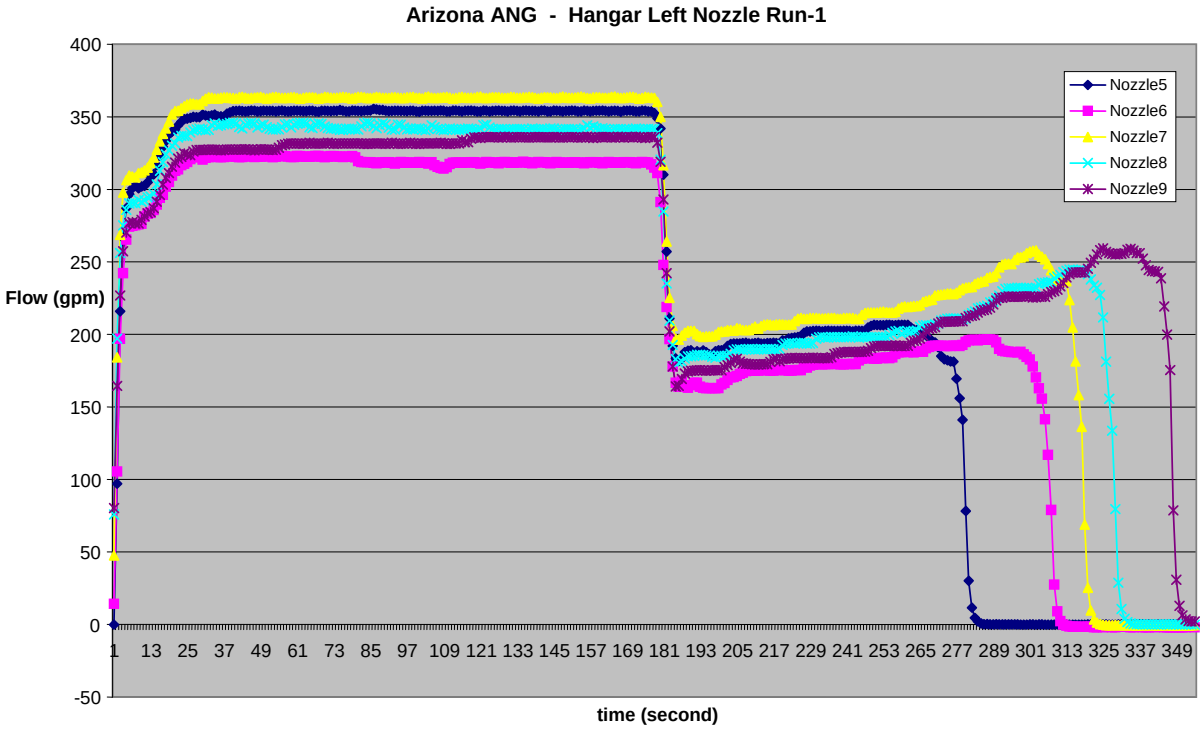
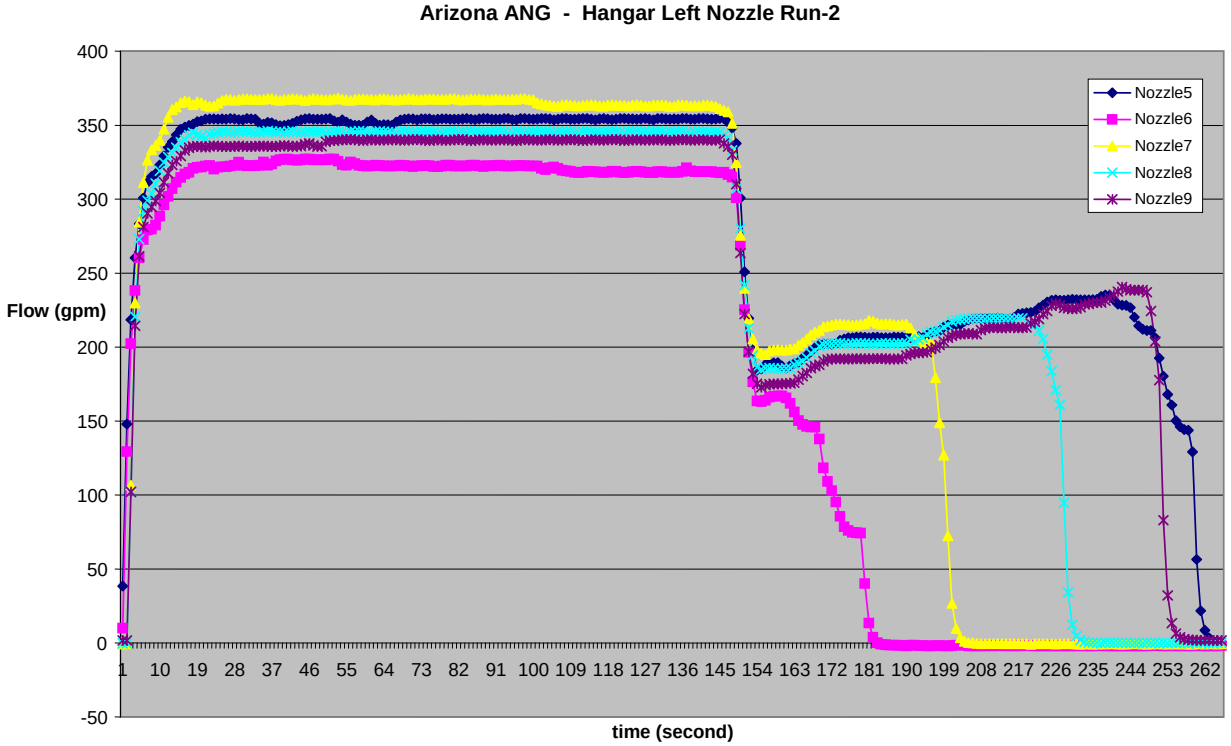
4/4/2008 8:36	4440	13.21	224.3	0.441
4/4/2008 8:36	4441	13.21	219.6	0.622
4/4/2008 8:36	4442	13.21	216.9	0.441
4/4/2008 8:36	4443	13.21	207	0.26
4/4/2008 8:36	4444	13.21	188.3	0.441
4/4/2008 8:36	4445	13.21	181.1	0.441
4/4/2008 8:36	4446	13.21	178.6	0.622
4/4/2008 8:36	4447	13.21	178	0.441
4/4/2008 8:36	4448	13.21	157.8	0.441
4/4/2008 8:36	4449	13.21	148.9	0.26
4/4/2008 8:36	4450	13.21	145.5	0.26
4/4/2008 8:36	4451	13.21	144.2	0.622
4/4/2008 8:36	4452	13.21	131.9	0.622
4/4/2008 8:36	4453	13.21	59.94	0.624
4/4/2008 8:36	4454	13.21	23.59	0.624
4/4/2008 8:36	4455	13.21	9.3	0.443
4/4/2008 8:36	4456	13.21	3.879	0.263
4/4/2008 8:36	4457	13.21	1.709	0.624
4/4/2008 8:36	4458	13.21	0.443	0.624
4/4/2008 8:36	4459	13.21	-0.099	0.443

Hangar Left Nozzles Run-1:



Hangar Left Nozzle Run-2:



Hangar left Nozzles Run-1 and Run-2 Data:

TOA5	CR3000	CR3000.Std.05	CR3000	1569		8866	
TIMESTAMP	RECORD	Batt_Volt	Measure_10	Measure_12	Measure_13	Measure_14	Measure_15
TS	RN	Volts	mV	mV	mV	mV	mV
		Smp	Smp	Smp	Smp	Smp	Smp
RUN-1:							
4/4/2008 7:54	178	13.26	-0.133	14.13	47.55	75.9	80.2
4/4/2008 7:54	179	13.26	97	105.5	184.1	197.1	164.4
4/4/2008 7:54	180	13.25	215.9	196.9	268.6	256.2	226.9
4/4/2008 7:54	181	13.25	266.6	242.1	297.7	275.1	257.4
4/4/2008 7:55	182	13.26	287	265.4	306.4	285.8	270.2
4/4/2008 7:55	183	13.25	296.6	274.2	309.6	290.3	276.7
4/4/2008 7:55	184	13.25	300.8	274.9	308.9	290.5	277.3
4/4/2008 7:55	185	13.26	302.4	275.3	308.2	290.5	276.4
4/4/2008 7:55	186	13.25	300.6	275.7	311.1	292.6	276.4
4/4/2008 7:55	187	13.25	302	276.2	311.8	291.4	278.9
4/4/2008 7:55	188	13.25	302.4	281.1	313	292.3	281.4
4/4/2008 7:55	189	13.25	304.9	283.2	315	294.4	283.4
4/4/2008 7:55	190	13.26	308.7	283.8	318.1	295	284.3
4/4/2008 7:55	191	13.26	310.5	285.8	321.9	296.8	287
4/4/2008 7:55	192	13.26	316.5	289.4	327.3	303.5	291.5
4/4/2008 7:55	193	13.25	323.2	294.1	333.1	312.7	296.2
4/4/2008 7:55	194	13.26	329.3	296.2	338.1	318.8	303.3
4/4/2008 7:55	195	13.26	333.4	301.8	341.9	324.2	308
4/4/2008 7:55	196	13.25	337.8	305.1	346.8	326.9	311.2
4/4/2008 7:55	197	13.26	339.8	309.4	351.7	330.2	315.6
4/4/2008 7:55	198	13.25	341	312.7	353.9	331.8	318.5
4/4/2008 7:55	199	13.26	344.1	313.6	354.2	335.6	321.3
4/4/2008 7:55	200	13.25	346.6	316.5	355.8	336.9	322.4
4/4/2008 7:55	201	13.26	348.3	317.6	357.3	336.9	324.8
4/4/2008 7:55	202	13.25	348.8	318.8	358.4	336.7	324.1
4/4/2008 7:55	203	13.25	349.3	320.8	359.1	339.2	323.5
4/4/2008 7:55	204	13.25	349.9	322.2	359.1	340.7	326
4/4/2008 7:55	205	13.25	349.7	322.6	358.7	341.2	327.1
4/4/2008 7:55	206	13.25	349.7	321.9	358.7	341.8	327.1
4/4/2008 7:55	207	13.25	351.5	320.4	360.9	341.4	327.1
4/4/2008 7:55	208	13.26	350.8	321.7	362.3	340.7	327.1
4/4/2008 7:55	209	13.26	350.6	322.1	363.4	341	327.5
4/4/2008 7:55	210	13.26	351	322.6	363.2	344.3	327.3
4/4/2008 7:55	211	13.26	351.5	322.8	362.7	345.4	327.3
4/4/2008 7:55	212	13.26	350.2	322.2	362.7	343.7	327.1
4/4/2008 7:55	213	13.25	350.2	322.1	363.2	344.1	326.9
4/4/2008 7:55	214	13.25	350.1	322.2	363.4	344.8	327.1
4/4/2008 7:55	215	13.25	352.2	322.8	363.4	345	327.5
4/4/2008 7:55	216	13.26	353.1	322.8	363.1	345.7	327.5
4/4/2008 7:55	217	13.25	353.9	322.6	362.9	345.9	327.3
4/4/2008 7:55	218	13.25	354	322.6	362.7	345.5	327.3

4/4/2008 7:55	219	13.26	354.2	322.1	363.6	343	327.5
4/4/2008 7:55	220	13.26	353.9	322.2	363.8	341.9	327.3
4/4/2008 7:55	221	13.26	353.7	323	363.2	344.6	327.7
4/4/2008 7:55	222	13.25	353.9	322.8	362.7	345.4	327.5
4/4/2008 7:55	223	13.25	354.4	322.6	363.1	345.7	327.1
4/4/2008 7:55	224	13.25	354.2	322.2	363.2	345.5	326.9
4/4/2008 7:55	225	13.25	353.7	322.4	363.4	342.7	327.5
4/4/2008 7:55	226	13.26	353.9	322.4	363.8	344.1	327.7
4/4/2008 7:55	227	13.26	354.2	323	363.1	344.6	327.5
4/4/2008 7:55	228	13.25	354	322.8	362.7	342.8	327.3
4/4/2008 7:55	229	13.26	354	322.6	362.9	341.8	327.3
4/4/2008 7:55	230	13.26	354	322.1	363.6	341.2	327.1
4/4/2008 7:55	231	13.25	353.7	322.4	363.8	341.4	327.3
4/4/2008 7:55	232	13.25	354	322.8	363.2	341.4	328.6
4/4/2008 7:55	233	13.25	354.4	323	362.9	342.8	330.4
4/4/2008 7:55	234	13.25	353.9	322.8	363.1	344.8	330.9
4/4/2008 7:55	235	13.25	353.7	322.6	363.1	345	331.5
4/4/2008 7:55	236	13.25	353.9	322.2	363.6	342.7	331.8
4/4/2008 7:55	237	13.25	354.2	322.2	363.6	344.6	331.6
4/4/2008 7:55	238	13.25	354.2	323	362.9	345.5	331.6
4/4/2008 7:55	239	13.25	354	322.8	362.5	345.7	331.5
4/4/2008 7:55	240	13.25	353.9	322.4	363.1	345.7	331.3
4/4/2008 7:55	241	13.25	353.9	322.4	363.4	345.4	331.6
4/4/2008 7:56	242	13.25	354.2	322.4	363.4	342.8	332
4/4/2008 7:56	243	13.25	354.2	322.6	363.4	342.3	331.6
4/4/2008 7:56	244	13.25	353.7	323	363.2	344.8	331.5
4/4/2008 7:56	245	13.25	353.5	323	362.5	345.5	331.5
4/4/2008 7:56	246	13.25	354.2	322.4	362.9	345.2	331.6
4/4/2008 7:56	247	13.25	354.2	322.1	363.8	343.2	331.6
4/4/2008 7:56	248	13.25	354	322.4	363.6	342.3	332
4/4/2008 7:56	249	13.25	353.9	322.8	363.2	341.8	331.8
4/4/2008 7:56	250	13.25	354.2	322.8	362.9	341.9	331.3
4/4/2008 7:56	251	13.25	354	322.6	363.2	341.6	331.5
4/4/2008 7:56	252	13.25	354.6	322.6	363.4	341	331.8
4/4/2008 7:56	253	13.25	354.2	322.2	363.8	341	331.6
4/4/2008 7:56	254	13.25	353.7	322.4	363.6	341.8	331.6
4/4/2008 7:56	255	13.25	353.7	322.6	363.1	341.8	331.6
4/4/2008 7:56	256	13.25	354.4	322.8	362.7	341.6	331.6
4/4/2008 7:56	257	13.25	354.2	321.9	363.2	341.4	331.6
4/4/2008 7:56	258	13.25	354	319.5	363.8	341.2	331.8
4/4/2008 7:56	259	13.25	353.9	318.8	363.8	343.4	331.8
4/4/2008 7:56	260	13.25	354.2	318.6	363.4	345.4	331.3
4/4/2008 7:56	261	13.25	354.4	318.6	362.9	345.9	331.3
4/4/2008 7:56	262	13.25	354.4	318.6	362.9	345.5	331.5
4/4/2008 7:56	263	13.25	355.5	318.3	363.2	343.4	331.8
4/4/2008 7:56	264	13.25	355.1	317.9	363.8	342.1	331.8
4/4/2008 7:56	265	13.25	354.6	318.3	363.4	344.3	331.6
4/4/2008 7:56	266	13.25	354.6	318.5	363.1	345.4	331.6
4/4/2008 7:56	267	13.25	354.2	318.6	363.1	344.8	331.3

4/4/2008 7:56	268	13.25	353.9	318.6	362.9	342.5	331.5
4/4/2008 7:56	269	13.25	354	318.3	363.4	341.2	332
4/4/2008 7:56	270	13.25	354.2	317.7	363.6	341.2	331.8
4/4/2008 7:56	271	13.25	354.2	318.1	363.2	344.5	331.3
4/4/2008 7:56	272	13.25	354	318.8	362.9	344.6	331.5
4/4/2008 7:56	273	13.25	354	318.6	362.9	342.5	331.5
4/4/2008 7:56	274	13.25	353.9	318.3	363.6	341.4	331.6
4/4/2008 7:56	275	13.25	354.2	318.1	363.6	341.6	332
4/4/2008 7:56	276	13.25	354.2	318.3	363.8	341.4	331.8
4/4/2008 7:56	277	13.25	353.8	318.3	363.1	341.9	331.3
4/4/2008 7:56	278	13.25	353.5	318.8	363.1	341.9	331.3
4/4/2008 7:56	279	13.25	354.2	318.6	362.7	341.2	331.8
4/4/2008 7:56	280	13.25	354.2	318.1	363.6	340.8	331.8
4/4/2008 7:56	281	13.25	354	317.7	364	341.6	331.6
4/4/2008 7:56	282	13.25	354	318.6	363.2	344.1	331.6
4/4/2008 7:56	283	13.25	354.2	316.6	362.9	342.8	331.8
4/4/2008 7:56	284	13.25	354	315.4	363.1	341.7	331.6
4/4/2008 7:56	285	13.25	354.4	314.7	363.2	341.4	332
4/4/2008 7:56	286	13.25	354.2	314.3	363.6	340.8	331.8
4/4/2008 7:56	287	13.25	353.7	315.2	363.8	341.4	331.3
4/4/2008 7:56	288	13.25	353.7	317.4	363.2	341.9	331.3
4/4/2008 7:56	289	13.25	354.4	318.3	362.7	341.6	331.8
4/4/2008 7:56	290	13.25	354.4	318.4	362.9	341	331.8
4/4/2008 7:56	291	13.25	354	318.3	363.4	341	331.6
4/4/2008 7:56	292	13.25	353.8	318.3	363.8	341.4	333.8
4/4/2008 7:56	293	13.25	354.2	318.4	363.2	341.7	332.5
4/4/2008 7:56	294	13.25	354.2	318.4	363.1	341.9	332.5
4/4/2008 7:56	295	13.25	354.4	318.6	363.2	341.6	334.9
4/4/2008 7:56	296	13.25	354	318.6	363.1	341	335.8
4/4/2008 7:56	297	13.25	353.7	318.1	363.8	341	335.6
4/4/2008 7:56	298	13.25	353.8	317.7	364	341.6	335.4
4/4/2008 7:56	299	13.25	354.4	318.1	363.1	344.3	336
4/4/2008 7:56	300	13.25	354.2	318.8	362.9	344.6	336.1
4/4/2008 7:56	301	13.25	353.8	318.6	363.2	342.5	336
4/4/2008 7:57	302	13.25	354	318.4	363.6	341.7	336
4/4/2008 7:57	303	13.25	354.2	318.3	363.6	341.2	336
4/4/2008 7:57	304	13.25	354.4	317.9	363.6	341.7	335.6
4/4/2008 7:57	305	13.25	354	318.6	363.1	341.7	335.8
4/4/2008 7:57	306	13.25	354	318.8	362.9	341.4	336.3
4/4/2008 7:57	307	13.25	353.7	318.6	363.1	341	336
4/4/2008 7:57	308	13.25	354.2	318.3	363.8	341.4	335.6
4/4/2008 7:57	309	13.25	354.4	318.3	363.6	341.6	335.8
4/4/2008 7:57	310	13.25	354	318.4	363.1	341.7	336.1
4/4/2008 7:57	311	13.25	353.7	318.4	363.1	341.7	336
4/4/2008 7:57	312	13.25	354.2	319	363.4	341.4	336
4/4/2008 7:57	313	13.25	354.4	318.6	363.4	340.8	335.8
4/4/2008 7:57	314	13.25	354	318.1	363.8	341.2	335.6
4/4/2008 7:57	315	13.25	354	317.9	363.6	341.9	335.8
4/4/2008 7:57	316	13.25	354	318.4	362.9	341.7	336.1

4/4/2008 7:57	317	13.25	353.8	318.8	362.7	341.4	336.1
4/4/2008 7:57	318	13.25	354.4	318.6	363.2	341.4	336
4/4/2008 7:57	319	13.25	354.4	318.6	363.6	341.4	335.8
4/4/2008 7:57	320	13.25	353.7	318.3	363.4	341.2	335.8
4/4/2008 7:57	321	13.25	353.7	317.9	363.4	341.9	335.8
4/4/2008 7:57	322	13.25	354.4	318.4	363.1	341.9	336.1
4/4/2008 7:57	323	13.25	354.2	318.8	362.9	341	336.1
4/4/2008 7:57	324	13.25	354	318.4	363.4	340.8	335.6
4/4/2008 7:57	325	13.25	353.7	318.1	364	341.4	335.6
4/4/2008 7:57	326	13.25	354	318.1	363.4	341.7	336
4/4/2008 7:57	327	13.25	354	318.3	363.1	341.7	336
4/4/2008 7:57	328	13.25	354.4	318.4	363.1	341.4	336.1
4/4/2008 7:57	329	13.25	354.2	318.6	363.2	341.4	336
4/4/2008 7:57	330	13.25	353.7	318.4	363.6	340.8	335.6
4/4/2008 7:57	331	13.25	353.8	318.3	364	341.4	335.6
4/4/2008 7:57	332	13.25	354.4	317.9	363.4	341.9	336
4/4/2008 7:57	333	13.25	354	318.4	362.9	344.1	336.3
4/4/2008 7:57	334	13.25	353.8	318.6	362.7	342.5	336
4/4/2008 7:57	335	13.25	354	318.6	363.4	343.4	335.4
4/4/2008 7:57	336	13.25	354.2	318.6	363.6	342.3	335.6
4/4/2008 7:57	337	13.25	354.2	318.3	363.4	341.7	336.1
4/4/2008 7:57	338	13.25	354.4	317.9	363.1	342.1	336.1
4/4/2008 7:57	339	13.25	354	318.4	363.1	341.7	336.1
4/4/2008 7:57	340	13.25	353.7	318.8	363.1	341	336
4/4/2008 7:57	341	13.25	354	318.4	363.8	340.8	335.6
4/4/2008 7:57	342	13.25	354.2	318.3	364	341.6	335.8
4/4/2008 7:57	343	13.25	354	318.3	363.2	341.7	336.3
4/4/2008 7:57	344	13.25	353.5	318.3	362.9	341.6	336
4/4/2008 7:57	345	13.25	354.2	318.6	363.1	341	335.6
4/4/2008 7:57	346	13.25	354.2	318.6	363.4	341.2	336
4/4/2008 7:57	347	13.25	354.4	318.6	363.8	341	336.1
4/4/2008 7:57	348	13.25	354	318.3	363.8	341.6	335.8
4/4/2008 7:57	349	13.25	353.8	317.9	363.2	341.9	336.3
4/4/2008 7:57	350	13.25	353.8	318.4	362.5	341.6	336
4/4/2008 7:57	351	13.25	354.4	318.8	362.9	341	335.6
4/4/2008 7:57	352	13.25	354.2	318.6	363.8	341.4	335.4
4/4/2008 7:57	353	13.25	353.7	318.4	363.4	341.7	336.1
4/4/2008 7:57	354	13.25	353.7	317.2	363.2	341.7	336.1
4/4/2008 7:57	355	13.25	352.4	315	362.9	341.7	336
4/4/2008 7:57	356	13.25	349	311.2	360.3	338.7	332.2
4/4/2008 7:57	357	13.25	341.9	291.2	349.9	320.3	319
4/4/2008 7:57	358	13.25	310.1	247.8	316.6	284.7	293
4/4/2008 7:57	359	13.25	257	218.9	264.1	235	242.2
4/4/2008 7:57	360	13.25	211	196.7	225.1	209.5	202
4/4/2008 7:57	361	13.25	192.2	177.8	205.9	192.7	177.9
4/4/2008 7:58	362	13.25	183.4	166.6	196.9	183	164.2
4/4/2008 7:58	363	13.25	181.7	163.8	196.4	180.5	164.6
4/4/2008 7:58	364	13.25	183.2	168	199.2	181.4	169.3
4/4/2008 7:58	365	13.25	187.7	164.2	201.2	183.4	173.1

4/4/2008 7:58	366	13.25	188.8	163.1	202.3	184.8	174.5
4/4/2008 7:58	367	13.25	189.1	164.8	202.3	185	175
4/4/2008 7:58	368	13.25	187.3	166.4	202.3	185.2	175
4/4/2008 7:58	369	13.25	188.4	166.6	200.1	185.9	175.2
4/4/2008 7:58	370	13.25	187.5	163.8	198.9	185.9	175.4
4/4/2008 7:58	371	13.25	189	163.1	198.3	185.7	175.2
4/4/2008 7:58	372	13.25	187.7	162.8	198.5	185.5	175
4/4/2008 7:58	373	13.25	186.1	162.9	198.5	185.5	175
4/4/2008 7:58	374	13.25	186.1	162.9	198.7	184.6	175.4
4/4/2008 7:58	375	13.25	188.4	162.8	199.8	183.9	175.2
4/4/2008 7:58	376	13.25	189.1	162.9	201.6	185.2	175.4
4/4/2008 7:58	377	13.25	189.1	165.5	202	185.3	175.2
4/4/2008 7:58	378	13.25	189.7	166.4	202.1	185.2	177.4
4/4/2008 7:58	379	13.25	192	168.5	202.9	185.3	178.8
4/4/2008 7:58	380	13.25	193.3	170.3	202.9	186.6	180.3
4/4/2008 7:58	381	13.25	193.6	170.5	202.7	189	182.4
4/4/2008 7:58	382	13.25	193.8	171.3	204.3	189.7	183.2
4/4/2008 7:58	383	13.25	193.8	172.7	203.8	189.7	181.2
4/4/2008 7:58	384	13.25	194	173.4	203	189.3	180.1
4/4/2008 7:58	385	13.25	194.2	174.7	203	189.7	179.7
4/4/2008 7:58	386	13.25	193.6	175	203	190	179.6
4/4/2008 7:58	387	13.25	193.6	175.2	204.1	189.9	179.4
4/4/2008 7:58	388	13.25	194	175	205.4	189.7	179.2
4/4/2008 7:58	389	13.25	194.2	175	203.9	189.7	179.2
4/4/2008 7:58	390	13.25	193.6	175.2	205.7	189.9	179.4
4/4/2008 7:58	391	13.25	193.8	175.4	206.7	189.7	179.6
4/4/2008 7:58	392	13.25	194	175.2	206.8	190	179.4
4/4/2008 7:58	393	13.25	194	175	206.7	190	181
4/4/2008 7:58	394	13.25	194.2	175	206.3	189.7	182.8
4/4/2008 7:58	395	13.25	194	175.4	206.8	189.3	183.2
4/4/2008 7:58	396	13.25	193.6	175.4	207	189.9	181.5
4/4/2008 7:58	397	13.25	196	175.4	206.8	192.7	183
4/4/2008 7:58	398	13.25	195.8	175.2	206.7	193.6	183.2
4/4/2008 7:58	399	13.25	197.3	174.9	206.7	193.8	183.4
4/4/2008 7:58	400	13.25	197.6	174.9	206.8	194	183.7
4/4/2008 7:58	401	13.25	197.8	175.4	209.2	193.6	183.7
4/4/2008 7:58	402	13.25	198.2	175.4	210.8	194	183.5
4/4/2008 7:58	403	13.25	198.7	175.2	211.2	194.2	183.7
4/4/2008 7:58	404	13.25	201.1	177.4	210.6	194.2	183.5
4/4/2008 7:58	405	13.25	202	176.9	210.6	193.6	183.5
4/4/2008 7:58	406	13.25	202.1	178.5	211.2	193.6	183.7
4/4/2008 7:58	407	13.25	202.3	179	211.2	194	183.9
4/4/2008 7:58	408	13.25	202.5	179.6	211.2	196.9	183.7
4/4/2008 7:58	409	13.25	202.3	179.4	211	198	183.5
4/4/2008 7:58	410	13.25	202	179.2	211	198.2	183.5
4/4/2008 7:58	411	13.25	202.3	179.4	211	197.8	183.7
4/4/2008 7:58	412	13.25	202.5	179.4	211.2	197.8	183.5
4/4/2008 7:58	413	13.25	202.3	179.6	211.3	198.3	184.3
4/4/2008 7:58	414	13.25	202.3	179.6	211.2	198.3	186.4

4/4/2008 7:58	415	13.25	202.3	179.6	210.8	198.3	187.1
4/4/2008 7:58	416	13.25	202.3	179.2	210.8	198	187.5
4/4/2008 7:58	417	13.25	202.5	179.2	211.2	198	187.9
4/4/2008 7:58	418	13.25	202.5	179.6	211.2	198	187.7
4/4/2008 7:58	419	13.25	202.3	179.4	211.3	198.3	187.9
4/4/2008 7:58	420	13.25	202.1	179.6	211.2	198.5	187.7
4/4/2008 7:58	421	13.25	202.5	179.4	210.6	198.2	187.9
4/4/2008 7:59	422	13.25	202.5	182.1	210.6	197.8	187.9
4/4/2008 7:59	423	13.25	202.3	183.2	213.5	198.2	187.9
4/4/2008 7:59	424	13.25	202.3	183.5	214.8	198.3	188
4/4/2008 7:59	425	13.25	204.7	183.7	215.1	198.3	188.6
4/4/2008 7:59	426	13.25	205.9	183.5	215.1	198.3	190.6
4/4/2008 7:59	427	13.25	206.6	183.3	215	198.2	191.7
4/4/2008 7:59	428	13.25	206.5	183.3	215	197.8	192
4/4/2008 7:59	429	13.25	206.3	183.7	215.5	198	192.2
4/4/2008 7:59	430	13.25	206.3	183.7	215.7	198.3	192.2
4/4/2008 7:59	431	13.25	206.6	183.9	215.3	198.3	192.2
4/4/2008 7:59	432	13.25	206.6	183.5	215	199.4	191.8
4/4/2008 7:59	433	13.25	206.3	184.1	215.1	201	192.2
4/4/2008 7:59	434	13.25	206.5	186.4	215.5	202	192.4
4/4/2008 7:59	435	13.25	206.6	187.5	217.8	202.3	192
4/4/2008 7:59	436	13.25	206.6	187.7	218.9	200.5	191.8
4/4/2008 7:59	437	13.25	206.6	187.9	219.3	201.8	192
4/4/2008 7:59	438	13.25	206.6	187.7	218.9	202	192.2
4/4/2008 7:59	439	13.25	204.8	187.9	219.3	201.8	194.2
4/4/2008 7:59	440	13.25	203.4	187.5	219.6	202.3	195.6
4/4/2008 7:59	441	13.25	202.9	188	219.6	202.7	196
4/4/2008 7:59	442	13.25	202.3	188	220.2	205.2	196.9
4/4/2008 7:59	443	13.25	201.4	187.9	222.4	206.1	199.2
4/4/2008 7:59	444	13.25	199.4	190.4	223.1	206.3	202
4/4/2008 7:59	445	13.25	197.4	191.3	223.6	206.1	203.8
4/4/2008 7:59	446	13.25	195.1	192	224	206.5	204.3
4/4/2008 7:59	447	13.25	194.5	192.2	226.7	206.8	205
4/4/2008 7:59	448	13.25	191.1	192.2	227.2	207.5	207.5
4/4/2008 7:59	449	13.25	185	192.2	227.4	209.5	208.5
4/4/2008 7:59	450	13.25	182.8	191.8	227.8	210.1	208.8
4/4/2008 7:59	451	13.25	182.1	191.8	228.1	210.8	208.8
4/4/2008 7:59	452	13.25	181.4	192	228.1	211	208.8
4/4/2008 7:59	453	13.25	181.2	192.2	227.8	211	208.8
4/4/2008 7:59	454	13.25	169.4	192.2	228.7	211	209
4/4/2008 7:59	455	13.25	155.9	192	230.5	210.4	209
4/4/2008 7:59	456	13.25	141.1	192.7	231.8	210.3	209
4/4/2008 7:59	457	13.25	78.24	194.7	232.3	210.8	211.3
4/4/2008 7:59	458	13.25	30.01	195.8	232.5	213.5	212.4
4/4/2008 7:59	459	13.25	11.59	196.2	232.7	214.6	212.8
4/4/2008 7:59	460	13.25	4.549	196.2	234.8	215.9	213.3
4/4/2008 7:59	461	13.25	2.021	195.8	235.7	218	215.1
4/4/2008 7:59	462	13.25	0.756	196.2	236.3	218.6	216.4
4/4/2008 7:59	463	13.25	0.214	196.4	236.6	219.1	216.8

4/4/2008 7:59	464	13.25	0.395	196.4	239	219.7	217.3
4/4/2008 7:59	465	13.25	0.034	196.5	239.5	222	218.4
4/4/2008 7:59	466	13.25	0.034	196.2	239.9	222.5	220.6
4/4/2008 7:59	467	13.25	0.214	194.5	242.2	224.9	223.3
4/4/2008 7:59	468	13.25	0.034	190	246.2	226.9	225.1
4/4/2008 7:59	469	13.25	0.034	188.8	248.2	229.8	225.2
4/4/2008 7:59	470	13.25	0.034	188.4	248.7	231.4	225.8
4/4/2008 7:59	471	13.25	0.034	188	248.7	231.6	226.2
4/4/2008 7:59	472	13.25	0.034	187.7	248.5	231.6	226
4/4/2008 7:59	473	13.25	0.034	187.7	251.3	231.6	225.8
4/4/2008 7:59	474	13.25	0.034	187.5	252.9	232.1	225.8
4/4/2008 7:59	475	13.25	-0.146	187.9	253.1	232.1	226
4/4/2008 7:59	476	13.25	-0.146	186.1	253.8	231.9	226.2
4/4/2008 7:59	477	13.25	-0.146	184.4	256	231.8	226.2
4/4/2008 7:59	478	13.25	0.034	182.6	257	231.8	226.2
4/4/2008 7:59	479	13.25	0.034	177.9	257.6	231.6	225.4
4/4/2008 7:59	480	13.25	-0.146	170.2	257.9	232.1	225.6
4/4/2008 7:59	481	13.25	0.034	162.8	255	234.6	226
4/4/2008 8:00	482	13.25	0.034	155.7	253.6	235.4	226.2
4/4/2008 8:00	483	13.25	-0.146	141.4	251.8	235.4	225.8
4/4/2008 8:00	484	13.25	-0.146	116.9	248.5	235.9	227.8
4/4/2008 8:00	485	13.25	-0.146	78.96	244.2	236.1	229.2
4/4/2008 8:00	486	13.25	-0.146	27.49	239.5	238.8	229.8
4/4/2008 8:00	487	13.25	0.034	9.06	237.4	239.9	230.8
4/4/2008 8:00	488	13.25	0.034	2.202	236.8	241	233.2
4/4/2008 8:00	489	13.25	-0.146	-0.146	236.3	242.9	235.5
4/4/2008 8:00	490	13.25	-0.146	-0.869	236.6	243.9	239.2
4/4/2008 8:00	491	13.25	-0.146	-1.41	223.6	244.6	241.5
4/4/2008 8:00	492	13.25	-0.146	-1.591	204.7	244.6	242.6
4/4/2008 8:00	493	13.25	-0.146	-1.591	181.4	244.2	242.8
4/4/2008 8:00	494	13.25	-0.146	-1.772	158.2	244.2	242.8
4/4/2008 8:00	495	13.25	-0.146	-1.772	136.2	244.4	242.8
4/4/2008 8:00	496	13.25	-0.146	-1.772	68.85	242.4	242.6
4/4/2008 8:00	497	13.25	0.034	-1.591	25.32	241.5	245.3
4/4/2008 8:00	498	13.25	0.034	-1.591	9.61	237.9	249.3
4/4/2008 8:00	499	13.25	-0.146	-1.952	3.466	233.7	251.6
4/4/2008 8:00	500	13.25	-0.146	-1.952	1.299	232.1	255.2
4/4/2008 8:00	501	13.25	0.035	-1.771	0.396	227.1	258.1
4/4/2008 8:00	502	13.25	0.035	-1.952	-0.146	211.7	259.2
4/4/2008 8:00	503	13.25	0.035	-1.771	-0.507	181.2	256.9
4/4/2008 8:00	504	13.25	-0.146	-1.591	-0.507	155.5	256.1
4/4/2008 8:00	505	13.25	-0.146	-1.952	-0.507	133.7	255.6
4/4/2008 8:00	506	13.25	-0.146	-1.952	-0.326	79.5	255.1
4/4/2008 8:00	507	13.25	0.035	-1.771	-0.507	28.75	255.4
4/4/2008 8:00	508	13.25	0.035	-1.771	-0.507	10.69	255.6
4/4/2008 8:00	509	13.25	-0.146	-1.591	-0.507	4.008	256
4/4/2008 8:00	510	13.25	0.035	-1.591	-0.507	1.66	258.3
4/4/2008 8:00	511	13.25	0.035	-1.952	-0.507	0.757	259
4/4/2008 8:00	512	13.25	0.035	-1.952	-0.507	0.396	257.8

4/4/2008 8:00	513	13.25	-0.146	-1.771	-0.688	0.215	256.1
4/4/2008 8:00	514	13.25	0.035	-1.771	-0.507	0.215	256.1
4/4/2008 8:00	515	13.25	0.035	-1.952	-0.507	0.035	252.3
4/4/2008 8:00	516	13.25	-0.146	-1.952	-0.507	0.035	247.6
4/4/2008 8:00	517	13.25	0.035	-1.952	-0.507	0.035	244.4
4/4/2008 8:00	518	13.25	-0.146	-1.771	-0.507	0.035	243.7
4/4/2008 8:00	519	13.25	-0.146	-1.952	-0.507	0.035	243.5
4/4/2008 8:00	520	13.25	0.035	-1.591	-0.688	0.035	243.1
4/4/2008 8:00	521	13.25	-0.146	-1.771	-0.507	0.035	238.6
4/4/2008 8:00	522	13.25	-0.146	-1.952	-0.507	0.215	219.3
4/4/2008 8:00	523	13.25	-0.146	-1.952	-0.507	0.035	199.8
4/4/2008 8:00	524	13.25	0.035	-1.952	-0.507	0.215	175.4
4/4/2008 8:00	525	13.25	0.035	-1.952	-0.688	0.215	78.6
4/4/2008 8:00	526	13.25	-0.146	-1.952	-0.688	0.035	30.74
4/4/2008 8:00	527	13.25	-0.146	-1.952	-0.688	-0.146	12.86
4/4/2008 8:00	528	13.25	-0.146	-1.952	-0.507	0.035	6.356
4/4/2008 8:00	529	13.25	-0.146	-1.952	-0.507	0.035	3.467
4/4/2008 8:00	530	13.25	0.035	-1.771	-0.687	0.035	2.383
4/4/2008 8:00	531	13.25	-0.146	-1.771	-0.507	-0.146	2.022
4/4/2008 8:00	532	13.25	-0.146	-1.952	-0.507	-0.146	2.022

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4/4/2008 8:31	2376	13.25	38.48	9.95	-0.711	-0.169	1.637
4/4/2008 8:31	2377	13.25	147.9	129.3	-0.53	-0.169	1.637
4/4/2008 8:31	2378	13.25	218.5	202.3	106.6	102.1	102.1
4/4/2008 8:31	2379	13.25	260.4	238.2	229.7	220.5	214.4
4/4/2008 8:31	2380	13.25	283.4	260.3	284.3	272.9	261.3
4/4/2008 8:31	2381	13.25	300.7	272.7	311.2	291.7	281.2
4/4/2008 8:31	2382	13.25	311.2	279.2	326.4	298.9	290.4
4/4/2008 8:31	2383	13.25	315.3	279.6	333.4	304	294.8
4/4/2008 8:31	2384	13.25	317.3	282.5	336.3	310.6	298.7
4/4/2008 8:31	2385	13.25	323.1	288.4	339.7	319.1	304.1
4/4/2008 8:31	2386	13.25	329.2	296	347.3	324.7	311.4
4/4/2008 8:31	2387	13.25	335	301.8	355.4	328.5	317.5
4/4/2008 8:31	2388	13.25	338.8	307	360.5	331.2	323.1
4/4/2008 8:31	2389	13.25	343.5	311.4	362.3	334.8	325.6
4/4/2008 8:31	2390	13.25	347.3	314.6	365.2	338.6	329.1
4/4/2008 8:31	2391	13.25	348.6	317	366.3	340.3	333
4/4/2008 8:31	2392	13.25	349.8	318.1	365.9	343.2	334.7
4/4/2008 8:31	2393	13.25	350.6	320.8	363.9	344.8	335.6
4/4/2008 8:31	2394	13.25	352.4	321.5	365.7	343.5	335.7
4/4/2008 8:31	2395	13.25	352.9	321.7	365	342.3	335.6
4/4/2008 8:31	2396	13.25	354	322.4	363.6	341.5	335.2
4/4/2008 8:31	2397	13.25	354.2	322.7	362.8	344.1	335.7
4/4/2008 8:31	2398	13.25	354.2	320.2	363	344.4	336.1
4/4/2008 8:31	2399	13.25	354	321.5	364.8	345.3	335.9
4/4/2008 8:31	2400	13.25	354.2	321.8	366.6	345.9	335.6
4/4/2008 8:31	2401	13.25	354	321.8	367.4	345.5	335.6
4/4/2008 8:32	2402	13.25	354.5	322.4	367.4	345	335.6

4/4/2008 8:32	2403	13.25	354.2	322.9	366.8	345.3	335.6
4/4/2008 8:32	2404	13.25	353.8	324.9	367.2	345.5	336.1
4/4/2008 8:32	2405	13.25	353.6	322.9	367.7	345.7	335.8
4/4/2008 8:32	2406	13.25	354.4	322.6	367.7	345.9	335.4
4/4/2008 8:32	2407	13.25	354.2	322.6	367.5	345.7	335.4
4/4/2008 8:32	2408	13.25	354	322.6	367.4	345	335.8
4/4/2008 8:32	2409	13.25	351.3	322.9	367.2	345.1	335.9
4/4/2008 8:32	2410	13.25	350.6	325.1	367.4	345.7	335.9
4/4/2008 8:32	2411	13.25	351.8	322.9	367.9	346	335.8
4/4/2008 8:32	2412	13.25	351.5	323.7	367.9	345.7	335.6
4/4/2008 8:32	2413	13.25	350.4	325.8	367.2	345.3	335.6
4/4/2008 8:32	2414	13.25	349.7	326.7	366.8	345.5	335.9
4/4/2008 8:32	2415	13.25	349.8	326.9	367.4	345.1	336.3
4/4/2008 8:32	2416	13.25	350.4	326.9	367.5	345.7	335.9
4/4/2008 8:32	2417	13.25	351.3	326.5	367.9	346	335.4
4/4/2008 8:32	2418	13.25	352.7	326.2	367.7	345.3	335.9
4/4/2008 8:32	2419	13.25	353.6	326.5	367.4	345.1	335.9
4/4/2008 8:32	2420	13.25	354.2	327.1	366.6	345.3	337
4/4/2008 8:32	2421	13.25	354.4	326.9	367.4	345.9	337.6
4/4/2008 8:32	2422	13.25	354	326.5	367.9	345.7	336.3
4/4/2008 8:32	2423	13.25	354	326.5	367.5	345.5	335.6
4/4/2008 8:32	2424	13.25	354	326.5	367.4	345.5	335.8
4/4/2008 8:32	2425	13.25	354.2	326.5	367	345	338.8
4/4/2008 8:32	2426	13.25	354.5	327.1	367.4	345.3	339.5
4/4/2008 8:32	2427	13.25	352.9	326.9	367.7	346	339.5
4/4/2008 8:32	2428	13.25	352	325.6	368.3	345.7	339.9
4/4/2008 8:32	2429	13.25	353.6	323.3	367.7	345.3	340.1
4/4/2008 8:32	2430	13.25	352.2	322.9	367	345	340.1
4/4/2008 8:32	2431	13.25	350.7	325.1	366.8	345.5	340.4
4/4/2008 8:32	2432	13.25	350	324	367.5	345.5	340.1
4/4/2008 8:32	2433	13.25	350	322.9	367.7	346	339.9
4/4/2008 8:32	2434	13.25	350	322.6	367.7	345.9	339.5
4/4/2008 8:32	2435	13.25	352.2	322.2	367.4	345.1	340.1
4/4/2008 8:32	2436	13.25	353.4	322.4	367.4	345	340.3
4/4/2008 8:32	2437	13.25	351.1	322.9	367	345.5	339.9
4/4/2008 8:32	2438	13.25	350	322.7	367.7	345.9	339.9
4/4/2008 8:32	2439	13.25	350.4	322.4	367.9	345.7	340.1
4/4/2008 8:32	2440	13.25	350.2	322.2	367.5	345.3	339.9
4/4/2008 8:32	2441	13.25	350	322.4	367.2	345.3	340.3
4/4/2008 8:32	2442	13.25	352.2	322.4	367	345	340.3
4/4/2008 8:32	2443	13.25	353.4	322.9	367.4	345.7	339.9
4/4/2008 8:32	2444	13.25	354	322.7	367.5	346	339.7
4/4/2008 8:32	2445	13.25	354.3	322.2	368.1	345.5	340.1
4/4/2008 8:32	2446	13.25	354.2	322	367.7	345.1	340.1
4/4/2008 8:32	2447	13.25	353.6	322.4	367.2	345.3	340.3
4/4/2008 8:32	2448	13.25	354.2	322.6	367.2	345.9	340.1
4/4/2008 8:32	2449	13.25	354.3	322.7	367.7	345.9	339.9
4/4/2008 8:32	2450	13.25	354.3	322.6	367.7	345.9	339.5
4/4/2008 8:32	2451	13.25	353.8	322	367.7	345.7	340.1

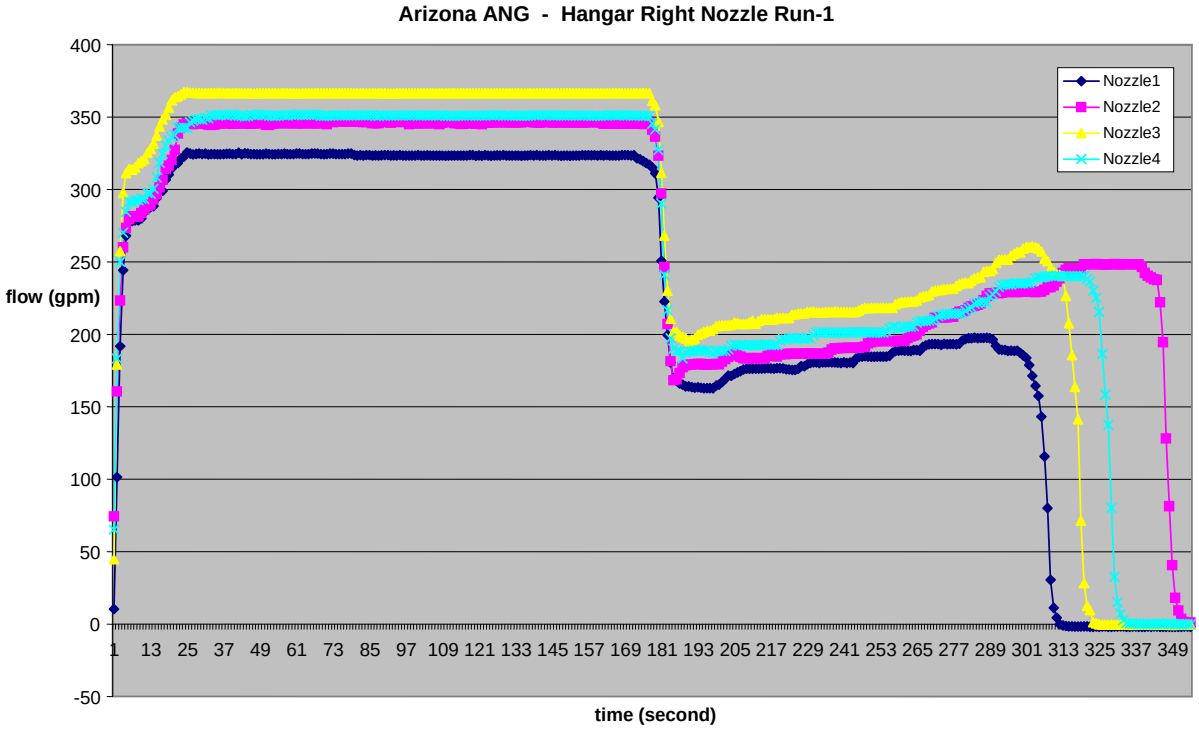
4/4/2008 8:32	2452	13.25	354	321.8	367.4	345	340.3
4/4/2008 8:32	2453	13.25	354.3	322.2	367.4	345.1	339.9
4/4/2008 8:32	2454	13.25	354.3	322.9	367.4	345.9	339.7
4/4/2008 8:32	2455	13.25	354	322.9	367.9	345.9	339.9
4/4/2008 8:32	2456	13.25	354	322.2	367.9	345.7	340.1
4/4/2008 8:32	2457	13.25	354	322.4	367.4	345.3	340.3
4/4/2008 8:32	2458	13.25	354.2	322.4	367	345.5	340.4
4/4/2008 8:32	2459	13.25	354.5	322.2	367.4	345.3	339.9
4/4/2008 8:32	2460	13.25	354	322.9	367.7	345.9	339.5
4/4/2008 8:32	2461	13.25	353.8	322.9	367.5	345.9	339.7
4/4/2008 8:33	2462	13.25	354.2	322.4	367.7	345.5	340.1
4/4/2008 8:33	2463	13.25	354.4	322	367.4	345.1	340.3
4/4/2008 8:33	2464	13.25	354.4	322.6	367	345.3	339.9
4/4/2008 8:33	2465	13.25	354	322.4	367.2	345.9	339.9
4/4/2008 8:33	2466	13.25	354	322.7	367.7	345.9	340.1
4/4/2008 8:33	2467	13.25	354	322.9	367.4	345.9	339.9
4/4/2008 8:33	2468	13.25	354.5	322.4	367.4	345.3	340.1
4/4/2008 8:33	2469	13.25	354.5	322.2	367.2	345	340.1
4/4/2008 8:33	2470	13.25	353.8	322.4	367.5	345.3	339.7
4/4/2008 8:33	2471	13.24	353.6	322.6	367.5	346	339.5
4/4/2008 8:33	2472	13.25	354.4	322.7	367.9	345.7	340.1
4/4/2008 8:33	2473	13.25	354.4	322.6	367.9	345.3	340.3
4/4/2008 8:33	2474	13.25	354.2	322.2	367.4	345.3	340.1
4/4/2008 8:33	2475	13.25	354	322.4	367	345.5	339.9
4/4/2008 8:33	2476	13.25	354.2	322.4	365	345.7	339.9
4/4/2008 8:33	2477	13.25	354.4	320.8	364.3	346	339.9
4/4/2008 8:33	2478	13.25	354.5	319.9	363.7	345.9	340.1
4/4/2008 8:33	2479	13.25	354.2	321.1	363.4	345.3	340.3
4/4/2008 8:33	2480	13.25	353.6	321.7	363	345	340.1
4/4/2008 8:33	2481	13.25	354	320.6	362.7	345.7	339.7
4/4/2008 8:33	2482	13.25	354.4	319.5	363.6	345.7	339.9
4/4/2008 8:33	2483	13.25	354.4	319	363.9	345.9	340.1
4/4/2008 8:33	2484	13.25	354	318.8	363.6	345.7	340.1
4/4/2008 8:33	2485	13.25	354	318.2	363.2	345.3	340.3
4/4/2008 8:33	2486	13.25	354.2	317.9	363	345	339.9
4/4/2008 8:33	2487	13.25	354.4	318.2	363.4	345.7	339.5
4/4/2008 8:33	2488	13.25	354.4	318.8	363.6	346	339.7
4/4/2008 8:33	2489	13.25	354	318.6	363.9	345.7	340.3
4/4/2008 8:33	2490	13.25	353.6	318.4	363.6	345.1	340.3
4/4/2008 8:33	2491	13.25	354.2	318.1	363	345.3	339.7
4/4/2008 8:33	2492	13.25	354.5	318.2	362.8	345.7	339.9
4/4/2008 8:33	2493	13.25	354	318.2	363.6	345.9	340.1
4/4/2008 8:33	2494	13.25	353.8	318.8	363.7	346	340.1
4/4/2008 8:33	2495	13.25	354	318.8	363.4	345.7	340.1
4/4/2008 8:33	2496	13.25	354.4	318.2	363.4	345.1	340.1
4/4/2008 8:33	2497	13.25	354.4	317.9	363.2	345.1	339.5
4/4/2008 8:33	2498	13.25	354.2	318.2	363	345.9	339.7
4/4/2008 8:33	2499	13.25	354.2	318.6	363.6	345.9	340.1
4/4/2008 8:33	2500	13.25	354	318.8	363.9	345.9	340.3

4/4/2008 8:33	2501	13.25	354.2	318.6	363.4	345.5	339.9
4/4/2008 8:33	2502	13.25	354.5	318.2	363	345.5	339.9
4/4/2008 8:33	2503	13.25	354	317.9	363	345.3	340.1
4/4/2008 8:33	2504	13.25	353.6	317.9	363.6	345.9	339.9
4/4/2008 8:33	2505	13.25	354.4	318.6	363.6	346	340.1
4/4/2008 8:33	2506	13.25	354.4	318.6	363.7	345.5	340.3
4/4/2008 8:33	2507	13.25	354.2	318.2	363.4	345.1	339.7
4/4/2008 8:33	2508	13.25	354	318.2	362.7	345.7	339.7
4/4/2008 8:33	2509	13.25	354.2	318.2	362.8	345.7	339.9
4/4/2008 8:33	2510	13.25	354	318.1	363.7	345.9	340.1
4/4/2008 8:33	2511	13.25	354.5	318.8	363.7	345.9	340.3
4/4/2008 8:33	2512	13.25	354.4	321.1	363.4	345.3	340.1
4/4/2008 8:33	2513	13.25	354	319.1	363	345	339.9
4/4/2008 8:33	2514	13.25	354	318.4	363.2	345.3	339.7
4/4/2008 8:33	2515	13.25	354.4	318.6	363	345.9	340.1
4/4/2008 8:33	2516	13.25	354.4	318.6	363.6	345.7	340.3
4/4/2008 8:33	2517	13.25	354.2	318.4	363.7	345.3	339.9
4/4/2008 8:33	2518	13.25	354	318.6	363.2	345.3	339.7
4/4/2008 8:33	2519	13.25	354.2	318.1	362.7	345.5	339.9
4/4/2008 8:33	2520	13.25	354.4	317.7	361.2	345.3	340.1
4/4/2008 8:33	2521	13.25	354.4	318.1	360.1	343.3	337.6
4/4/2008 8:34	2522	13.25	351.8	316.6	359	341.5	335.6
4/4/2008 8:34	2523	13.25	348	314.8	351.3	332.9	330
4/4/2008 8:34	2524	13.25	337.7	300.9	324.6	307	310.1
4/4/2008 8:34	2525	13.25	300.7	268.9	275.4	280.1	263.5
4/4/2008 8:34	2526	13.25	250.9	225.2	239.7	241.8	222.3
4/4/2008 8:34	2527	13.25	219.3	196.3	219.1	212.8	196.9
4/4/2008 8:34	2528	13.24	197.8	176.5	205.5	194.3	181.9
4/4/2008 8:34	2529	13.25	184.4	163.6	198.1	186.2	175.2
4/4/2008 8:34	2530	13.25	185.3	163.1	195.8	185	172.8
4/4/2008 8:34	2531	13.25	188.2	164	194.9	185.7	174.3
4/4/2008 8:34	2532	13.25	189.1	166	197.4	185.9	174.8
4/4/2008 8:34	2533	13.25	189.3	166.7	198	185.5	175.2
4/4/2008 8:34	2534	13.25	189.5	166.9	198.3	185.1	175
4/4/2008 8:34	2535	13.25	187.1	166.9	198	185.5	175.2
4/4/2008 8:34	2536	13.25	185.9	165.6	198	185.7	175.4
4/4/2008 8:34	2537	13.25	187.5	162	198.7	185.9	175.4
4/4/2008 8:34	2538	13.25	189.1	156.1	198.9	188.2	175.9
4/4/2008 8:34	2539	13.25	189.8	150.3	201.2	189.1	177.9
4/4/2008 8:34	2540	13.25	192.5	147.6	203	190.4	180.4
4/4/2008 8:34	2541	13.25	194.5	146.3	205.4	192.7	182.4
4/4/2008 8:34	2542	13.25	196.9	145.9	208.2	196	185.7
4/4/2008 8:34	2543	13.25	199.6	145.8	210.2	197.4	187.1
4/4/2008 8:34	2544	13.25	201.6	137.8	211.3	200.5	188
4/4/2008 8:34	2545	13.25	202.1	118.3	213.7	201.6	190.4
4/4/2008 8:34	2546	13.25	202.1	109.1	214.2	202.1	191.6
4/4/2008 8:34	2547	13.25	201.9	103	214.9	202.3	192
4/4/2008 8:34	2548	13.25	202.5	95.2	215.5	202.7	192
4/4/2008 8:34	2549	13.25	204.6	85.6	215.5	202.7	192

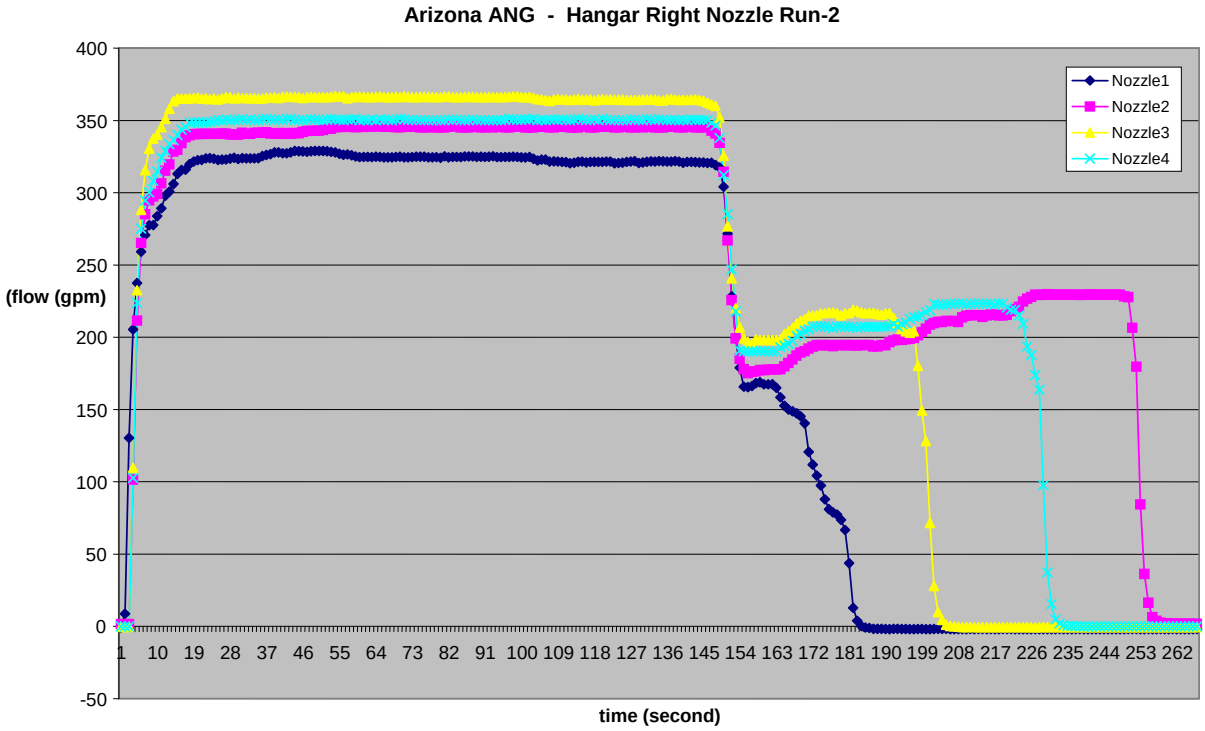
4/4/2008 8:34	2550	13.25	205.5	78.58	215.3	202.1	192
4/4/2008 8:34	2551	13.25	206.3	76.05	215.1	201.9	191.8
4/4/2008 8:34	2552	13.25	206.4	74.78	214.8	202.3	192
4/4/2008 8:34	2553	13.25	206.8	74.42	214.9	202.7	192.2
4/4/2008 8:34	2554	13.25	206.8	74.24	215.5	202.5	192
4/4/2008 8:34	2555	13.25	206.6	40.11	215.7	202.5	192
4/4/2008 8:34	2556	13.25	206.3	13.38	218	202.3	192
4/4/2008 8:34	2557	13.25	206.6	3.808	217.5	201.9	192.2
4/4/2008 8:34	2558	13.25	206.8	0.196	216.2	202.1	192.2
4/4/2008 8:34	2559	13.25	206.4	-0.888	215.5	202.7	192.2
4/4/2008 8:34	2560	13.25	206.4	-1.249	215.8	202.5	192.2
4/4/2008 8:34	2561	13.25	206.4	-1.61	215.7	202.3	191.8
4/4/2008 8:34	2562	13.25	206.8	-1.61	215.1	202.1	191.8
4/4/2008 8:34	2563	13.25	206.6	-1.61	214.9	202.5	192.2
4/4/2008 8:34	2564	13.25	206.6	-1.791	215.3	202.5	192
4/4/2008 8:34	2565	13.25	206.6	-1.972	215.5	202.7	194.3
4/4/2008 8:34	2566	13.25	206.4	-1.61	212.9	205	195.4
4/4/2008 8:34	2567	13.25	206.8	-1.61	208.4	203.6	196
4/4/2008 8:34	2568	13.25	207	-1.791	204.6	205.2	196.1
4/4/2008 8:34	2569	13.25	206.4	-1.791	203	206.3	196.5
4/4/2008 8:34	2570	13.25	207.9	-1.972	202.8	208.8	196.5
4/4/2008 8:34	2571	13.25	209.7	-1.972	203	210.2	198.5
4/4/2008 8:34	2572	13.25	210.6	-1.79	179.2	210.6	199.6
4/4/2008 8:34	2573	13.25	211	-1.79	148.8	211.3	201.4
4/4/2008 8:34	2574	13.25	213.5	-1.971	127	213.5	203.7
4/4/2008 8:34	2575	13.25	214.6	-1.971	72.44	214.8	206.3
4/4/2008 8:34	2576	13.25	214.9	-1.79	26.74	217.3	207.7
4/4/2008 8:34	2577	13.25	215.3	-1.61	9.77	218.4	208.6
4/4/2008 8:34	2578	13.25	215.3	-1.61	3.447	218.5	208.6
4/4/2008 8:34	2579	13.25	217.5	-1.61	1.099	218.9	209
4/4/2008 8:34	2580	13.25	218.4	-1.971	0.196	219.1	209.2
4/4/2008 8:34	2581	13.25	219.1	-1.971	0.016	219.3	209
4/4/2008 8:35	2582	13.25	219.3	-1.971	-0.165	219.4	208.6
4/4/2008 8:35	2583	13.25	219.3	-1.971	-0.526	219.3	211.5
4/4/2008 8:35	2584	13.25	219.3	-1.971	-0.526	218.9	212.6
4/4/2008 8:35	2585	13.25	219.4	-1.79	-0.346	219.1	213.1
4/4/2008 8:35	2586	13.25	219.3	-1.971	-0.526	219.4	213.1
4/4/2008 8:35	2587	13.25	219.6	-1.79	-0.346	219.4	213.1
4/4/2008 8:35	2588	13.25	219.3	-1.79	-0.526	219.3	212.8
4/4/2008 8:35	2589	13.25	218.9	-1.971	-0.526	219.1	213.1
4/4/2008 8:35	2590	13.25	219.1	-1.79	-0.526	219.1	213.5
4/4/2008 8:35	2591	13.25	220	-1.971	-0.526	218.9	213.3
4/4/2008 8:35	2592	13.25	222.3	-1.971	-0.526	219.4	212.9
4/4/2008 8:35	2593	13.25	222.7	-1.79	-0.526	219.4	213.1
4/4/2008 8:35	2594	13.25	223.2	-1.79	-0.526	216.6	213.3
4/4/2008 8:35	2595	13.25	223.4	-1.79	-0.887	215.1	216
4/4/2008 8:35	2596	13.25	224	-1.971	-0.526	215.1	217.1
4/4/2008 8:35	2597	13.25	226.5	-1.971	-0.526	211	218.9
4/4/2008 8:35	2598	13.25	228.3	-1.971	-0.526	205.4	222.3

4/4/2008 8:35	2599	13.25	230.5	-1.971	-0.526	194.7	224.3
4/4/2008 8:35	2600	13.25	231.6	-1.967	-0.522	183.7	227.9
4/4/2008 8:35	2601	13.25	231.9	-1.967	-0.703	170.9	229.4
4/4/2008 8:35	2602	13.25	231.7	-1.967	-0.522	160.9	228.3
4/4/2008 8:35	2603	13.24	231.7	-1.967	-0.522	94.8	226.5
4/4/2008 8:35	2604	13.25	231.9	-1.967	-0.522	34.15	226.3
4/4/2008 8:35	2605	13.25	232.3	-1.967	-0.522	12.3	225.8
4/4/2008 8:35	2606	13.25	232.1	-1.967	-0.703	4.715	226.1
4/4/2008 8:35	2607	13.25	231.9	-1.786	-0.883	2.006	227
4/4/2008 8:35	2608	13.25	231.9	-1.967	-0.703	0.742	228.8
4/4/2008 8:35	2609	13.25	231.9	-1.967	-0.522	0.381	229.2
4/4/2008 8:35	2610	13.25	232.1	-1.967	-0.883	0.2	229.9
4/4/2008 8:35	2611	13.25	232.3	-1.786	-0.703	0.02	230.1
4/4/2008 8:35	2612	13.25	234.3	-1.786	-0.522	-0.161	230.1
4/4/2008 8:35	2613	13.25	235.2	-1.967	-0.703	0.2	231.4
4/4/2008 8:35	2614	13.25	235	-1.967	-0.522	0.2	233.2
4/4/2008 8:35	2615	13.25	231.9	-1.967	-0.522	0.02	235.5
4/4/2008 8:35	2616	13.25	229	-1.967	-0.703	0.02	237.5
4/4/2008 8:35	2617	13.25	228.3	-1.967	-0.703	0.02	240.6
4/4/2008 8:35	2618	13.25	228.1	-1.967	-0.703	0.02	239.1
4/4/2008 8:35	2619	13.25	226.7	-1.967	-0.522	0.02	238.4
4/4/2008 8:35	2620	13.25	220.2	-1.967	-0.522	0.02	238.4
4/4/2008 8:35	2621	13.25	214.4	-1.967	-0.522	0.02	238.6
4/4/2008 8:35	2622	13.25	212	-1.967	-0.703	-0.161	238.6
4/4/2008 8:35	2623	13.25	211.1	-1.967	-0.703	0.02	237
4/4/2008 8:35	2624	13.25	211.1	-1.786	-0.703	0.02	224.3
4/4/2008 8:35	2625	13.25	206.3	-1.786	-0.522	0.02	203.9
4/4/2008 8:35	2626	13.25	192.5	-1.786	-0.522	-0.161	177.7
4/4/2008 8:35	2627	13.25	180.3	-1.967	-0.703	0.02	82.9
4/4/2008 8:35	2628	13.25	168	-1.967	-0.703	-0.161	32.17
4/4/2008 8:35	2629	13.25	160.8	-1.787	-0.522	0.019	13.38
4/4/2008 8:35	2630	13.25	150.3	-1.967	-0.703	0.019	6.34
4/4/2008 8:35	2631	13.25	146.1	-1.967	-0.522	0.019	3.812
4/4/2008 8:35	2632	13.25	144.3	-1.787	-0.703	0.019	2.548
4/4/2008 8:35	2633	13.24	143.8	-1.967	-0.703	-0.161	2.187
4/4/2008 8:35	2634	13.25	129.2	-1.967	-0.884	0.019	2.006
4/4/2008 8:35	2635	13.25	56.37	-1.787	-0.522	-0.161	1.825
4/4/2008 8:35	2636	13.25	21.69	-1.967	-0.522	0.019	1.645
4/4/2008 8:35	2637	13.25	8.51	-1.967	-0.703	0.019	1.825
4/4/2008 8:35	2638	13.25	3.451	-1.967	-0.522	-0.161	1.825
4/4/2008 8:35	2639	13.25	1.284	-1.967	-0.522	-0.161	1.645
4/4/2008 8:35	2640	13.25	0.742	-1.967	-0.703	0.019	1.645
4/4/2008 8:35	2641	13.25	0.561	-1.787	-0.522	0.019	1.645

Hangar Right Nozzles Run-1:



Hangar Right Nozzles Run-2:



Hangar Right Nozzles Run-1 and Run-2 Data:

TOA5	CR3000	CR3000.Std.05	CR3000	CPU:		8866
TIMESTAMP	RECORD	Batt_Volt	Measure_5	Measure_6	Measure_7	Measure_8
TS	RN	Volts	mV	mV	mV	mV
		Smp	Smp	Smp	Smp	Smp
RUN-1:						
4/4/2008 7:54	95	13.25	10.33	74.31	44.68	65.3
4/4/2008 7:54	96	13.25	101.3	160.5	179.3	183.3
4/4/2008 7:54	97	13.25	191.8	223.4	257.4	250.1
4/4/2008 7:54	98	13.25	244.3	260.1	297.7	270.3
4/4/2008 7:54	99	13.26	268.1	273.5	311.3	284.6
4/4/2008 7:54	100	13.25	277.5	279.5	314.4	291.4
4/4/2008 7:54	101	13.25	278.2	281.5	313.7	291.5
4/4/2008 7:54	102	13.25	278.8	281.3	315.3	292.5
4/4/2008 7:54	103	13.25	278.8	281.4	318.2	292.6
4/4/2008 7:54	104	13.25	280.1	283.7	319.6	293.7
4/4/2008 7:54	105	13.25	284.3	286.2	321.1	293.5
4/4/2008 7:54	106	13.25	286.3	288.7	325.3	297.6
4/4/2008 7:54	107	13.25	287.8	289.5	328.1	297.1
4/4/2008 7:54	108	13.26	288.5	293.1	331.6	300.5
4/4/2008 7:54	109	13.26	294.1	296.7	337.2	308.4
4/4/2008 7:54	110	13.25	298.7	301.4	343.4	318.5
4/4/2008 7:54	111	13.25	299.1	306.6	348.4	324.6
4/4/2008 7:54	112	13.25	306.8	314.1	351.7	330.4
4/4/2008 7:54	113	13.25	310.3	316.4	356.6	333.6
4/4/2008 7:54	114	13.26	314.7	320.4	361.6	336.1
4/4/2008 7:54	115	13.25	317.6	327.4	363.7	337.5
4/4/2008 7:54	116	13.26	318.4	338.7	364.4	342.5
4/4/2008 7:54	117	13.25	321.4	342.6	365.6	342.6
4/4/2008 7:54	118	13.26	322.7	344.9	367.2	342.7
4/4/2008 7:54	119	13.25	325.7	345.6	367.3	342.6
4/4/2008 7:54	120	13.25	324.8	345.6	366.9	346.4
4/4/2008 7:54	121	13.25	324.2	345.1	366.8	347.5
4/4/2008 7:54	122	13.25	324.6	345.4	366.5	348.4
4/4/2008 7:54	123	13.25	324.9	345.3	366.6	348.7
4/4/2008 7:54	124	13.25	324.4	345.3	366.6	348.3
4/4/2008 7:54	125	13.25	324.7	345.3	366.5	349.6
4/4/2008 7:54	126	13.26	324.1	344.7	366.6	349.1
4/4/2008 7:54	127	13.26	324.4	344.5	366.7	351.2
4/4/2008 7:54	128	13.26	324.4	344.8	366.6	351.3
4/4/2008 7:54	129	13.26	324.3	345.6	366.7	351.4
4/4/2008 7:54	130	13.25	324.3	345.3	366.7	351.3
4/4/2008 7:54	131	13.25	324.5	345.6	366.7	351.6
4/4/2008 7:54	132	13.25	324.6	345.7	366.5	351.1
4/4/2008 7:54	133	13.25	324.7	345.7	366.5	351.6
4/4/2008 7:54	134	13.25	324.5	345.3	366.6	351.8

4/4/2008 7:54	135	13.25	324.5	345.5	366.7	351.4
4/4/2008 7:54	136	13.25	325.3	345.6	366.6	351.1
4/4/2008 7:54	137	13.26	324.3	345.5	366.6	350.9
4/4/2008 7:54	138	13.26	325.1	345.6	366.5	350.5
4/4/2008 7:54	139	13.25	324.7	345.7	366.5	350.6
4/4/2008 7:55	140	13.25	324.5	345.4	366.5	351.6
4/4/2008 7:55	141	13.25	324.4	345.5	366.4	351.4
4/4/2008 7:55	142	13.25	324.3	345.7	366.5	351.5
4/4/2008 7:55	143	13.26	324.3	345.9	366.6	351.6
4/4/2008 7:55	144	13.26	324.3	345.6	366.6	351.5
4/4/2008 7:55	145	13.25	324.7	344.6	366.5	351.7
4/4/2008 7:55	146	13.26	324.5	344.5	366.5	350.9
4/4/2008 7:55	147	13.26	324.3	345.4	366.6	350.7
4/4/2008 7:55	148	13.25	324.3	345.6	366.5	350.8
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4/4/2008 7:55	154	13.25	324.5	345.7	366.5	351.5
4/4/2008 7:55	155	13.25	324.7	345.7	366.4	351.6
4/4/2008 7:55	156	13.25	324.7	345.7	366.4	351.6
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4/4/2008 7:55	159	13.25	324.5	346.1	366.6	351.7
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4/4/2008 7:55	162	13.25	324.8	345.7	366.7	351.6
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4/4/2008 7:55	166	13.25	324.7	346.7	366.5	350.9
4/4/2008 7:55	167	13.25	324.7	346.5	366.6	351.1
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4/4/2008 7:55	179	13.25	323.7	346.7	366.6	351.3
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4/4/2008 7:55	191	13.25	323.4	346.8	366.5	351.2
4/4/2008 7:55	192	13.25	323.4	345.1	366.6	351.2
4/4/2008 7:55	193	13.25	323.5	345.7	366.6	351.3
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4/4/2008 7:56	201	13.25	323.4	345.7	366.5	351.1
4/4/2008 7:56	202	13.25	323.5	345.1	366.6	351.1
4/4/2008 7:56	203	13.25	323.4	345.9	366.5	351.3
4/4/2008 7:56	204	13.25	323.3	346.5	366.5	350.9
4/4/2008 7:56	205	13.25	323.5	346.5	366.5	350.9
4/4/2008 7:56	206	13.25	323.4	346.7	366.5	350.8
4/4/2008 7:56	207	13.25	323.5	345.8	366.6	350.8
4/4/2008 7:56	208	13.25	323.4	345.7	366.6	350.9
4/4/2008 7:56	209	13.25	323.4	345.2	366.6	351.1
4/4/2008 7:56	210	13.25	323.5	345.3	366.6	351.1
4/4/2008 7:56	211	13.25	323.5	346.3	366.5	351.1
4/4/2008 7:56	212	13.25	323.7	346.7	366.5	351.1
4/4/2008 7:56	213	13.25	323.7	345.5	366.5	351.1
4/4/2008 7:56	214	13.25	323.2	345.4	366.6	351.1
4/4/2008 7:56	215	13.25	323.6	345.5	366.6	351.1
4/4/2008 7:56	216	13.25	323.2	345.1	366.6	351.1
4/4/2008 7:56	217	13.25	323.7	346.3	366.7	351.1
4/4/2008 7:56	218	13.25	323.5	346.1	366.5	351.3
4/4/2008 7:56	219	13.25	323.3	346.3	366.5	351.2
4/4/2008 7:56	220	13.25	323.4	346.4	366.5	351.2
4/4/2008 7:56	221	13.25	323.6	346.4	366.5	351.3
4/4/2008 7:56	222	13.25	323.5	346.7	366.5	351.3
4/4/2008 7:56	223	13.25	323.7	346.5	366.5	351.1
4/4/2008 7:56	224	13.25	323.5	346.3	366.5	351.1
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4/4/2008 7:56	226	13.25	323.4	346.5	366.6	351.1
4/4/2008 7:56	227	13.25	323.5	346.3	366.6	351.2
4/4/2008 7:56	228	13.25	323.5	346.2	366.7	351.1
4/4/2008 7:56	229	13.25	323.3	346.2	366.6	350.9
4/4/2008 7:56	230	13.25	323.5	346.6	366.6	350.9
4/4/2008 7:56	231	13.25	323.4	346.7	366.6	350.9
4/4/2008 7:56	232	13.25	323.7	346.6	366.6	351.1

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4/4/2008 7:56	234	13.25	323.7	346.3	366.5	351.3
4/4/2008 7:56	235	13.25	323.5	346.1	366.5	351.3
4/4/2008 7:56	236	13.25	323.5	346.6	366.5	351.3
4/4/2008 7:56	237	13.25	323.4	346.5	366.5	351.2
4/4/2008 7:56	238	13.25	323.7	346.5	366.5	351.3
4/4/2008 7:56	239	13.25	323.5	346.3	366.5	351.2
4/4/2008 7:56	240	13.25	323.7	346.3	366.5	351.2
4/4/2008 7:56	241	13.25	323.5	346.4	366.5	351.2
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4/4/2008 7:56	243	13.25	323.5	346.5	366.6	351.1
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4/4/2008 7:56	246	13.25	323.5	346.3	366.6	351.2
4/4/2008 7:56	247	13.25	323.5	346.3	366.6	351.1
4/4/2008 7:56	248	13.25	323.5	346.4	366.6	351.1
4/4/2008 7:56	249	13.25	323.7	346.3	366.6	351.1
4/4/2008 7:56	250	13.25	323.6	346.4	366.6	351.3
4/4/2008 7:56	251	13.25	323.7	346.3	366.5	351.1
4/4/2008 7:56	252	13.25	323.6	346.5	366.5	350.9
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4/4/2008 7:56	255	13.25	323.7	346.4	366.5	350.8
4/4/2008 7:56	256	13.25	323.5	345.4	366.6	351.1
4/4/2008 7:56	257	13.25	323.7	345.3	366.6	351.1
4/4/2008 7:56	258	13.25	323.5	346.4	366.6	351.3
4/4/2008 7:57	259	13.25	323.4	345.4	366.7	351.3
4/4/2008 7:57	260	13.25	323.4	345.4	366.7	351.2
4/4/2008 7:57	261	13.25	323.5	345.3	366.6	351.2
4/4/2008 7:57	262	13.25	323.7	345.4	366.6	351.3
4/4/2008 7:57	263	13.25	323.7	345.3	366.6	351.2
4/4/2008 7:57	264	13.25	323.7	345.4	366.5	351.2
4/4/2008 7:57	265	13.25	323.4	345.4	366.6	351.1
4/4/2008 7:57	266	13.25	323.7	345.5	366.5	351.1
4/4/2008 7:57	267	13.25	321.5	345.3	366.5	351.1
4/4/2008 7:57	268	13.25	320.8	345.4	366.5	351.1
4/4/2008 7:57	269	13.25	319.6	345.2	366.7	350.8
4/4/2008 7:57	270	13.25	318.4	345.3	366.5	350.9
4/4/2008 7:57	271	13.25	317.2	345.3	366.6	350.8
4/4/2008 7:57	272	13.25	315.1	341.3	361.5	345.5
4/4/2008 7:57	273	13.25	311.2	336.4	358.2	341.5
4/4/2008 7:57	274	13.25	294.3	323.3	346.7	327.2
4/4/2008 7:57	275	13.25	250.7	297.2	311.4	290.3
4/4/2008 7:57	276	13.25	222.7	246.5	268.2	241.1
4/4/2008 7:57	277	13.25	199.5	207.1	230.3	216.6
4/4/2008 7:57	278	13.25	180.6	181.5	210.8	197.4
4/4/2008 7:57	279	13.25	169.7	168.3	201.7	190.1
4/4/2008 7:57	280	13.25	167.8	168.8	201.6	188.4
4/4/2008 7:57	281	13.25	166.1	173.2	199.2	188.5

4/4/2008 7:57	282	13.25	165.3	177.3	198.3	183.4
4/4/2008 7:57	283	13.25	164.1	178.7	197.2	187.6
4/4/2008 7:57	284	13.25	164.1	179.1	195.2	188.1
4/4/2008 7:57	285	13.25	163.6	179.1	196.4	188.2
4/4/2008 7:57	286	13.25	163.2	179.4	197.2	188.7
4/4/2008 7:57	287	13.25	163.5	179.6	199.7	188.7
4/4/2008 7:57	288	13.25	163.1	179.5	200.6	188.9
4/4/2008 7:57	289	13.25	162.8	179.1	201.6	188.7
4/4/2008 7:57	290	13.25	162.9	179.1	202.4	188.7
4/4/2008 7:57	291	13.25	162.9	179.3	202.4	187.7
4/4/2008 7:57	292	13.25	162.8	179.4	203.5	186.8
4/4/2008 7:57	293	13.25	164.6	179.6	205.5	188.6
4/4/2008 7:57	294	13.25	165.4	179.3	206.1	188.5
4/4/2008 7:57	295	13.25	167.1	181.1	206.2	188.5
4/4/2008 7:57	296	13.25	169.3	182.7	206.2	188.5
4/4/2008 7:57	297	13.25	171.5	184.3	206.4	189.7
4/4/2008 7:57	298	13.25	171.4	186.3	206.5	192.1
4/4/2008 7:57	299	13.25	172.7	187.4	208.2	192.8
4/4/2008 7:57	300	13.25	173.7	185.4	207.7	192.6
4/4/2008 7:57	301	13.25	174.6	184.5	207.1	192.5
4/4/2008 7:57	302	13.25	175.8	183.5	207.2	192.6
4/4/2008 7:57	303	13.25	176.1	183.5	207.2	192.1
4/4/2008 7:57	304	13.25	176.2	183.6	208.3	192.7
4/4/2008 7:57	305	13.25	176.1	183.3	209.5	192.5
4/4/2008 7:57	306	13.25	176.1	183.3	207.3	192.5
4/4/2008 7:57	307	13.25	176.3	183.6	209.2	192.7
4/4/2008 7:57	308	13.25	176.3	183.4	210.5	192.5
4/4/2008 7:57	309	13.25	176.4	183.5	210.4	193.1
4/4/2008 7:57	310	13.25	176.6	185.1	210.3	193.1
4/4/2008 7:57	311	13.25	176.5	185.7	210.4	192.5
4/4/2008 7:57	312	13.25	176.3	186.3	210.3	192.5
4/4/2008 7:57	313	13.25	176.6	184.6	211.4	192.7
4/4/2008 7:57	314	13.25	176.6	186.1	211.3	195.6
4/4/2008 7:57	315	13.25	176.4	186.4	211.4	196.7
4/4/2008 7:57	316	13.25	175.9	186.3	211.3	196.5
4/4/2008 7:57	317	13.25	175.7	186.5	211.4	197.1
4/4/2008 7:57	318	13.25	175.4	186.6	213.5	197.7
4/4/2008 7:58	319	13.25	175.4	186.6	213.7	197.1
4/4/2008 7:58	320	13.25	176.2	186.6	214.3	197.4
4/4/2008 7:58	321	13.25	178.1	186.6	214.4	197.1
4/4/2008 7:58	322	13.25	177.9	186.6	214.5	196.5
4/4/2008 7:58	323	13.25	179.4	186.5	215.3	197.5
4/4/2008 7:58	324	13.25	180.1	186.7	215.5	197.1
4/4/2008 7:58	325	13.25	180.5	186.6	215.7	199.5
4/4/2008 7:58	326	13.25	180.5	186.6	215.1	201.1
4/4/2008 7:58	327	13.25	180.3	186.6	215.1	201.3
4/4/2008 7:58	328	13.25	180.5	186.6	215.1	201.4
4/4/2008 7:58	329	13.25	180.6	186.6	215.3	201.3
4/4/2008 7:58	330	13.25	180.7	187.4	215.4	201.2

4/4/2008 7:58	331	13.25	180.5	189.5	215.3	201.2
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4/4/2008 7:58	334	13.25	180.3	190.5	215.3	201.1
4/4/2008 7:58	335	13.25	180.7	190.5	215.4	201.1
4/4/2008 7:58	336	13.25	180.3	190.6	215.4	201.1
4/4/2008 7:58	337	13.25	180.5	190.6	215.3	201.4
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4/4/2008 7:58	339	13.25	183.2	190.7	215.4	201.5
4/4/2008 7:58	340	13.25	184.3	190.7	216.5	201.3
4/4/2008 7:58	341	13.25	184.6	191.1	217.7	201.4
4/4/2008 7:58	342	13.25	184.9	191.5	218.2	201.5
4/4/2008 7:58	343	13.25	184.7	193.7	218.1	201.4
4/4/2008 7:58	344	13.25	184.5	194.6	218.2	201.3
4/4/2008 7:58	345	13.25	184.5	195.1	218.2	201.2
4/4/2008 7:58	346	13.25	184.6	195.3	218.3	201.1
4/4/2008 7:58	347	13.25	184.6	195.3	218.4	201.3
4/4/2008 7:58	348	13.25	184.7	195.3	218.3	201.2
4/4/2008 7:58	349	13.25	184.6	195.4	218.2	202.1
4/4/2008 7:58	350	13.25	185.2	195.3	218.2	204.1
4/4/2008 7:58	351	13.25	187.3	195.3	218.4	205.1
4/4/2008 7:58	352	13.25	188.4	195.1	220.7	205.4
4/4/2008 7:58	353	13.25	188.8	195.6	221.6	203.6
4/4/2008 7:58	354	13.25	188.9	195.3	222.4	204.6
4/4/2008 7:58	355	13.25	188.8	195.4	222.3	205.1
4/4/2008 7:58	356	13.25	188.8	197.4	222.5	205.4
4/4/2008 7:58	357	13.25	188.4	198.5	222.7	205.3
4/4/2008 7:58	358	13.25	189.1	199.1	222.6	205.6
4/4/2008 7:58	359	13.25	189.1	199.9	223.3	208.2
4/4/2008 7:58	360	13.25	188.8	202.3	225.6	209.1
4/4/2008 7:58	361	13.25	191.3	205.1	226.2	209.2
4/4/2008 7:58	362	13.25	192.4	206.7	226.5	209.2
4/4/2008 7:58	363	13.25	193.1	207.4	227.2	209.6
4/4/2008 7:58	364	13.25	193.2	208.1	229.6	209.7
4/4/2008 7:58	365	13.25	193.3	211.4	230.3	210.6
4/4/2008 7:58	366	13.25	193.3	211.7	230.5	212.6
4/4/2008 7:58	367	13.25	192.7	211.7	230.7	213.3
4/4/2008 7:58	368	13.25	193.6	211.7	231.3	213.7
4/4/2008 7:58	369	13.25	193.1	211.7	231.4	214.1
4/4/2008 7:58	370	13.25	193.3	212.1	231.5	214.1
4/4/2008 7:58	371	13.25	193.3	212.1	231.6	214.1
4/4/2008 7:58	372	13.25	193.1	214.4	233.5	214.3
4/4/2008 7:58	373	13.25	193.6	215.6	234.6	214.3
4/4/2008 7:58	374	13.25	195.8	215.7	235.3	214.4
4/4/2008 7:58	375	13.25	196.7	216.5	235.8	216.4
4/4/2008 7:58	376	13.25	197.3	218.3	235.5	217.7
4/4/2008 7:58	377	13.25	197.3	219.3	237.3	218.6
4/4/2008 7:58	378	13.25	197.7	219.5	238.6	221.1
4/4/2008 7:59	379	13.25	197.3	220.5	239.4	221.7

4/4/2008 7:59	380	13.25	197.5	221.5	239.5	222.3
4/4/2008 7:59	381	13.25	197.5	223.5	243.3	222.6
4/4/2008 7:59	382	13.25	197.6	226.4	243.6	222.1
4/4/2008 7:59	383	13.25	197.4	228.3	243.7	225.8
4/4/2008 7:59	384	13.25	196.4	228.4	245.1	227.8
4/4/2008 7:59	385	13.25	192.1	228.7	249.4	229.6
4/4/2008 7:59	386	13.25	189.6	228.4	251.4	232.6
4/4/2008 7:59	387	13.25	189.3	228.6	251.6	234.3
4/4/2008 7:59	388	13.25	189.1	229.4	251.7	234.4
4/4/2008 7:59	389	13.25	188.6	229.1	251.6	234.5
4/4/2008 7:59	390	13.25	188.7	229.5	254.4	234.5
4/4/2008 7:59	391	13.25	188.6	229.4	255.6	235.3
4/4/2008 7:59	392	13.25	188.8	229.1	256.8	235.2
4/4/2008 7:59	393	13.25	187.2	229.4	256.7	235.1
4/4/2008 7:59	394	13.25	185.5	229.4	259.1	235.2
4/4/2008 7:59	395	13.25	183.7	229.3	260.3	235.5
4/4/2008 7:59	396	13.25	178.8	229.3	260.2	235.5
4/4/2008 7:59	397	13.25	171.3	229.5	260.6	236.3
4/4/2008 7:59	398	13.25	164.5	229.1	260.1	238.5
4/4/2008 7:59	399	13.25	157.5	229.4	259.3	239.3
4/4/2008 7:59	400	13.25	143.2	229.5	257.2	239.3
4/4/2008 7:59	401	13.25	115.7	230.7	252.3	239.7
4/4/2008 7:59	402	13.25	79.96	232.5	250.5	240.1
4/4/2008 7:59	403	13.25	30.46	232.4	245.4	240.3
4/4/2008 7:59	404	13.25	11.15	233.7	243.2	240.1
4/4/2008 7:59	405	13.25	4.313	236.4	241.4	240.3
4/4/2008 7:59	406	13.25	-0.146	238.6	241.1	240.3
4/4/2008 7:59	407	13.25	-0.869	242.4	240.3	240.2
4/4/2008 7:59	408	13.25	-1.41	244.6	226.5	240.2
4/4/2008 7:59	409	13.25	-1.591	245.7	207.6	240.1
4/4/2008 7:59	410	13.25	-1.591	245.6	185.7	240.2
4/4/2008 7:59	411	13.25	-1.772	245.6	163.8	240.2
4/4/2008 7:59	412	13.25	-1.772	245.5	141.3	240.2
4/4/2008 7:59	413	13.25	-1.772	245.4	71.45	240.1
4/4/2008 7:59	414	13.25	-1.591	248.4	28.34	240.1
4/4/2008 7:59	415	13.25	-1.591	248.3	12.56	238.3
4/4/2008 7:59	416	13.25	-1.952	248.4	9.656	236.5
4/4/2008 7:59	417	13.25	-1.952	248.4	1.113	230.1
4/4/2008 7:59	418	13.25	-1.771	248.5	0.396	225.2
4/4/2008 7:59	419	13.25	-1.952	248.3	-0.146	215.5
4/4/2008 7:59	420	13.25	-1.771	248.2	-0.507	186.4
4/4/2008 7:59	421	13.25	-1.591	248.2	-0.507	158.3
4/4/2008 7:59	422	13.25	-1.952	248.2	-0.507	137.5
4/4/2008 7:59	423	13.25	-1.952	248.4	-0.326	80.2
4/4/2008 7:59	424	13.25	-1.771	248.5	-0.507	32.57
4/4/2008 7:59	425	13.25	-1.771	248.3	-0.507	14.96
4/4/2008 7:59	426	13.25	-1.591	248.2	-0.507	7.025
4/4/2008 7:59	427	13.25	-1.591	248.3	-0.507	2.675
4/4/2008 7:59	428	13.25	-1.952	248.3	-0.507	0.757

4/4/2008 7:59	429	13.25	-1.952	248.4	-0.507	0.396
4/4/2008 7:59	430	13.25	-1.771	248.3	-0.688	0.215
4/4/2008 7:59	431	13.25	-1.771	248.3	-0.507	0.215
4/4/2008 7:59	432	13.25	-1.952	248.4	-0.507	0.035
4/4/2008 7:59	433	13.25	-1.952	246.5	-0.507	0.035
4/4/2008 7:59	434	13.25	-1.952	242.3	-0.507	0.035
4/4/2008 7:59	435	13.25	-1.771	240.5	-0.507	0.035
4/4/2008 7:59	436	13.25	-1.952	239.3	-0.507	0.035
4/4/2008 7:59	437	13.25	-1.591	238.1	-0.688	0.035
4/4/2008 8:00	438	13.25	-1.771	237.5	-0.507	0.035
4/4/2008 8:00	439	13.25	-1.952	222.2	-0.507	0.215
4/4/2008 8:00	440	13.25	-1.952	194.6	-0.507	0.035
4/4/2008 8:00	441	13.25	-1.952	128.1	-0.507	0.215
4/4/2008 8:00	442	13.25	-1.952	81.4	-0.688	0.215
4/4/2008 8:00	443	13.25	-1.952	40.64	-0.688	0.035
4/4/2008 8:00	444	13.25	-1.952	18.14	-0.688	-0.146
4/4/2008 8:00	445	13.25	-1.952	9.376	-0.507	0.035
4/4/2008 8:00	446	13.25	-1.952	3.467	-0.507	0.035
4/4/2008 8:00	447	13.25	-1.771	1.367	-0.687	0.035
4/4/2008 8:00	448	13.25	-1.771	1.027	-0.507	-0.146
4/4/2008 8:00	449	13.25	-1.952	1.025	-0.507	-0.146

RUN-2:

4/3/2008 8:30	2291	13.25	-1.091	1.54	-0.323	-0.121
4/4/2008 8:30	2292	13.25	8.75	1.533	-0.514	-0.121
4/4/2008 8:30	2293	13.25	130.3	1.533	-0.213	-0.122
4/4/2008 8:30	2294	13.25	205.4	101.5	109.7	102.7
4/4/2008 8:30	2295	13.25	237.5	211.5	232.5	223.8
4/4/2008 8:30	2296	13.25	259.2	265.2	288.1	275.2
4/4/2008 8:30	2297	13.25	270.7	285.1	315.5	294.6
4/4/2008 8:30	2298	13.25	277.5	294.6	330.4	300.2
4/4/2008 8:30	2299	13.25	277.6	297.3	337.3	308.1
4/4/2008 8:31	2300	13.25	283.7	299.1	340.1	314.7
4/4/2008 8:31	2301	13.25	289.2	306.5	345.4	324.2
4/4/2008 8:31	2302	13.25	298	315.2	351.1	328.8
4/4/2008 8:31	2303	13.25	300.8	319.5	358.2	333.6
4/4/2008 8:31	2304	13.25	306	328.4	363.2	336.3
4/4/2008 8:31	2305	13.25	313.1	329.6	365.1	339.9
4/4/2008 8:31	2306	13.25	315.7	334.2	365.1	343.7
4/4/2008 8:31	2307	13.25	316	338.4	365.1	345.4
4/4/2008 8:31	2308	13.25	319.8	339.7	365.3	348.3
4/4/2008 8:31	2309	13.25	321.5	340.4	365.5	348.6
4/4/2008 8:31	2310	13.25	322.5	340.5	365.7	348.6
4/4/2008 8:31	2311	13.25	322.7	340.5	365	348.6
4/4/2008 8:31	2312	13.25	323.7	340.7	365.3	348.6
4/4/2008 8:31	2313	13.25	323.9	340.7	364.7	349.2
4/4/2008 8:31	2314	13.25	323.4	340.7	365.1	349.5
4/4/2008 8:31	2315	13.25	322.7	340.7	364.5	350.4
4/4/2008 8:31	2316	13.25	322.9	340.9	365.3	350.1

4/4/2008 8:31	2317	13.25	323	340.9	366.1	350.6
4/4/2008 8:31	2318	13.25	323.6	340.3	366.1	350.1
4/4/2008 8:31	2319	13.25	324.1	340.3	365.2	350.4
4/4/2008 8:31	2320	13.25	323.3	340.2	365.8	350.6
4/4/2008 8:31	2321	13.25	323.9	341.4	365.5	350.8
4/4/2008 8:31	2322	13.25	323.8	340.7	365.5	350.2
4/4/2008 8:31	2323	13.25	323.8	340.7	365.3	350.8
4/4/2008 8:31	2324	13.25	323.8	341.3	365.4	350.1
4/4/2008 8:31	2325	13.25	323.9	341.5	365.2	350.2
4/4/2008 8:31	2326	13.25	325.4	341.5	365.1	350.8
4/4/2008 8:31	2327	13.25	326.1	341.7	365.8	351.1
4/4/2008 8:31	2328	13.25	326.6	340.9	365.8	350.8
4/4/2008 8:31	2329	13.25	327.9	340.9	366.1	350.4
4/4/2008 8:31	2330	13.25	327.9	341.2	365.5	350.6
4/4/2008 8:31	2331	13.25	327.2	340.7	366.3	350.2
4/4/2008 8:31	2332	13.25	327.2	341.2	366.5	350.8
4/4/2008 8:31	2333	13.25	327.9	340.7	366.4	351.1
4/4/2008 8:31	2334	13.25	328.9	341.2	366.3	350.4
4/4/2008 8:31	2335	13.25	328.7	341.2	366.2	350.2
4/4/2008 8:31	2336	13.25	328.5	342.1	365.4	350.4
4/4/2008 8:31	2337	13.25	328.3	342.6	366.2	350.1
4/4/2008 8:31	2338	13.25	328.7	342.8	366.3	350.8
4/4/2008 8:31	2339	13.25	328.8	342.8	366.2	350.7
4/4/2008 8:31	2340	13.25	328.8	342.9	366.1	350.6
4/4/2008 8:31	2341	13.25	328.8	343.3	366.2	350.1
4/4/2008 8:31	2342	13.25	328.7	344.1	366.1	350.4
4/4/2008 8:31	2343	13.25	328.2	344.2	366.4	351
4/4/2008 8:31	2344	13.25	327.8	345.3	366.9	350.8
4/4/2008 8:31	2345	13.25	326.9	345.4	366.5	350.4
4/4/2008 8:31	2346	13.25	326.2	345.4	366.7	350.1
4/4/2008 8:31	2347	13.25	326.5	345.9	365.3	350.6
4/4/2008 8:31	2348	13.25	326	345.5	366.2	350.7
4/4/2008 8:31	2349	13.25	325.1	345.3	366.3	351.1
4/4/2008 8:31	2350	13.25	324.6	345.8	366.3	350.1
4/4/2008 8:31	2351	13.25	324.7	345.4	366.3	350.3
4/4/2008 8:31	2352	13.25	324.7	345.9	366.1	350.1
4/4/2008 8:31	2353	13.25	324.6	345.7	366.1	350.6
4/4/2008 8:31	2354	13.25	324.9	346.1	366.3	350.1
4/4/2008 8:31	2355	13.25	324.7	345.9	366.6	350.8
4/4/2008 8:31	2356	13.25	324.5	345.6	366.2	350.4
4/4/2008 8:31	2357	13.25	324.5	345.6	366.1	350.4
4/4/2008 8:31	2358	13.25	324.5	345.6	366.1	350.1
4/4/2008 8:31	2359	13.25	324.7	345.3	366.3	350.8
4/4/2008 8:32	2360	13.25	324.9	345.3	366.2	351.1
4/4/2008 8:32	2361	13.25	324.5	345.6	366.9	350.6
4/4/2008 8:32	2362	13.25	324.4	345.6	366.4	350.2
4/4/2008 8:32	2363	13.25	324.6	345.8	366.1	350.4
4/4/2008 8:32	2364	13.25	324.9	345.6	366.1	350.2
4/4/2008 8:32	2365	13.25	324.9	345.1	366.4	350.2

4/4/2008 8:32	2366	13.25	324.9	345.1	366.4	350.2
4/4/2008 8:32	2367	13.25	324.5	345.3	366.4	350.1
4/4/2008 8:32	2368	13.25	324.4	345.6	366.2	350.1
4/4/2008 8:32	2369	13.25	324.6	345.1	366.2	350.3
4/4/2008 8:32	2370	13.25	324.2	345.1	366.2	350.1
4/4/2008 8:32	2371	13.25	325.2	345.1	366.5	350.1
4/4/2008 8:32	2372	13.25	324.4	345.5	366.5	350.7
4/4/2008 8:32	2373	13.25	324.7	345.9	366.2	350.4
4/4/2008 8:32	2374	13.25	324.7	345.9	366.1	350.6
4/4/2008 8:32	2375	13.25	324.6	345.1	366.2	350.4
4/4/2008 8:32	2376	13.25	325.1	345.1	366.4	350.1
4/4/2008 8:32	2377	13.25	325.1	345.1	366.3	350.1
4/4/2008 8:32	2378	13.25	325.1	345.6	366.4	350.6
4/4/2008 8:32	2379	13.25	324.7	345.9	366.2	350.2
4/4/2008 8:32	2380	13.25	324.9	345.1	366.1	350.4
4/4/2008 8:32	2381	13.25	324.7	345.1	366.1	350.1
4/4/2008 8:32	2382	13.25	324.9	345.6	366.4	350.1
4/4/2008 8:32	2383	13.25	325.2	345.1	366.2	350.1
4/4/2008 8:32	2384	13.25	324.6	345.6	366.2	350.2
4/4/2008 8:32	2385	13.25	324.6	345.6	366.1	350.1
4/4/2008 8:32	2386	13.25	324.7	345.1	366.3	350.2
4/4/2008 8:32	2387	13.24	324.8	345.1	366.3	351.1
4/4/2008 8:32	2388	13.25	324.9	345.7	366.6	350.8
4/4/2008 8:32	2389	13.25	324.7	345.8	366.6	350.4
4/4/2008 8:32	2390	13.25	324.5	345.7	366.2	350.4
4/4/2008 8:32	2391	13.25	324.3	345.1	366.1	350.6
4/4/2008 8:32	2392	13.25	324.7	345.1	366.3	350.8
4/4/2008 8:32	2393	13.25	323.4	345.1	365.6	351.1
4/4/2008 8:32	2394	13.25	322.3	345.6	364.7	350.1
4/4/2008 8:32	2395	13.25	322.8	345.7	364.5	350.4
4/4/2008 8:32	2396	13.25	322.9	345.6	364.1	350.1
4/4/2008 8:32	2397	13.25	321.6	345.1	363.6	350.6
4/4/2008 8:32	2398	13.25	321.7	345.1	364.5	350.6
4/4/2008 8:32	2399	13.25	321.5	345.6	364.7	350.4
4/4/2008 8:32	2400	13.25	321.2	345.6	364.5	350.6
4/4/2008 8:32	2401	13.25	321.1	345.9	364.5	350.4
4/4/2008 8:32	2402	13.25	320.4	345.1	364.1	350.1
4/4/2008 8:32	2403	13.25	320.6	345.1	364.5	350.6
4/4/2008 8:32	2404	13.25	321.4	345.1	364.8	351.1
4/4/2008 8:32	2405	13.25	321.6	345.9	364.3	350.6
4/4/2008 8:32	2406	13.25	321	345.9	364.4	350.2
4/4/2008 8:32	2407	13.25	321.3	345.1	364.6	350.4
4/4/2008 8:32	2408	13.25	321.4	345.1	363.8	350.6
4/4/2008 8:32	2409	13.25	321.2	345.6	364.4	350.1
4/4/2008 8:32	2410	13.25	321.3	345.6	364.7	351.1
4/4/2008 8:32	2411	13.25	321.5	345.6	364.5	350.6
4/4/2008 8:32	2412	13.25	321.5	345.6	364.6	350.2
4/4/2008 8:32	2413	13.25	320.4	345.1	364.4	350.2
4/4/2008 8:32	2414	13.25	320.5	345.1	364.3	350.1

4/4/2008 8:32	2415	13.25	320.8	345.6	364.4	350.1
4/4/2008 8:32	2416	13.25	321.3	345.9	364.1	350.1
4/4/2008 8:32	2417	13.25	321.5	345.1	364.2	350.6
4/4/2008 8:32	2418	13.25	321.8	345.1	364.1	350.6
4/4/2008 8:32	2419	13.25	320.5	345.6	364.1	350.4
4/4/2008 8:33	2420	13.25	320.9	345.1	364.4	350.1
4/4/2008 8:33	2421	13.25	321.4	345.6	364.4	351
4/4/2008 8:33	2422	13.25	321.7	345.9	364.6	350.6
4/4/2008 8:33	2423	13.25	321.6	345.1	364.5	350.2
4/4/2008 8:33	2424	13.25	321.8	345.1	363.8	350.6
4/4/2008 8:33	2425	13.25	321.7	345.1	363.9	350.6
4/4/2008 8:33	2426	13.25	321.5	345.6	364.7	350.3
4/4/2008 8:33	2427	13.25	321.6	345.9	364.7	350.3
4/4/2008 8:33	2428	13.25	321.8	345.6	364.5	350.4
4/4/2008 8:33	2429	13.25	321.6	345.1	364.1	350.1
4/4/2008 8:33	2430	13.25	320.7	345.1	364.3	350.4
4/4/2008 8:33	2431	13.25	321.2	345.6	364.1	350.1
4/4/2008 8:33	2432	13.25	321.2	345.9	364.5	350.6
4/4/2008 8:33	2433	13.25	321.1	345.1	364.6	350.4
4/4/2008 8:33	2434	13.25	321	345.1	364.1	350.4
4/4/2008 8:33	2435	13.25	320.9	345.1	363.6	350.4
4/4/2008 8:33	2436	13.25	320.5	345.6	362.2	350.2
4/4/2008 8:33	2437	13.25	320.8	342.9	361.2	348.3
4/4/2008 8:33	2438	13.25	319.1	340.8	360.1	346.4
4/4/2008 8:33	2439	13.25	317.5	334.4	352.2	337.8
4/4/2008 8:33	2440	13.25	304.1	314.3	325.5	312.1
4/4/2008 8:33	2441	13.25	271.6	266.9	276.7	285.2
4/4/2008 8:33	2442	13.25	228.3	225.7	240.7	246.9
4/4/2008 8:33	2443	13.25	199.3	199.2	220.2	217.9
4/4/2008 8:33	2444	13.24	178.9	184.9	206.7	190.8
4/4/2008 8:33	2445	13.25	165.8	177.9	199.1	190.1
4/4/2008 8:33	2446	13.25	165.5	175.2	196.7	190.1
4/4/2008 8:33	2447	13.25	166.2	176.1	195.8	190.3
4/4/2008 8:33	2448	13.25	168.3	176.3	198.5	190.3
4/4/2008 8:33	2449	13.25	168.9	177.2	198.1	190.3
4/4/2008 8:33	2450	13.25	167.4	177.2	198.1	190.2
4/4/2008 8:33	2451	13.25	167.4	177.6	198.1	190.1
4/4/2008 8:33	2452	13.25	167.5	177.6	198.1	190.2
4/4/2008 8:33	2453	13.25	165	177.6	198.1	190.2
4/4/2008 8:33	2454	13.25	158.5	177.8	198.5	193.2
4/4/2008 8:33	2455	13.25	152.6	179.9	202.2	194.2
4/4/2008 8:33	2456	13.25	149.9	182.2	204.1	195.5
4/4/2008 8:33	2457	13.25	148.8	184.7	206.3	197.6
4/4/2008 8:33	2458	13.25	147.4	187.3	209.5	201.1
4/4/2008 8:33	2459	13.25	145.3	189.4	211.4	202.3
4/4/2008 8:33	2460	13.25	140.4	190.3	212.5	204.4
4/4/2008 8:33	2461	13.25	120.7	192.2	214.8	205.5
4/4/2008 8:33	2462	13.25	111.9	193.4	215.1	207.2
4/4/2008 8:33	2463	13.25	104.3	194.4	215.3	207.2

4/4/2008 8:33	2464	13.25	97.4	194.4	216.7	207.6
4/4/2008 8:33	2465	13.25	87.9	194.4	216.7	207.6
4/4/2008 8:33	2466	13.25	81.09	194.4	217.1	207.1
4/4/2008 8:33	2467	13.25	78.85	193.8	217.1	206.3
4/4/2008 8:33	2468	13.25	77.43	194.4	216.7	207.2
4/4/2008 8:33	2469	13.25	73.73	194.6	215.3	207.6
4/4/2008 8:33	2470	13.25	66.67	194.4	216.6	207.4
4/4/2008 8:33	2471	13.25	43.66	194.4	216.7	207.4
4/4/2008 8:33	2472	13.25	12.83	194.4	219.1	207.2
4/4/2008 8:33	2473	13.25	3.808	194.2	218.4	206.5
4/4/2008 8:33	2474	13.25	0.173	194.6	217.3	207.1
4/4/2008 8:33	2475	13.25	-0.873	194.6	216.6	207.3
4/4/2008 8:33	2476	13.25	-1.143	194.6	216.9	207.4
4/4/2008 8:33	2477	13.25	-1.73	193.6	216.8	207.2
4/4/2008 8:33	2478	13.25	-1.73	193.6	216.2	207.1
4/4/2008 8:33	2479	13.25	-1.73	194.6	215.5	207.4
4/4/2008 8:34	2480	13.25	-1.794	194.4	216.5	207.4
4/4/2008 8:34	2481	13.25	-1.974	196.5	216.6	207.6
4/4/2008 8:34	2482	13.25	-1.73	197.7	213.4	209.1
4/4/2008 8:34	2483	13.25	-1.73	198.4	209.5	207.5
4/4/2008 8:34	2484	13.25	-1.794	198.1	205.7	209.1
4/4/2008 8:34	2485	13.25	-1.794	198.5	204.2	210.2
4/4/2008 8:34	2486	13.25	-1.971	198.9	203.1	212.7
4/4/2008 8:34	2487	13.25	-1.971	199.5	204.1	214.1
4/4/2008 8:34	2488	13.25	-1.791	201.4	180.2	214.5
4/4/2008 8:34	2489	13.25	-1.791	203.6	149.4	215.2
4/4/2008 8:34	2490	13.25	-1.972	205.9	128.1	217.4
4/4/2008 8:34	2491	13.25	-1.972	208.6	71.56	218.7
4/4/2008 8:34	2492	13.25	-1.792	209.7	27.83	223.2
4/4/2008 8:34	2493	13.25	-1.73	210.5	9.85	222.3
4/4/2008 8:34	2494	13.25	-1.73	210.5	4.474	222.4
4/4/2008 8:34	2495	13.25	-1.73	211.3	1.099	222.8
4/4/2008 8:34	2496	13.25	-1.972	211.2	0.196	223.2
4/4/2008 8:34	2497	13.25	-1.972	211.3	0.016	223.2
4/4/2008 8:34	2498	13.25	-1.972	210.5	-0.165	223.3
4/4/2008 8:34	2499	13.25	-1.972	213.7	-0.526	223.2
4/4/2008 8:34	2500	13.25	-1.972	214.8	-0.526	222.7
4/4/2008 8:34	2501	13.25	-1.791	215.3	-0.325	223.1
4/4/2008 8:34	2502	13.25	-1.972	215.3	-0.525	223.3
4/4/2008 8:34	2503	13.25	-1.791	215.3	-0.525	223.3
4/4/2008 8:34	2504	13.25	-1.792	214.1	-0.525	223.2
4/4/2008 8:34	2505	13.25	-1.971	215.1	-0.526	223.1
4/4/2008 8:34	2506	13.25	-1.791	215.7	-0.526	223.1
4/4/2008 8:34	2507	13.25	-1.972	215.6	-0.525	222.6
4/4/2008 8:34	2508	13.25	-1.971	215.1	-0.526	223.3
4/4/2008 8:34	2509	13.25	-1.792	215.1	-0.526	223.3
4/4/2008 8:34	2510	13.25	-1.792	215.5	-0.526	220.5
4/4/2008 8:34	2511	13.25	-1.791	218.1	-0.525	219.1
4/4/2008 8:34	2512	13.25	-1.971	219.3	-0.525	219.1

4/4/2008 8:34	2513	13.25	-1.971	220.9	-0.526	215.1
4/4/2008 8:34	2514	13.25	-1.971	224.6	-0.526	209.3
4/4/2008 8:34	2515	13.25	-1.972	226.7	-0.526	193.6
4/4/2008 8:34	2516	13.25	-1.972	227.9	-0.522	187.6
4/4/2008 8:34	2517	13.25	-1.972	229.4	-0.703	173.8
4/4/2008 8:34	2518	13.25	-1.971	229.1	-0.522	163.8
4/4/2008 8:34	2519	13.25	-1.971	229.3	-0.522	97.7
4/4/2008 8:34	2520	13.25	-1.971	229.8	-0.522	37.23
4/4/2008 8:34	2521	13.25	-1.972	229.4	-0.522	15.4
4/4/2008 8:34	2522	13.25	-1.972	229.3	-0.526	4.715
4/4/2008 8:34	2523	13.25	-1.771	229.5	-0.526	2.006
4/4/2008 8:34	2524	13.25	-1.972	229.4	-0.525	0.742
4/4/2008 8:34	2525	13.25	-1.972	229.4	-0.522	0.381
4/4/2008 8:34	2526	13.25	-1.972	229.4	-0.525	0.212
4/4/2008 8:34	2527	13.25	-1.771	229.5	-0.525	0.025
4/4/2008 8:34	2528	13.25	-1.771	229.1	-0.522	-0.122
4/4/2008 8:34	2529	13.25	-1.972	229.3	-0.525	-0.122
4/4/2008 8:34	2530	13.25	-1.972	229.4	-0.522	-0.122
4/4/2008 8:34	2531	13.25	-1.972	229.6	-0.522	-0.122
4/4/2008 8:34	2532	13.25	-1.972	229.4	-0.525	-0.122
4/4/2008 8:34	2533	13.25	-1.971	229.4	-0.525	-0.122
4/4/2008 8:34	2534	13.25	-1.971	229.3	-0.526	-0.122
4/4/2008 8:34	2535	13.25	-1.971	229.3	-0.522	-0.122
4/4/2008 8:34	2536	13.25	-1.972	229.4	-0.522	-0.122
4/4/2008 8:34	2537	13.25	-1.972	229.3	-0.522	-0.122
4/4/2008 8:34	2538	13.25	-1.972	229.4	-0.525	-0.122
4/4/2008 8:34	2539	13.25	-1.972	228.3	-0.526	-0.122
4/4/2008 8:35	2540	13.25	-1.771	227.7	-0.526	-0.122
4/4/2008 8:35	2541	13.25	-1.771	206.5	-0.522	-0.122
4/4/2008 8:35	2542	13.25	-1.772	179.7	-0.522	0.122
4/4/2008 8:35	2543	13.25	-1.971	84.2	-0.525	-0.122
4/4/2008 8:35	2544	13.25	-1.971	36.17	-0.525	-0.122
4/4/2008 8:35	2545	13.25	-1.772	16.34	-0.522	-0.123
4/4/2008 8:35	2546	13.25	-1.972	6.34	-0.525	-0.123
4/4/2008 8:35	2547	13.25	-1.972	3.812	-0.522	-0.123
4/4/2008 8:35	2548	13.25	-1.771	2.548	-0.525	-0.123
4/4/2008 8:35	2549	13.25	-1.971	2.187	-0.525	-0.122
4/4/2008 8:35	2550	13.25	-1.971	2.006	-0.526	-0.123
4/4/2008 8:35	2551	13.25	-1.772	1.825	-0.522	-0.122
4/4/2008 8:35	2552	13.25	-1.971	1.645	-0.522	-0.123
4/4/2008 8:35	2553	13.25	-1.971	1.825	-0.525	-0.123
4/4/2008 8:35	2554	13.25	-1.971	1.825	-0.522	-0.122
4/4/2008 8:35	2555	13.25	-1.971	1.645	-0.522	-0.122
4/4/2008 8:35	2556	13.25	-1.971	1.645	-0.525	-0.123
4/4/2008 8:35	2557	13.25	-1.772	1.645	-0.522	-0.122

Marine Corps Base Hawaii Building 5069:

Pump Room Run-1:

HANGAR: Building 5069, Run-1 sheet no.: 01

date: 30 December 2008, Run-1 AFFF: 3%

by: US Marine Corps Base Hawaii & NAVFAC ESC

DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	TIME (SEC)			COMMENTS / PROBLEMS
Fire Pump Riser:	674	121			water press = 110 psi
AFFF:	22	121			AFFF press = 76 psi
Nozzles:					
1.	322	121			
2.	315	121			

Pump Room Run-2:

HANGAR: Building 5069, Run-2 sheet no.: 02

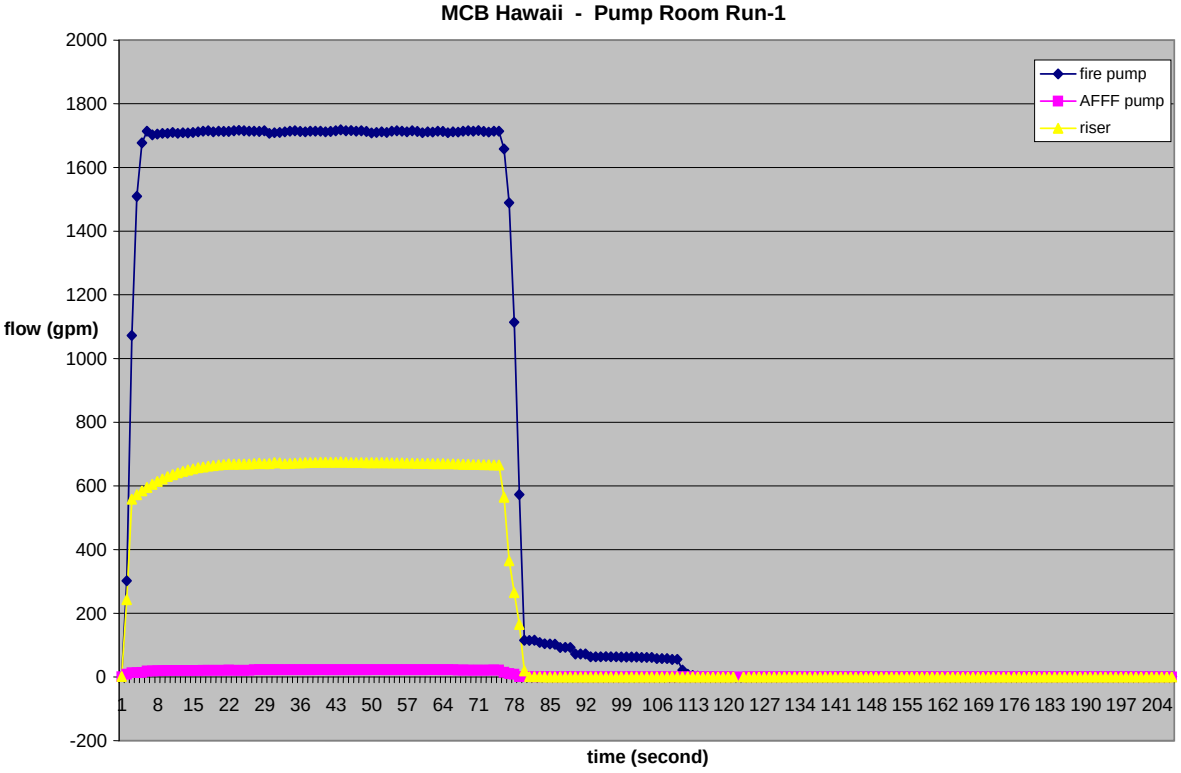
date: 30 December 2008, Run-2 AFFF: 3%

by: US Marine Corps Base Hawaii & NAVFAC ESC

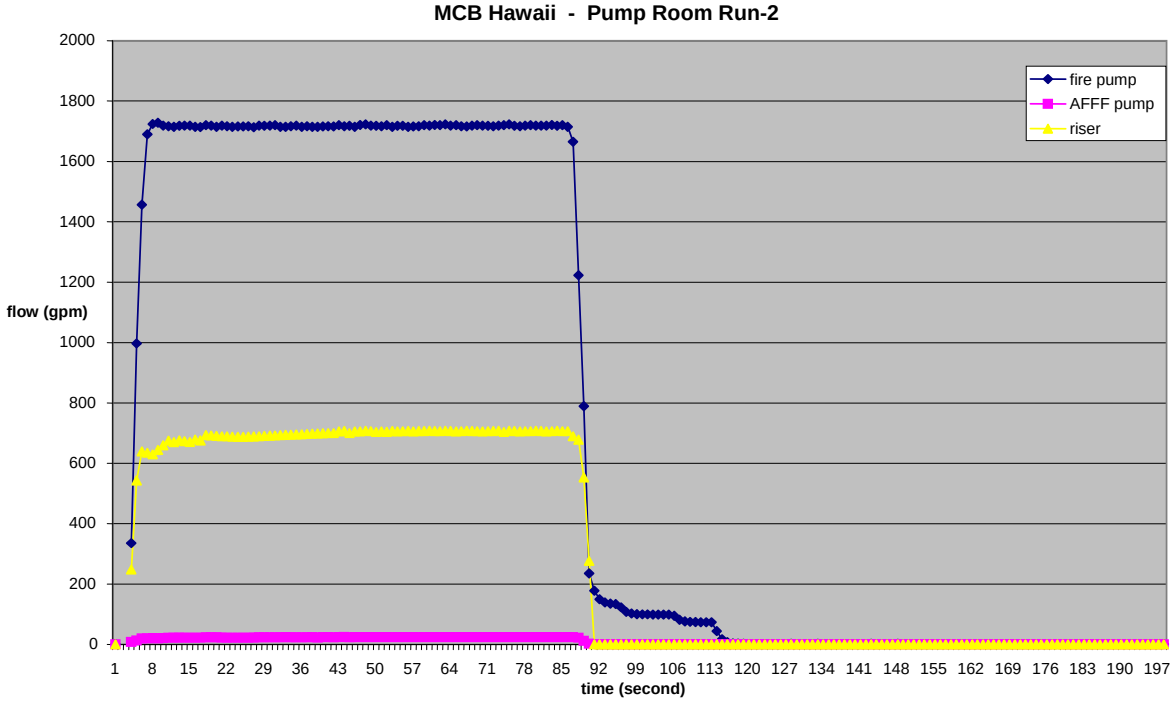
DISCHARGE TABLE

DISCHARGE (GPM)	WATER DISCHARGE FLOW RATE (GPM)	TIME (SEC)			COMMENTS / PROBLEMS
Fire Pump Riser:	707	117			water press = 110 psi
AFFF:	24	117			AFFF press = 76 psi
Nozzles:					
1.	326	117			
2.	315	117			

Pump Room Run-1:



Pump Room Run-2:



Pump Room Run-1 and Run-2 Data:

TOA5	CR3000	CR3000.Std.05	CR3000	1569	CPU:3kaneohepmprm.CR3
TIMESTAMP	RECORD	Batt_Volt	Measure	Measure_2	Measure_3
TS	RN	Volts	mV	mV	mV
		Smp	Smp	Smp	Smp
RUN 1:					
12/30/2008 17:19	4150	12.34	1.021	0.411	1.134
12/30/2008 17:19	4151	12.34	302.2	8.413	243.0
12/30/2008 17:19	4152	12.34	1072	13.23	558.5
12/30/2008 17:19	4153	12.34	1509	13.43	571.9
12/30/2008 17:19	4154	12.34	1677	13.59	584.2
12/30/2008 17:19	4155	12.34	1714	18.59	595.2
12/30/2008 17:19	4156	12.34	1702	18.59	605.1
12/30/2008 17:19	4157	12.33	1705	19.41	614.0
12/30/2008 17:19	4158	12.34	1707	19.41	621.8
12/30/2008 17:19	4159	12.34	1707	20.01	629.0
12/30/2008 17:20	4160	12.34	1710	20.01	635.1
12/30/2008 17:20	4161	12.33	1707	20.01	640.9
12/30/2008 17:20	4162	12.33	1709	20.03	645.6
12/30/2008 17:20	4163	12.33	1708	20.03	649.8
12/30/2008 17:20	4164	12.33	1710	20.05	653.6
12/30/2008 17:20	4165	12.33	1712	20.13	656.6
12/30/2008 17:20	4166	12.33	1714	20.73	659.3
12/30/2008 17:20	4167	12.33	1715	20.73	661.7
12/30/2008 17:20	4168	12.33	1712	20.9	663.9
12/30/2008 17:20	4169	12.33	1714	20.91	665.7
12/30/2008 17:20	4170	12.33	1713	20.91	667.6
12/30/2008 17:20	4171	12.33	1713	21.23	669.4
12/30/2008 17:20	4172	12.33	1715	20.9	668.4
12/30/2008 17:20	4173	12.33	1717	20.91	668.9
12/30/2008 17:20	4174	12.33	1715	20.91	668.7
12/30/2008 17:20	4175	12.33	1714	20.93	668.9
12/30/2008 17:20	4176	12.33	1714	22.23	670.2
12/30/2008 17:20	4177	12.33	1713	22.23	671.4
12/30/2008 17:20	4178	12.33	1715	22.41	669.5
12/30/2008 17:20	4179	12.33	1707	22.42	669.8
12/30/2008 17:20	4180	12.33	1709	22.24	673.4
12/30/2008 17:20	4181	12.33	1710	22.24	672.5
12/30/2008 17:20	4182	12.33	1712	22.24	669.5
12/30/2008 17:20	4183	12.33	1714	22.42	670.5
12/30/2008 17:20	4184	12.32	1715	22.42	671.6
12/30/2008 17:20	4185	12.32	1713	22.24	672.2
12/30/2008 17:20	4186	12.32	1712	22.24	672.9

12/30/2008 17:20	4187	12.31	1714	22.42	673.4
12/30/2008 17:20	4188	12.31	1714	22.24	673.8
12/30/2008 17:20	4189	12.3	1714	22.6	674.0
12/30/2008 17:20	4190	12.31	1712	22.24	674.2
12/30/2008 17:20	4191	12.3	1713	22.24	674.2
12/30/2008 17:20	4192	12.31	1715	22.24	674.5
12/30/2008 17:20	4193	12.3	1718	22.42	674.7
12/30/2008 17:20	4194	12.3	1715	22.24	674.3
12/30/2008 17:20	4195	12.3	1716	22.42	673.6
12/30/2008 17:20	4196	12.3	1714	22.24	673.4
12/30/2008 17:20	4197	12.31	1715	22.06	673.4
12/30/2008 17:20	4198	12.3	1713	22.42	673.2
12/30/2008 17:20	4199	12.3	1708	22.06	673.1
12/30/2008 17:20	4200	12.3	1710	22.6	673.2
12/30/2008 17:20	4201	12.3	1712	22.24	672.7
12/30/2008 17:20	4202	12.3	1710	22.24	672.7
12/30/2008 17:20	4203	12.3	1714	22.24	672.2
12/30/2008 17:20	4204	12.3	1715	22.06	672.3
12/30/2008 17:20	4205	12.3	1714	22.42	672.0
12/30/2008 17:20	4206	12.3	1712	22.24	671.8
12/30/2008 17:20	4207	12.3	1715	22.43	671.6
12/30/2008 17:20	4208	12.3	1713	22.56	671.1
12/30/2008 17:20	4209	12.3	1709	22.25	671.1
12/30/2008 17:20	4210	12.3	1712	22.43	670.5
12/30/2008 17:20	4211	12.3	1711	22.61	670.4
12/30/2008 17:20	4212	12.29	1714	22.25	670.2
12/30/2008 17:20	4213	12.3	1713	22.43	669.8
12/30/2008 17:20	4214	12.29	1709	22.41	669.5
12/30/2008 17:20	4215	12.29	1712	22.25	669.3
12/30/2008 17:20	4216	12.29	1711	21.43	668.9
12/30/2008 17:20	4217	12.29	1714	21.79	668.2
12/30/2008 17:20	4218	12.3	1715	21.43	667.8
12/30/2008 17:20	4219	12.3	1714	21.07	667.5
12/30/2008 17:21	4220	12.29	1716	21.43	667.1
12/30/2008 17:21	4221	12.3	1713	21.07	666.9
12/30/2008 17:21	4222	12.29	1711	21.43	666.4
12/30/2008 17:21	4223	12.29	1714	21.25	666.0
12/30/2008 17:21	4224	12.29	1714	21.19	665.8
12/30/2008 17:21	4225	12.29	1658	14.43	564.9
12/30/2008 17:21	4226	12.29	1489	10.07	364.8
12/30/2008 17:21	4227	12.29	1114	8.257	264.6
12/30/2008 17:21	4228	12.29	573.1	1.025	164.5
12/30/2008 17:21	4229	12.29	115	1.025	19.13
12/30/2008 17:21	4230	12.29	114.6	0.873	0.899
12/30/2008 17:21	4231	12.29	115	0.253	0.888
12/30/2008 17:21	4232	12.29	108.1	0.253	0.873
12/30/2008 17:21	4233	12.29	104.5	0.434	0.087
12/30/2008 17:21	4234	12.29	103.2	0.253	0.088

12/30/2008 17:21	4235	12.29	102.7	0.081	0.102
12/30/2008 17:21	4236	12.28	92.54	0.261	0.201
12/30/2008 17:21	4237	12.28	92.73	0.261	0.211
12/30/2008 17:21	4238	12.29	92.37	0.442	0.105
12/30/2008 17:21	4239	12.28	72.37	0.261	0.114
12/30/2008 17:21	4240	12.3	72.35	0.261	0.113
12/30/2008 17:21	4241	12.3	72.25	0.261	0.113
12/30/2008 17:21	4242	12.3	63.5	0.081	0.081
12/30/2008 17:21	4243	12.3	63.5	0.081	0.076
12/30/2008 17:21	4244	12.3	63.5	0.081	0.105
12/30/2008 17:21	4245	12.3	63.7	0.261	0.108
12/30/2008 17:21	4246	12.3	63.3	0.081	0.112
12/30/2008 17:21	4247	12.3	62.93	0.089	0.087
12/30/2008 17:21	4248	12.3	62.57	0.093	0.079
12/30/2008 17:21	4249	12.3	62.57	0.261	0.111
12/30/2008 17:21	4250	12.3	62.53	0.442	0.098
12/30/2008 17:21	4251	12.3	62.5	0.261	0.093
12/30/2008 17:21	4252	12.3	61.39	0.081	0.112
12/30/2008 17:21	4253	12.3	61.37	0.261	0.11
12/30/2008 17:21	4254	12.3	61.27	0.198	0.097
12/30/2008 17:21	4255	12.3	57.95	0.081	0.101
12/30/2008 17:21	4256	12.3	57.85	0.442	0.114
12/30/2008 17:21	4257	12.3	57.32	0.261	0.079
12/30/2008 17:21	4258	12.3	54.75	0.261	0.89
12/30/2008 17:21	4259	12.3	55.72	0.195	0.098
12/30/2008 17:21	4260	12.3	21.22	0.061	0.109
12/30/2008 17:21	4261	12.3	8.58	0.081	0.105
12/30/2008 17:21	4262	12.3	3.88	0.094	0.089
12/30/2008 17:21	4263	12.3	2.067	0.087	0.079
12/30/2008 17:21	4264	12.3	1.344	0.087	0.079
12/30/2008 17:21	4265	12.3	1.344	0.087	0.097
12/30/2008 17:21	4266	12.3	1.164	0.268	0.083
12/30/2008 17:21	4267	12.3	0.983	0.268	0.093
12/30/2008 17:21	4268	12.3	0.983	0.268	0.091
12/30/2008 17:21	4269	12.3	1.164	0.192	0.089
12/30/2008 17:21	4270	12.3	0.983	0.087	0.085
12/30/2008 17:21	4271	12.3	0.983	0.191	0.107
12/30/2008 17:21	4272	12.3	0.803	0.087	0.095
12/30/2008 17:21	4273	12.3	0.803	0.094	0.092
12/30/2008 17:21	4274	12.3	0.803	0.087	0.084
12/30/2008 17:21	4275	12.3	0.803	0.072	0.093
12/30/2008 17:21	4276	12.3	0.803	0.097	0.076
12/30/2008 17:21	4277	12.3	0.803	0.087	-0.075
12/30/2008 17:21	4278	12.3	0.803	0.091	0.077
12/30/2008 17:21	4279	12.3	0.803	0.092	0.094
12/30/2008 17:22	4280	12.3	0.803	0.087	0.091
12/30/2008 17:22	4281	12.3	0.983	0.091	0.101

12/30/2008 17:22	4282	12.3	0.983	0.097	0.111
12/30/2008 17:22	4283	12.3	0.803	0.087	0.095
12/30/2008 17:22	4284	12.3	0.803	0.068	0.085
12/30/2008 17:22	4285	12.3	0.803	0.087	0.109
12/30/2008 17:22	4286	12.3	0.983	0.097	0.092
12/30/2008 17:22	4287	12.3	0.979	0.087	0.098
12/30/2008 17:22	4288	12.3	0.988	0.09	0.091
12/30/2008 17:22	4289	12.34	1.362	0.096	0.087
12/30/2008 17:22	4290	12.33	1.542	0.086	0.088
12/30/2008 17:22	4291	12.34	1.542	0.098	0.078
12/30/2008 17:22	4292	12.34	1.723	0.096	0.072
12/30/2008 17:22	4293	12.34	1.362	0.091	0.071
12/30/2008 17:22	4294	12.34	1.542	0.083	0.081
12/30/2008 17:22	4295	12.34	1.723	0.086	0.083
12/30/2008 17:22	4296	12.34	1.542	0.095	0.091
12/30/2008 17:22	4297	12.33	1.542	0.086	0.093
12/30/2008 17:22	4298	12.34	1.542	0.107	0.092
12/30/2008 17:22	4299	12.34	1.362	0.086	0.105
12/30/2008 17:22	4300	12.34	1.542	0.086	0.079
12/30/2008 17:22	4301	12.33	1.542	0.082	0.093
12/30/2008 17:22	4302	12.33	1.542	0.091	0.089
12/30/2008 17:22	4303	12.33	1.723	0.076	0.082
12/30/2008 17:22	4304	12.33	1.542	0.067	0.107
12/30/2008 17:22	4305	12.33	1.362	0.079	0.093
12/30/2008 17:22	4306	12.33	1.542	0.083	0.093
12/30/2008 17:22	4307	12.33	1.542	0.067	0.091
12/30/2008 17:22	4308	12.33	1.542	0.091	0.089
12/30/2008 17:22	4309	12.33	1.362	0.067	0.085
12/30/2008 17:22	4310	12.33	1.362	0.082	0.091
12/30/2008 17:22	4311	12.33	1.542	0.087	0.094
12/30/2008 17:22	4312	12.33	1.542	0.083	0.087
12/30/2008 17:22	4313	12.33	1.362	0.076	0.083
12/30/2008 17:22	4314	12.33	1.542	0.056	0.085
12/30/2008 17:22	4315	12.33	1.542	0.073	0.087
12/30/2008 17:22	4316	12.33	1.362	0.079	0.092
12/30/2008 17:22	4317	12.33	1.542	0.076	0.096
12/30/2008 17:22	4318	12.33	1.534	0.107	0.103
12/30/2008 17:22	4319	12.33	1.353	0.095	0.093
12/30/2008 17:22	4320	12.33	1.534	0.075	0.094
12/30/2008 17:22	4321	12.33	1.534	0.081	0.091
12/30/2008 17:22	4322	12.33	1.534	0.075	0.089
12/30/2008 17:22	4323	12.32	1.353	0.081	0.085
12/30/2008 17:22	4324	12.33	1.534	0.077	0.093
12/30/2008 17:22	4325	12.33	1.534	0.095	0.091
12/30/2008 17:22	4326	12.33	1.534	0.081	0.097
12/30/2008 17:22	4327	12.33	1.534	0.084	0.111
12/30/2008 17:22	4328	12.33	1.534	0.075	0.096
12/30/2008 17:22	4329	12.33	1.534	0.085	0.091

12/30/2008 17:22	4330	12.33	1.534	0.087	0.087
12/30/2008 17:22	4331	12.33	1.534	0.073	0.093
12/30/2008 17:22	4332	12.33	1.534	0.081	0.091
12/30/2008 17:22	4333	12.33	1.534	0.085	0.097
12/30/2008 17:22	4334	12.33	1.534	0.089	0.092
12/30/2008 17:22	4335	12.33	1.534	0.075	0.085
12/30/2008 17:22	4336	12.33	1.353	0.081	0.087
12/30/2008 17:22	4337	12.33	1.534	0.085	0.086
12/30/2008 17:22	4338	12.32	1.534	0.085	0.097
12/30/2008 17:22	4339	12.33	1.353	0.087	0.076
12/30/2008 17:23	4340	12.33	1.534	0.081	0.079
12/30/2008 17:23	4341	12.33	1.534	0.075	0.079
12/30/2008 17:23	4342	12.33	1.534	0.067	0.096
12/30/2008 17:23	4343	12.32	1.534	0.087	0.087
12/30/2008 17:23	4344	12.32	1.534	0.089	0.081
12/30/2008 17:23	4345	12.32	1.534	0.091	0.083
12/30/2008 17:23	4346	12.32	1.516	0.063	0.105
12/30/2008 17:23	4347	12.32	1.516	0.073	0.115
12/30/2008 17:23	4348	12.32	1.697	0.083	0.103
12/30/2008 17:23	4349	12.32	1.516	0.073	0.094
12/30/2008 17:23	4350	12.32	1.335	0.083	0.091
12/30/2008 17:23	4351	12.32	1.516	0.091	0.092
12/30/2008 17:23	4352	12.32	1.516	0.078	0.097
12/30/2008 17:23	4353	12.32	1.516	0.083	0.095
12/30/2008 17:23	4354	12.32	1.516	0.086	0.098
12/30/2008 17:23	4355	12.32	1.516	0.074	0.089
12/30/2008 17:46	4356	12.32	1.335	0.083	0.083
12/30/2008 17:46	4357	12.32	1.516	0.073	0.081
12/30/2008 17:46	4358	12.32	1.516	0.082	0.087
12/30/2008 17:46	4359	12.32	1.516	0.079	0.091
12/30/2008 17:46	4360	12.32	1.516	0.082	0.094
12/30/2008 17:46	4361	12.32	1.516	0.093	0.092
12/30/2008 17:46	4362	12.32	1.516	0.063	0.102
12/30/2008 17:46	4363	12.32	1.516	0.083	0.101
12/30/2008 17:46	4364	12.32	1.516	0.073	0.084
12/30/2008 17:46	4365	12.32	1.516	0.093	0.081
12/30/2008 17:46	4366	12.32	1.516	0.086	0.093
12/30/2008 17:46	4367	12.32	1.516	0.087	0.092
12/30/2008 17:46	4368	12.32	1.516	0.088	0.096
12/30/2008 17:46	4369	12.32	1.516	0.093	0.097
12/30/2008 17:46	4370	12.32	1.516	0.089	0.092
12/30/2008 17:46	4371	12.32	1.516	0.083	0.091
12/30/2008 17:46	4372	12.32	1.516	0.074	0.087
12/30/2008 17:46	4373	12.32	1.516	0.093	0.089
12/30/2008 17:46	4374	12.32	1.513	0.086	0.093
12/30/2008 17:46	4375	12.32	1.513	0.076	0.099

12/30/2008 17:46	4376	12.32	1.513	0.085	0.107
12/30/2008 17:46	4377	12.32	1.513	0.084	0.112
12/30/2008 17:46	4378	12.32	1.513	0.081	0.091
12/30/2008 17:46	4379	12.32	1.513	0.083	0.096
12/30/2008 17:46	4380	12.32	1.513	0.079	0.094
12/30/2008 17:46	4381	12.32	1.693	0.081	0.091
12/30/2008 17:46	4382	12.32	1.513	0.086	0.092
12/30/2008 17:46	4383	12.32	1.513	0.089	0.089
12/30/2008 17:46	4384	12.32	1.513	0.085	0.087
12/30/2008 17:46	4385	12.32	1.513	0.096	0.092
12/30/2008 17:46	4386	12.32	1.513	0.083	0.097
12/30/2008 17:46	4387	12.32	1.332	0.086	0.091
12/30/2008 17:46	4388	12.32	1.513	0.081	0.097
12/30/2008 17:46	4389	12.32	1.513	0.082	0.094
12/30/2008 17:46	4390	12.32	1.513	0.087	0.089
12/30/2008 17:46	4391	12.32	1.513	0.085	0.093
12/30/2008 17:46	4392	12.32	1.513	0.087	0.101
12/30/2008 17:46	4393	12.32	1.513	0.083	0.116
12/30/2008 17:46	4394	12.32	1.513	0.086	0.097
12/30/2008 17:46	4395	12.32	1.513	0.086	0.093
12/30/2008 17:46	4396	12.32	1.332	0.076	0.091

RUN 2:

12/30/2008 17:46	4397	12.32	335.2	8.019	247.9
12/30/2008 17:46	4398	12.32	997.3	13.01	543.5
12/30/2008 17:47	4399	12.32	1457	20.19	639.4
12/30/2008 17:47	4400	12.32	1690	20.01	634.5
12/30/2008 17:47	4401	12.32	1724	20.89	629.4
12/30/2008 17:47	4402	12.31	1728	20.02	644.2
12/30/2008 17:47	4403	12.32	1719	20.72	659.7
12/30/2008 17:47	4404	12.31	1717	22.02	675.2
12/30/2008 17:47	4405	12.32	1715	22.02	670.5
12/30/2008 17:47	4406	12.32	1718	22.84	676.5
12/30/2008 17:47	4407	12.31	1719	22.02	673.6
12/30/2008 17:47	4408	12.31	1719	22.02	670.9
12/30/2008 17:47	4409	12.31	1715	22.24	678.7
12/30/2008 17:47	4410	12.31	1714	22.03	675.8
12/30/2008 17:47	4411	12.31	1720	23.09	693.7
12/30/2008 17:47	4412	12.31	1719	23.38	692.2
12/30/2008 17:47	4413	12.31	1715	23.42	691
12/30/2008 17:47	4414	12.31	1719	22.76	689.9
12/30/2008 17:47	4415	12.31	1717	22.02	689.3
12/30/2008 17:47	4416	12.31	1715	22.29	688.6
12/30/2008 17:47	4417	12.31	1716	22.17	687.9
12/30/2008 17:47	4418	12.31	1716	22.38	687.9
12/30/2008 17:47	4419	12.31	1717	22.02	688.4
12/30/2008 17:47	4420	12.31	1713	22.85	689
12/30/2008 17:47	4421	12.31	1719	23.22	689.9

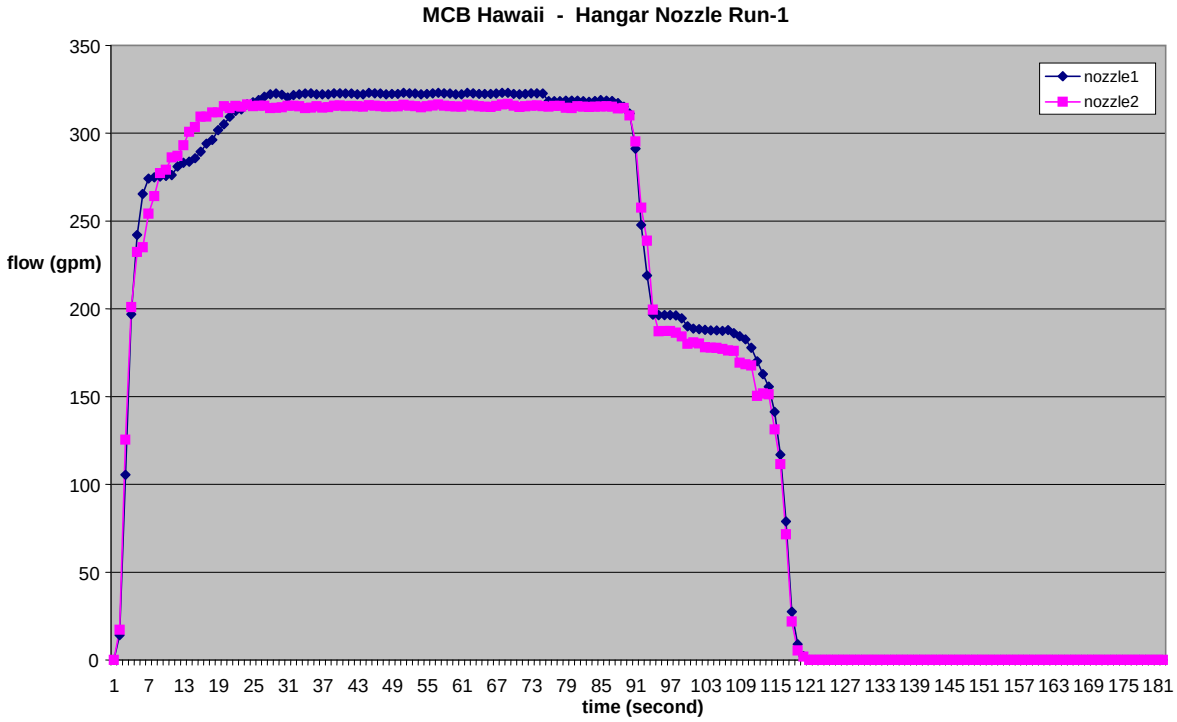
12/30/2008 17:47	4422	12.31	1718	23.16	690.8
12/30/2008 17:47	4423	12.31	1719	23.23	691.5
12/30/2008 17:47	4424	12.31	1720	23.53	692.6
12/30/2008 17:47	4425	12.31	1715	23.22	693.3
12/30/2008 17:47	4426	12.31	1715	23.75	694.2
12/30/2008 17:47	4427	12.31	1717	23.51	695.1
12/30/2008 17:47	4428	12.31	1719	23.4	695.8
12/30/2008 17:47	4429	12.31	1715	23.15	696.6
12/30/2008 17:47	4430	12.31	1717	23.24	697.6
12/30/2008 17:47	4431	12.31	1715	23.84	698.2
12/30/2008 17:47	4432	12.31	1715	23.02	698.7
12/30/2008 17:47	4433	12.31	1716	23.83	699.6
12/30/2008 17:47	4434	12.31	1717	23.74	700.2
12/30/2008 17:47	4435	12.31	1716	23.27	700.5
12/30/2008 17:47	4436	12.31	1720	24.04	705.8
12/30/2008 17:47	4437	12.31	1717	24.43	707.3
12/30/2008 17:47	4438	12.31	1718	23.24	700.3
12/30/2008 17:47	4439	12.31	1715	24.24	705.7
12/30/2008 17:47	4440	12.31	1721	24.24	705.4
12/30/2008 17:47	4441	12.31	1723	24.34	707.4
12/30/2008 17:47	4442	12.31	1719	24.32	706.2
12/30/2008 17:47	4443	12.31	1718	24.24	703.9
12/30/2008 17:47	4444	12.31	1717	24.23	705.6
12/30/2008 17:47	4445	12.31	1720	24.22	704.6
12/30/2008 17:47	4446	12.31	1715	24.34	707.2
12/30/2008 17:47	4447	12.31	1718	24.24	705.8
12/30/2008 17:47	4448	12.31	1718	24.23	706.5
12/30/2008 17:47	4449	12.31	1715	24.24	707.3
12/30/2008 17:47	4450	12.31	1716	24.04	705.9
12/30/2008 17:47	4451	12.31	1717	24.24	706.7
12/30/2008 17:47	4452	12.31	1720	24.32	707.3
12/30/2008 17:47	4453	12.31	1719	24.32	707.9
12/30/2008 17:47	4454	12.31	1721	24.24	706.8
12/30/2008 17:47	4455	12.31	1720	24.31	706.5
12/30/2008 17:47	4456	12.31	1723	24.31	707.7
12/30/2008 17:47	4457	12.31	1719	24.13	706.9
12/30/2008 17:47	4458	12.31	1720	24.15	705.7
12/30/2008 17:48	4459	12.31	1717	24.14	706.5
12/30/2008 17:48	4460	12.31	1716	24.25	707.4
12/30/2008 17:48	4461	12.31	1719	24.25	707.3
12/30/2008 17:48	4462	12.31	1720	24.22	706.6
12/30/2008 17:48	4463	12.31	1719	24.21	705.8
12/30/2008 17:48	4464	12.31	1718	24.22	706.3
12/30/2008 17:48	4465	12.31	1717	24.34	707.3
12/30/2008 17:48	4466	12.31	1719	24.34	707.5
12/30/2008 17:48	4467	12.31	1720	24.15	703.8
12/30/2008 17:48	4468	12.31	1723	24.35	707.4
12/30/2008 17:48	4469	12.31	1718	24.31	707.1

12/30/2008 17:48	4470	12.31	1717	24.23	705.9
12/30/2008 17:48	4471	12.31	1719	24.25	706.5
12/30/2008 17:48	4472	12.31	1720	24.25	706.3
12/30/2008 17:48	4473	12.31	1719	24.35	707.7
12/30/2008 17:48	4474	12.31	1719	24.35	707.3
12/30/2008 17:48	4475	12.31	1719	24.14	705.9
12/30/2008 17:48	4476	12.31	1721	24.17	706.5
12/30/2008 17:48	4477	12.31	1718	24.25	707.5
12/30/2008 17:48	4478	12.31	1720	24.14	706.4
12/30/2008 17:48	4479	12.3	1715	24.25	706.2
12/30/2008 17:48	4480	12.31	1665	23.84	689.5
12/30/2008 17:48	4481	12.31	1223	22.02	678.1
12/30/2008 17:48	4482	12.31	789.4	12.25	553.1
12/30/2008 17:48	4483	12.31	235.5	2.205	276.9
12/30/2008 17:48	4484	12.31	177.6	0.844	0.025
12/30/2008 17:48	4485	12.31	149.6	0.025	0.074
12/30/2008 17:48	4486	12.31	138.9	0.029	0.083
12/30/2008 17:48	4487	12.31	135	0.029	0.081
12/30/2008 17:48	4488	12.31	133.5	0.021	0.085
12/30/2008 17:48	4489	12.31	123.1	0.029	0.087
12/30/2008 17:48	4490	12.31	107.7	0.029	0.083
12/30/2008 17:48	4491	12.31	102.1	0.029	0.091
12/30/2008 17:48	4492	12.31	100.1	0.029	0.095
12/30/2008 17:48	4493	12.31	99.4	0.021	0.089
12/30/2008 17:48	4494	12.31	99.4	0.021	0.092
12/30/2008 17:48	4495	12.31	99.2	0.029	0.086
12/30/2008 17:48	4496	12.31	99	0.029	0.083
12/30/2008 17:48	4497	12.31	98.7	0.021	0.081
12/30/2008 17:48	4498	12.31	98.9	0.021	0.085
12/30/2008 17:48	4499	12.31	95.2	0.029	0.083
12/30/2008 17:48	4500	12.31	81.5	0.029	0.081
12/30/2008 17:48	4501	12.31	76.28	0.029	0.079
12/30/2008 17:48	4502	12.31	74.65	0.029	0.077
12/30/2008 17:48	4503	12.31	74.11	0.039	0.081
12/30/2008 17:48	4504	12.31	73.75	0.029	0.091
12/30/2008 17:48	4505	12.31	73.75	0.021	0.086
12/30/2008 17:48	4506	12.31	73.57	0.029	0.089
12/30/2008 17:48	4507	12.31	44.13	0.021	0.083
12/30/2008 17:48	4508	12.31	17.04	0.029	0.085
12/30/2008 17:48	4509	12.31	7.283	0.039	0.081
12/30/2008 17:48	4510	12.31	3.671	0.021	0.083
12/30/2008 17:48	4511	12.31	2.407	0.021	0.086
12/30/2008 17:48	4512	12.31	1.865	0.029	0.081
12/30/2008 17:48	4513	12.31	1.499	0.029	0.079
12/30/2008 17:48	4514	12.31	1.492	0.036	0.077
12/30/2008 17:48	4515	12.31	1.492	0.217	0.083
12/30/2008 17:48	4516	12.31	1.492	0.036	0.084
12/30/2008 17:48	4517	12.31	1.492	0.217	0.081

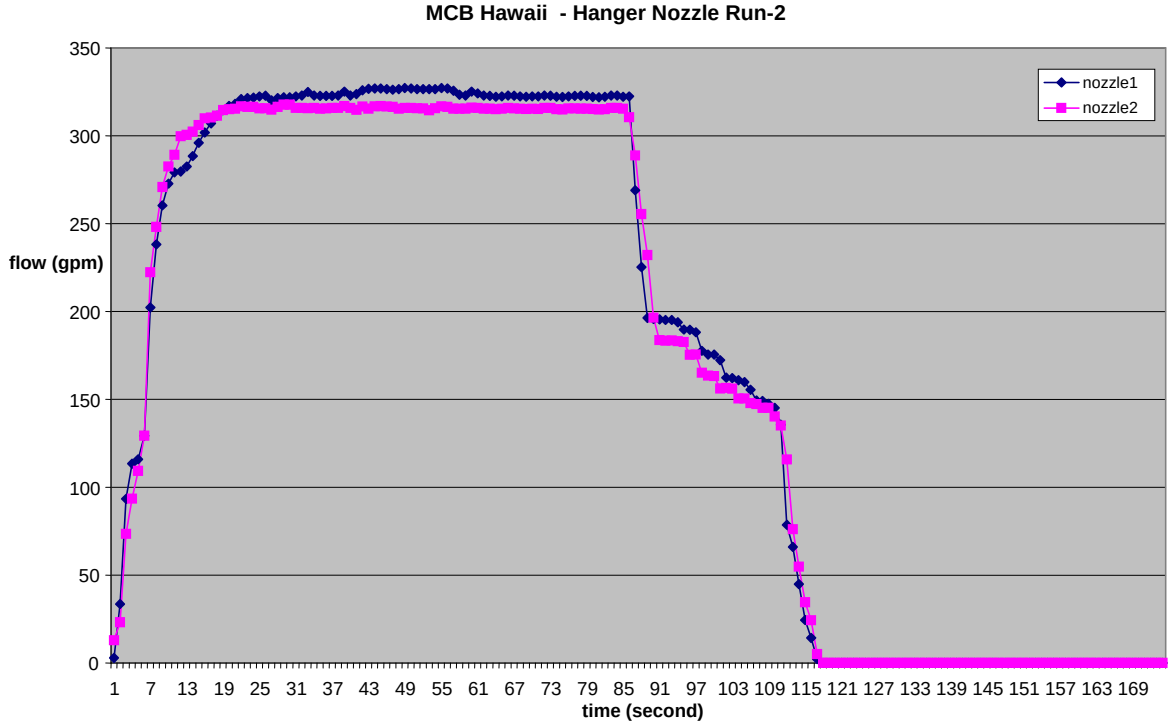
12/30/2008 17:48	4518	12.31	1.492	0.036	0.087
12/30/2008 17:49	4519	12.31	1.492	0.021	0.092
12/30/2008 17:49	4520	12.31	1.492	0.036	0.087
12/30/2008 17:49	4521	12.31	1.673	0.036	0.089
12/30/2008 17:49	4522	12.31	1.492	0.036	0.082
12/30/2008 17:49	4523	12.31	1.492	0.036	0.081
12/30/2008 17:49	4524	12.31	1.492	0.031	0.085
12/30/2008 17:49	4525	12.31	1.492	0.032	0.086
12/30/2008 17:49	4526	12.31	1.673	0.021	0.091
12/30/2008 17:49	4527	12.31	1.492	0.031	0.085
12/30/2008 17:49	4528	12.31	1.492	0.036	0.085
12/30/2008 17:49	4529	12.31	1.492	0.036	0.077
12/30/2008 17:49	4530	12.31	1.492	0.036	0.079
12/30/2008 17:49	4531	12.31	1.311	0.036	0.083
12/30/2008 17:49	4532	12.31	1.492	0.036	0.081
12/30/2008 17:49	4533	12.31	1.492	0.021	0.087
12/30/2008 17:49	4534	12.31	1.492	0.021	0.085
12/30/2008 17:49	4535	12.31	1.492	0.036	0.091
12/30/2008 17:49	4536	12.31	1.673	0.036	0.096
12/30/2008 17:49	4537	12.31	1.492	0.021	0.081
12/30/2008 17:49	4538	12.31	1.492	0.036	0.083
12/30/2008 17:49	4539	12.3	1.492	0.021	0.081
12/30/2008 17:49	4540	12.31	1.492	0.032	0.083
12/30/2008 17:49	4541	12.3	1.673	0.021	0.098
12/30/2008 17:49	4542	12.3	1.49	0.039	0.089
12/30/2008 17:49	4543	12.3	1.49	0.031	0.083
12/30/2008 17:49	4544	12.3	1.49	0.021	0.081
12/30/2008 17:49	4545	12.3	1.309	0.039	0.087
12/30/2008 17:49	4546	12.3	1.49	0.039	0.091
12/30/2008 17:49	4547	12.3	1.49	0.021	0.094
12/30/2008 17:49	4548	12.31	1.309	0.035	0.092
12/30/2008 17:49	4549	12.31	1.49	0.021	0.102
12/30/2008 17:49	4550	12.3	1.49	0.021	0.101
12/30/2008 17:49	4551	12.3	1.49	0.021	0.084
12/30/2008 17:49	4552	12.3	1.49	0.039	0.081
12/30/2008 17:49	4553	12.3	1.49	0.039	0.093
12/30/2008 17:49	4554	12.3	1.49	0.039	0.092
12/30/2008 17:49	4555	12.3	1.49	0.039	0.096
12/30/2008 17:49	4556	12.3	1.49	0.039	0.097
12/30/2008 17:49	4557	12.3	1.49	0.219	0.092
12/30/2008 17:49	4558	12.3	1.49	0.039	0.091
12/30/2008 17:49	4559	12.3	1.67	0.021	0.087
12/30/2008 17:49	4560	12.3	1.49	0.039	0.089
12/30/2008 17:49	4561	12.3	1.67	0.039	0.093
12/30/2008 17:49	4562	12.3	1.49	0.219	0.099
12/30/2008 17:49	4563	12.3	1.49	0.039	0.107
12/30/2008 17:49	4564	12.3	1.49	0.039	0.093
12/30/2008 17:49	4565	12.3	1.49	0.039	0.085

12/30/2008 17:49	4566	12.3	1.49	0.039	0.087
12/30/2008 17:49	4567	12.3	1.49	0.219	0.081
12/30/2008 17:49	4568	12.3	1.49	0.032	0.079
12/30/2008 17:49	4569	12.3	1.49	0.039	0.082
12/30/2008 17:49	4570	12.3	1.484	0.044	0.087
12/30/2008 17:49	4571	12.3	1.304	0.863	0.081
12/30/2008 17:49	4572	12.3	1.484	0.044	0.091
12/30/2008 17:49	4573	12.3	1.304	0.044	0.094
12/30/2008 17:49	4574	12.3	1.484	0.044	0.092
12/30/2008 17:49	4575	12.3	1.304	0.044	0.102
12/30/2008 17:49	4576	12.3	1.484	0.044	0.095
12/30/2008 17:49	4577	12.3	1.484	0.025	0.091
12/30/2008 17:49	4578	12.3	1.484	0.044	0.085
12/30/2008 17:50	4579	12.3	1.484	0.033	0.082
12/30/2008 17:50	4580	12.3	1.304	0.044	0.081
12/30/2008 17:50	4581	12.3	1.484	0.022	0.078
12/30/2008 17:50	4582	12.3	1.484	0.031	0.079
12/30/2008 17:50	4583	12.3	1.665	0.025	0.085
12/30/2008 17:50	4584	12.3	1.304	0.025	0.083
12/30/2008 17:50	4585	12.3	1.484	0.032	0.086
12/30/2008 17:50	4586	12.3	1.484	0.041	0.092
12/30/2008 17:50	4587	12.3	1.484	0.044	0.095
12/30/2008 17:50	4588	12.3	1.665	0.044	0.101
12/30/2008 17:50	4589	12.3	1.484	0.044	0.092
12/30/2008 17:50	4590	12.3	1.304	0.044	0.087
12/30/2008 17:50	4591	12.3	1.484	0.031	0.082

Hangar Nozzles Run-1:



Hangar Nozzles Run-2:



Hangar Nozzles Run-1 and Run-2:

				CR3000.Std.05	CPU:1kaneohehgrnozzle.CR3
TOA5	CR3000	CR3000	15715		
TIMESTAMP	RECORD	Batt_Volt	Measure	Measure_2	
TS	RN	Volts	mV	mV	
		Smp	Smp	Smp	
12/30/2008 17:19	9478	12.51	0.033	0.023	
RUN-1:					
12/30/2008 17:19	9479	12.51	0.036	0.023	
12/30/2008 17:19	9480	12.51	14.13	17.15	
12/30/2008 17:19	9481	12.51	105.5	125.5	
12/30/2008 17:20	9482	12.51	196.9	200.9	
12/30/2008 17:20	9483	12.51	242.1	232.3	
12/30/2008 17:20	9484	12.51	265.4	235.1	
12/30/2008 17:20	9485	12.51	274.2	254.2	
12/30/2008 17:20	9486	12.51	274.9	264.1	
12/30/2008 17:20	9487	12.51	275.3	277.3	
12/30/2008 17:20	9488	12.51	275.7	279.2	
12/30/2008 17:20	9489	12.51	276.2	286.3	
12/30/2008 17:20	9490	12.51	281.1	287.1	
12/30/2008 17:20	9491	12.51	283.2	293.1	
12/30/2008 17:20	9492	12.51	283.8	300.8	
12/30/2008 17:20	9493	12.51	285.8	303.4	
12/30/2008 17:20	9494	12.51	289.4	309.4	
12/30/2008 17:20	9495	12.51	294.1	309.5	
12/30/2008 17:20	9496	12.51	296.2	311.8	
12/30/2008 17:20	9497	12.51	301.8	311.8	
12/30/2008 17:20	9498	12.51	305.1	315.4	
12/30/2008 17:20	9499	12.51	309.4	314.3	
12/30/2008 17:20	9500	12.51	312.7	315.5	
12/30/2008 17:20	9501	12.51	313.6	315.1	
12/30/2008 17:20	9502	12.51	316.5	316.3	
12/30/2008 17:20	9503	12.51	317.6	315.4	
12/30/2008 17:20	9504	12.51	318.8	315.6	
12/30/2008 17:20	9505	12.51	320.8	315.6	
12/30/2008 17:20	9506	12.51	322.2	314.2	
12/30/2008 17:20	9507	12.51	322.6	314.4	
12/30/2008 17:20	9508	12.51	321.9	314.7	
12/30/2008 17:20	9509	12.51	320.4	315.6	
12/30/2008 17:20	9510	12.51	321.7	315.6	
12/30/2008 17:20	9511	12.51	322.1	315.3	
12/30/2008 17:20	9512	12.51	322.6	314.2	

12/30/2008 17:20	9513	12.51	322.8	314.6
12/30/2008 17:20	9514	12.51	322.2	315.3
12/30/2008 17:20	9515	12.51	322.1	314.6
12/30/2008 17:20	9516	12.51	322.2	314.8
12/30/2008 17:20	9517	12.51	322.8	315.6
12/30/2008 17:20	9518	12.51	322.8	315.7
12/30/2008 17:20	9519	12.51	322.6	315.4
12/30/2008 17:20	9520	12.51	322.6	315.5
12/30/2008 17:20	9521	12.51	322.1	315.3
12/30/2008 17:20	9522	12.51	322.2	315.1
12/30/2008 17:20	9523	12.51	323	315.9
12/30/2008 17:20	9524	12.51	322.8	315.6
12/30/2008 17:20	9525	12.51	322.6	315.4
12/30/2008 17:20	9526	12.51	322.2	315.1
12/30/2008 17:20	9527	12.51	322.4	315.3
12/30/2008 17:20	9528	12.51	322.4	315.3
12/30/2008 17:20	9529	12.51	323	316.1
12/30/2008 17:20	9530	12.51	322.8	315.6
12/30/2008 17:20	9531	12.51	322.6	315.4
12/30/2008 17:20	9532	12.51	322.1	314.7
12/30/2008 17:20	9533	12.51	322.4	315.3
12/30/2008 17:20	9534	12.51	322.8	315.7
12/30/2008 17:20	9535	12.51	323	316.3
12/30/2008 17:20	9536	12.51	322.8	315.6
12/30/2008 17:20	9537	12.51	322.6	315.4
12/30/2008 17:20	9538	12.51	322.2	315.2
12/30/2008 17:20	9539	12.51	322.2	315.1
12/30/2008 17:20	9540	12.51	323	316.2
12/30/2008 17:20	9541	12.51	322.8	315.7
12/30/2008 17:21	9542	12.51	322.4	315.3
12/30/2008 17:21	9543	12.51	322.4	315.1
12/30/2008 17:21	9544	12.51	322.4	314.9
12/30/2008 17:21	9545	12.51	322.6	315.5
12/30/2008 17:21	9546	12.51	323	316.3
12/30/2008 17:21	9547	12.51	323	316.7
12/30/2008 17:21	9548	12.51	322.4	315.6
12/30/2008 17:21	9549	12.51	322.1	314.9
12/30/2008 17:21	9550	12.51	322.4	315.3
12/30/2008 17:21	9551	12.51	322.8	315.6
12/30/2008 17:21	9552	12.51	322.8	315.7
12/30/2008 17:21	9553	12.51	322.6	315.4
12/30/2008 17:21	9554	12.51	318.3	315.1
12/30/2008 17:21	9555	12.51	318.3	315.5
12/30/2008 17:21	9556	12.51	318.3	315.5
12/30/2008 17:21	9557	12.51	318.6	314.4

12/30/2008 17:21	9558	12.51	318.6	314.3
12/30/2008 17:21	9559	12.51	318.6	315.4
12/30/2008 17:21	9560	12.51	318.3	315.1
12/30/2008 17:21	9561	12.51	317.9	314.9
12/30/2008 17:21	9562	12.51	318.4	315.1
12/30/2008 17:21	9563	12.51	318.8	315.2
12/30/2008 17:21	9564	12.51	318.6	315.3
12/30/2008 17:21	9565	12.51	318.4	315.1
12/30/2008 17:21	9566	12.51	317.2	314.1
12/30/2008 17:21	9567	12.51	315	314.3
12/30/2008 17:21	9568	12.51	311.2	310.1
12/30/2008 17:21	9569	12.51	291.2	295.3
12/30/2008 17:21	9570	12.51	247.8	257.6
12/30/2008 17:21	9571	12.51	218.9	238.8
12/30/2008 17:21	9572	12.51	196.7	199.5
12/30/2008 17:21	9573	12.51	196.4	187.2
12/30/2008 17:21	9574	12.51	196.4	187.3
12/30/2008 17:21	9575	12.51	196.5	187.3
12/30/2008 17:21	9576	12.51	196.2	186.4
12/30/2008 17:21	9577	12.51	194.5	184.3
12/30/2008 17:21	9578	12.51	190	180.1
12/30/2008 17:21	9579	12.51	188.8	180.8
12/30/2008 17:21	9580	12.51	188.4	180.2
12/30/2008 17:21	9581	12.51	188	178.1
12/30/2008 17:21	9582	12.51	187.7	177.9
12/30/2008 17:21	9583	12.51	187.7	177.7
12/30/2008 17:21	9584	12.51	187.5	177.1
12/30/2008 17:21	9585	12.51	187.9	176.3
12/30/2008 17:21	9586	12.51	186.1	176.1
12/30/2008 17:21	9587	12.51	184.4	169.3
12/30/2008 17:21	9588	12.5	182.6	168.4
12/30/2008 17:21	9589	12.51	177.9	167.7
12/30/2008 17:21	9590	12.51	170.2	150.4
12/30/2008 17:21	9591	12.51	162.8	151.8
12/30/2008 17:21	9592	12.51	155.7	151.3
12/30/2008 17:21	9593	12.51	141.4	131.3
12/30/2008 17:21	9594	12.51	116.9	111.5
12/30/2008 17:21	9595	12.51	78.96	71.61
12/30/2008 17:21	9596	12.5	27.49	21.97
12/30/2008 17:21	9597	12.51	9.06	5.461
12/30/2008 17:21	9598	12.51	2.202	1.925
12/30/2008 17:21	9599	12.51	0.016	0.026
12/30/2008 17:21	9600	12.51	0.016	0.027
12/30/2008 17:21	9601	12.51	0.016	0.027
12/30/2008 17:22	9602	12.51	0.017	0.028

12/30/2008 17:22	9603	12.51	0.017	0.028
12/30/2008 17:22	9604	12.51	0.016	0.026
12/30/2008 17:22	9605	12.5	0.016	0.027
12/30/2008 17:22	9606	12.51	0.016	0.027
12/30/2008 17:22	9607	12.5	0.016	0.026
12/30/2008 17:22	9608	12.51	0.018	0.026
12/30/2008 17:22	9609	12.51	0.016	0.026
12/30/2008 17:22	9610	12.51	0.016	0.027
12/30/2008 17:22	9611	12.51	0.016	0.027
12/30/2008 17:22	9612	12.51	0.016	0.026
12/30/2008 17:22	9613	12.5	0.015	0.028
12/30/2008 17:22	9614	12.51	0.015	0.026
12/30/2008 17:22	9615	12.5	0.015	0.026
12/30/2008 17:22	9616	12.51	0.015	0.027
12/30/2008 17:22	9617	12.51	0.016	0.027
12/30/2008 17:22	9618	12.5	0.016	0.027
12/30/2008 17:22	9619	12.5	0.016	0.025
12/30/2008 17:22	9620	12.51	0.016	0.026
12/30/2008 17:22	9621	12.51	0.016	0.026
12/30/2008 17:22	9622	12.51	0.017	0.028
12/30/2008 17:22	9623	12.51	0.016	0.028
12/30/2008 17:22	9624	12.5	0.016	0.027
12/30/2008 17:22	9625	12.51	0.016	0.027
12/30/2008 17:22	9626	12.51	0.016	0.028
12/30/2008 17:22	9627	12.5	0.016	0.027
12/30/2008 17:22	9628	12.51	0.016	0.027
12/30/2008 17:22	9629	12.51	0.018	0.026
12/30/2008 17:22	9630	12.5	0.016	0.026
12/30/2008 17:22	9631	12.5	0.016	0.025
12/30/2008 17:22	9632	12.5	0.017	0.025
12/30/2008 17:22	9633	12.5	0.017	0.026
12/30/2008 17:22	9634	12.51	0.017	0.026
12/30/2008 17:22	9635	12.5	0.017	0.026
12/30/2008 17:22	9636	12.51	0.016	0.026
12/30/2008 17:22	9637	12.51	0.016	0.026
12/30/2008 17:22	9638	12.5	0.016	0.026
12/30/2008 17:22	9639	12.5	0.016	0.027
12/30/2008 17:22	9640	12.5	0.016	0.027
12/30/2008 17:22	9641	12.51	0.016	0.026
12/30/2008 17:22	9642	12.5	0.016	0.026
12/30/2008 17:22	9643	12.5	0.016	0.027
12/30/2008 17:22	9644	12.5	0.016	0.027
12/30/2008 17:22	9645	12.5	0.015	0.027
12/30/2008 17:22	9646	12.5	0.015	0.026
12/30/2008 17:22	9647	12.5	0.016	0.027

12/30/2008 17:22	9648	12.5	0.016	0.027
12/30/2008 17:22	9649	12.5	0.016	0.027
12/30/2008 17:22	9650	12.5	0.016	0.027
12/30/2008 17:22	9651	12.5	0.016	0.026
12/30/2008 17:22	9652	12.5	0.016	0.026
12/30/2008 17:22	9653	12.5	0.016	0.027
12/30/2008 17:22	9654	12.5	0.017	0.027
12/30/2008 17:22	9655	12.5	0.017	0.027
12/30/2008 17:22	9656	12.5	0.017	0.026
12/30/2008 17:22	9657	12.5	0.016	0.026
12/30/2008 17:22	9658	12.5	0.016	0.026
12/30/2008 17:22	9659	12.5	0.016	0.025
12/30/2008 17:22	9660	12.5	0.016	0.025
12/30/2008 17:46	9661	12.5	0.016	0.024
12/30/2008 17:47	9662	12.5	0.016	0.026
12/30/2008 17:47	9663	12.5	0.013	0.026
12/30/2008 17:47	9664	12.5	0.016	0.026
12/30/2008 17:47	9665	12.5	0.016	0.027
12/30/2008 17:47	9666	12.5	0.016	0.027
12/30/2008 17:47	9667	12.5	0.015	0.027
12/30/2008 17:47	9668	12.5	0.015	0.026
12/30/2008 17:47	9669	12.5	0.016	0.026
12/30/2008 17:47	9670	12.5	0.016	0.027
12/30/2008 17:47	9671	12.5	0.016	0.027
12/30/2008 17:47	9672	12.5	0.016	0.026
12/30/2008 17:47	9673	12.5	0.016	0.026
12/30/2008 17:47	9674	12.5	0.016	0.026
12/30/2008 17:47	9675	12.5	0.016	0.026
12/30/2008 17:47	9676	12.5	0.016	0.027
12/30/2008 17:47	9677	12.5	0.017	0.027
12/30/2008 17:47	9678	12.5	0.017	0.027
12/30/2008 17:47	9679	12.5	0.017	0.026
12/30/2008 17:47	9680	12.5	0.016	0.026
12/30/2008 17:47	9681	12.5	0.016	0.026
12/30/2008 17:47	9682	12.5	0.016	0.027
12/30/2008 17:47	9683	12.5	0.016	0.025
12/30/2008 17:47	9684	12.5	0.018	0.025
12/30/2008 17:47	9685	12.5	0.016	0.025
12/30/2008 17:47	9686	12.5	0.016	0.026
12/30/2008 17:47	9687	12.5	0.016	0.026
12/30/2008 17:47	9688	12.5	0.016	0.026
12/30/2008 17:47	9689	12.5	0.016	0.026
12/30/2008 17:47	9690	12.5	0.014	0.026

12/30/2008 17:47	9691	12.5	0.015	0.026
12/30/2008 17:47	9692	12.5	0.015	0.026
12/30/2008 17:47	9693	12.5	0.02	0.025
12/30/2008 17:47	9694	12.5	0.019	0.025
12/30/2008 17:47	9695	12.5	0.017	0.025
12/30/2008 17:47	9696	12.5	0.017	0.025
12/30/2008 17:47	9697	12.5	0.017	0.027
12/30/2008 17:47	9698	12.5	0.015	0.027
12/30/2008 17:47	9699	12.5	0.016	0.027
12/30/2008 17:47	9700	12.5	0.016	0.026
12/30/2008 17:47	9701	12.5	0.015	0.026
12/30/2008 17:47	9702	12.5	0.017	0.024
12/30/2008 17:47	9703	12.5	0.016	0.025
12/30/2008 17:47	9704	12.5	0.016	0.025
12/30/2008 17:47	9705	12.5	0.017	0.025
12/30/2008 17:47	9706	12.5	0.016	0.026
12/30/2008 17:47	9707	12.5	0.016	0.026
12/30/2008 17:47	9708	12.5	0.016	0.026
12/30/2008 17:47	9709	12.5	0.016	0.026
12/30/2008 17:47	9710	12.5	0.015	0.026
12/30/2008 17:47	9711	12.5	0.016	0.027
12/30/2008 17:47	9712	12.5	0.016	0.027
12/30/2008 17:47	9713	12.5	0.016	0.027
12/30/2008 17:47	9714	12.5	0.016	0.027
12/30/2008 17:47	9715	12.5	0.017	0.026
12/30/2008 17:47	9716	12.5	0.017	0.026
12/30/2008 17:47	9717	12.5	0.017	0.026
12/30/2008 17:47	9718	12.5	0.016	0.026
12/30/2008 17:47	9719	12.5	0.016	0.027
12/30/2008 17:47	9720	12.5	0.016	0.027
12/30/2008 17:47	9721	12.5	0.016	0.026
12/30/2008 17:48	9722	12.5	0.016	0.026
12/30/2008 17:48	9723	12.5	0.015	0.026
12/30/2008 17:48	9724	12.5	0.016	0.026
12/30/2008 17:48	9725	12.5	0.016	0.026

RUN-2:

12/30/2008 17:48	9726	12.5	2.87	12.87
12/30/2008 17:48	9727	12.5	33.51	23.05
12/30/2008 17:48	9728	12.5	93.41	73.51
12/30/2008 17:48	9729	12.5	113.4	93.51
12/30/2008 17:48	9730	12.5	115.9	109.3
12/30/2008 17:48	9731	12.5	129.3	129.3
12/30/2008 17:48	9732	12.5	202.3	222.3
12/30/2008 17:48	9733	12.5	238.2	248.1

12/30/2008 17:48	9734	12.5	260.3	270.7
12/30/2008 17:48	9735	12.5	272.7	282.5
12/30/2008 17:48	9736	12.5	279.2	289.1
12/30/2008 17:48	9737	12.5	279.6	299.6
12/30/2008 17:48	9738	12.5	282.5	300.5
12/30/2008 17:48	9739	12.5	288.4	302.2
12/30/2008 17:48	9740	12.5	296	306.1
12/30/2008 17:48	9741	12.5	301.8	309.8
12/30/2008 17:48	9742	12.5	307	310.3
12/30/2008 17:48	9743	12.5	311.4	311.4
12/30/2008 17:48	9744	12.5	314.6	314.6
12/30/2008 17:48	9745	12.5	317	315
12/30/2008 17:48	9746	12.5	318.1	315.3
12/30/2008 17:48	9747	12.5	320.8	316.7
12/30/2008 17:48	9748	12.5	321.5	316.4
12/30/2008 17:48	9749	12.5	321.7	316.3
12/30/2008 17:48	9750	12.5	322.4	315.5
12/30/2008 17:48	9751	12.5	322.7	315.6
12/30/2008 17:48	9752	12.5	320.2	314.8
12/30/2008 17:48	9753	12.5	321.5	316.4
12/30/2008 17:48	9754	12.5	321.8	317.7
12/30/2008 17:48	9755	12.5	321.8	317.6
12/30/2008 17:48	9756	12.5	322.4	315.7
12/30/2008 17:48	9757	12.5	322.9	315.8
12/30/2008 17:48	9758	12.5	324.9	315.6
12/30/2008 17:48	9759	12.5	322.9	315.7
12/30/2008 17:48	9760	12.5	322.6	315.3
12/30/2008 17:48	9761	12.5	322.6	315.5
12/30/2008 17:48	9762	12.5	322.6	315.7
12/30/2008 17:48	9763	12.5	322.9	315.7
12/30/2008 17:48	9764	12.5	325.1	316.8
12/30/2008 17:48	9765	12.5	322.9	315.7
12/30/2008 17:48	9766	12.5	323.7	314.7
12/30/2008 17:48	9767	12.5	325.8	316.6
12/30/2008 17:48	9768	12.5	326.7	315.4
12/30/2008 17:48	9769	12.5	326.9	316.7
12/30/2008 17:48	9770	12.5	326.9	316.8
12/30/2008 17:48	9771	12.5	326.5	316.6
12/30/2008 17:48	9772	12.5	326.2	316.3
12/30/2008 17:48	9773	12.5	326.5	315.3
12/30/2008 17:48	9774	12.5	327.1	315.8
12/30/2008 17:48	9775	12.5	326.9	315.7
12/30/2008 17:48	9776	12.5	326.5	315.6
12/30/2008 17:48	9777	12.5	326.5	315.5
12/30/2008 17:48	9778	12.5	326.5	314.4

12/30/2008 17:48	9779	12.5	326.5	315.6
12/30/2008 17:48	9780	12.5	327.1	316.7
12/30/2008 17:48	9781	12.5	326.9	316.3
12/30/2008 17:49	9782	12.5	325.6	315.4
12/30/2008 17:49	9783	12.5	323.3	315.3
12/30/2008 17:49	9784	12.49	322.9	315.4
12/30/2008 17:49	9785	12.5	325.1	315.9
12/30/2008 17:49	9786	12.5	324	315.7
12/30/2008 17:49	9787	12.5	322.9	315.4
12/30/2008 17:49	9788	12.5	322.6	315.4
12/30/2008 17:49	9789	12.5	322.2	315.1
12/30/2008 17:49	9790	12.5	322.4	315.3
12/30/2008 17:49	9791	12.5	322.9	315.7
12/30/2008 17:49	9792	12.5	322.7	315.5
12/30/2008 17:49	9793	12.5	322.4	315.3
12/30/2008 17:49	9794	12.5	322.2	315.2
12/30/2008 17:49	9795	12.5	322.4	315.3
12/30/2008 17:49	9796	12.5	322.4	315.2
12/30/2008 17:49	9797	12.5	322.9	315.7
12/30/2008 17:49	9798	12.5	322.7	315.7
12/30/2008 17:49	9799	12.5	322.2	315.1
12/30/2008 17:49	9800	12.5	322	314.9
12/30/2008 17:49	9801	12.5	322.4	315.5
12/30/2008 17:49	9802	12.5	322.6	315.5
12/30/2008 17:49	9803	12.5	322.7	315.4
12/30/2008 17:49	9804	12.5	322.6	315.4
12/30/2008 17:49	9805	12.5	322	315.2
12/30/2008 17:49	9806	12.5	321.8	314.9
12/30/2008 17:49	9807	12.5	322.2	315.1
12/30/2008 17:49	9808	12.5	322.9	315.7
12/30/2008 17:49	9809	12.5	322.9	315.8
12/30/2008 17:49	9810	12.5	322.2	315.3
12/30/2008 17:49	9811	12.5	322.4	310.5
12/30/2008 17:49	9812	12.5	268.9	288.7
12/30/2008 17:49	9813	12.5	225.2	255.3
12/30/2008 17:49	9814	12.5	196.3	232.1
12/30/2008 17:49	9815	12.5	195.7	196.5
12/30/2008 17:49	9816	12.5	195.5	183.7
12/30/2008 17:49	9817	12.5	195.1	183.3
12/30/2008 17:49	9818	12.5	195.1	183.5
12/30/2008 17:49	9819	12.5	193.8	183.1
12/30/2008 17:49	9820	12.5	189.7	182.6
12/30/2008 17:49	9821	12.5	189.6	175.4
12/30/2008 17:49	9822	12.5	188.1	175.5
12/30/2008 17:49	9823	12.5	177.6	165.1

12/30/2008 17:49	9824	12.5	175.5	163.5
12/30/2008 17:49	9825	12.5	175.5	163.1
12/30/2008 17:49	9826	12.5	172.3	156.2
12/30/2008 17:49	9827	12.5	162.3	156.4
12/30/2008 17:49	9828	12.5	162.1	156.1
12/30/2008 17:49	9829	12.5	160.9	150.5
12/30/2008 17:49	9830	12.5	159.8	150.5
12/30/2008 17:49	9831	12.5	155.5	147.8
12/30/2008 17:49	9832	12.5	149.3	147.3
12/30/2008 17:49	9833	12.5	149.1	145.1
12/30/2008 17:49	9834	12.5	147.4	145.2
12/30/2008 17:49	9835	12.5	145.2	140.2
12/30/2008 17:49	9836	12.5	135.6	135.1
12/30/2008 17:49	9837	12.5	78.58	115.7
12/30/2008 17:49	9838	12.5	66.05	76.05
12/30/2008 17:49	9839	12.5	44.78	54.78
12/30/2008 17:49	9840	12.5	24.42	34.42
12/30/2008 17:49	9841	12.5	14.24	24.24
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12/30/2008 17:50	9867	12.5	0.017	0.026
12/30/2008 17:50	9868	12.5	0.017	0.027

12/30/2008 17:50	9869	12.5	0.016	0.027
12/30/2008 17:50	9870	12.5	0.016	0.027
12/30/2008 17:50	9871	12.5	0.016	0.027
12/30/2008 17:50	9872	12.5	0.016	0.026
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12/30/2008 17:50	9875	12.5	0.013	0.026
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12/30/2008 17:50	9879	12.5	0.015	0.026
12/30/2008 17:50	9880	12.5	0.015	0.025
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12/30/2008 17:50	9883	12.5	0.016	0.026
12/30/2008 17:50	9884	12.5	0.016	0.026
12/30/2008 17:50	9885	12.5	0.016	0.026
12/30/2008 17:50	9886	12.5	0.016	0.026
12/30/2008 17:50	9887	12.5	0.016	0.027
12/30/2008 17:50	9888	12.5	0.016	0.026
12/30/2008 17:50	9889	12.5	0.017	0.026
12/30/2008 17:50	9890	12.5	0.017	0.027
12/30/2008 17:50	9891	12.5	0.017	0.027
12/30/2008 17:50	9892	12.5	0.016	0.026
12/30/2008 17:50	9893	12.5	0.016	0.026
12/30/2008 17:50	9894	12.5	0.016	0.026
12/30/2008 17:50	9895	12.5	0.016	0.026
12/30/2008 17:50	9896	12.5	0.018	0.026
12/30/2008 17:50	9897	12.5	0.016	0.026
12/30/2008 17:50	9898	12.5	0.016	0.027
12/30/2008 17:50	9899	12.5	0.017	0.026

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APPENDIX C

NOFOAM SYSTEM CONSTRUCTION DRAWINGS

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Arizona Air National Guard:

GENERAL NOTES

1. THIS DRAWING DEVELOPED TO PROVIDE FOAM-FREE DYE-WATER NOFOAM SYSTEM WITH RETROFIT MODULES ON AIRCRAFT HANGAR FIRE SUPPRESSION FOAM SYSTEM.
2. WHEN OR WHERE ANY PARTICULAR MAKE OR MANUFACTURE OF MATERIAL IS SPECIFIED, IT IS NOT THE INTENT OF THIS DRAWING TO EXCLUDE OTHER PRODUCTS IF OF EQUAL MERIT, PROVIDED ENGINEERING APPROVAL IS OBTAINED.
3. PIPING AND COMPONENTS SHALL BE FREE OF LOOSE PARTICLES.
4. PIPING AND COMPONENTS SHALL BE OPERATIONAL AND TIGHTNESS TESTED. NO LEAKS ALLOWED.
5. ALL DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
6. DIMENSIONAL TOLERANCES ARE AS FOLLOWS:
   FRACTION – ±1/64 INCH
   ANGULAR – ± 0° – 30'
   FILLET AND ROUND – 1/8R
7. ALL WELDING SHALL BE IN ACCORDANCE WITH LOCAL INSTRUCTIONS AND PROCESSES.
8. ANTI SEIZE TAPE THREAD SEALANT CONTAINING TFE (OR EQUAL) SHALL BE USED ON ALL PIPE THREADED FITTINGS.
9. APPLY GENEROUS AMOUNT OF SILICONE GREASE TO ALL RUBBER GASKETS, O-RINGS, AND TRANSDUCER TO PIPE DURING ASSEMBLY.
10. ALL WIRES SHALL BE 16 GAGE UNLESS OTHERWISE NOTED.
11. ALL EXISTING COMPONENTS REMOVED AND NOT USED FOR RE-INSTALLATION SHALL BE TURNED -OVER TO THE ACTIVITY.
12. BALL VALVE SOURCE OF PROCUREMENT ARE AS FOLLOWS:
    AKRON BRASS CO.
    P.O. BOX 86
    WOOSTER, OH 44691
    (800) 228-1161, EXTN 7023, FAX (800) 531-7335
13. VICTAULIC FITTINGS SOURCE OF PROCUREMENT ARE AS FOLLOWS:
    FERGUSON ENTERPRISE, INC.
    4374 TRANSPORT ST
    VENTURA, CA 93003
    (805) 644-8871, FAX (805) 642-6113
    VICTAULIC
    20934 SOUTH SANTA FE AVE
    LONG BEACH, CA 90810
    (310) 537-1691, FAX (310) 537-9536
    VICTAULIC
    4901 KESSLERSVILLE RD
    EASTON, PA 18040
    (610) 559-3300, FAX (610) 250-8817
14. ULTRASONIC FLOW SENSOR SOURCE OF PROCUREMENT IS AS FOLLOWS:
    DYNASONICS
    8635 WASHINGTON AVE
    RACINE, WI 53406
    (800) 535-3569, FAX (800) 732-8354
    (262) 639-5770, FAX (262) 639-2267
    www.dynasonics.com
15. DATA LOGGER SOURCE OF PROCUREMENT IS AS FOLLOWS:
    CAMPBELL SCIENTIFIC, INC.
    815 WEST 1800 NORTH
    LOGAN, UT 84321-1784
    (435) 750-9602

REVISIONS

SHEET	LTR	DESCRIPTION	DATE	APPROVED

NO.	TITLE	MANUAL NO.
5		
4		
3		
2		
1	COMPOSITE AIRCRAFT MAINTENANCE HANGAR FIRE PROTECTION DIAGRAM, DATED 1 NOV 1988	FP-1, FP-2, FP-3, FP-4, FP-5 (SHEET 55-59)

REFERENCES

NAVFAC ENGINEERING SERVICE CENTER PORT HUENEME, CA 93043-4370 FSCM NO. 80091

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ALEXANDRIA, VA 22332-2300

DRAWN	DATE
RTK	8288
CHECK	
DESIGN	
DESIGN ACTIVITY	
CUSTOMER	

AIRCRAFT HANGAR
NOFOAM SYSTEM
NAVFAC ESC MODULES

SIZE	FSCM NO.	DWG NO.	REV
B		421HANGAR01	–

SCALE NONE | RTK-0019 | SHEET 001a

–	–	–	–	–	REV	REV STATUS OF SHEETS
5	4	3	2	1	SHEET	

MECHANICAL LIST OF MATERIAL (QUANTITY FOR ARIZONA AIR NATIONAL GUARD)

ITEM NO.	QTY	DESCRIPTION	MFG	PART OR IDENTIFYING NO.	
1	1	2-1/2"IPS NIPPLE X 48" LONG – MPT X VICTAULIC, 316L SS, SCHD 40S			
2	1	2-1/2"IPS BALL VALVE – VICTAULIC X VICTAULIC, BRONZE, 250 PSI	AKRON BRASS	8825-V1S-V1S-TS	SEE GENL NOTE 12.
3	1	2-1/2"IPS NIPPLE X 10" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
4	1	AFFF TEE ASSEMBLY		SHEET 007c1	
A	1	2-1/2"IPS NIPPLE X 14-1/2" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
B	1	2-1/2"IPS NIPPLE X 4-5/8" LONG – BW X VICTAULIC, 316L SS, SCHD 40S			
C	1	1-1/2"IPS NIPPLE X 5" LONG – BW X VICTAULIC, 316L SS, SCHD 40S			
5	1	2-1/2"IPS NIPPLE X 3-1/4" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
6	1	2-1/2"IPS BALL VALVE – VICTAULIC X VICTAULIC, BRONZE, 250 PSI	AKRON BRASS	8825-V1S-V1S-TS	SEE GENL NOTE 12.
7	1	1-1/2"IPS BALL VALVE – FPT X VICTAULIC, BRONZE, 250 PSI	AKRON BRASS	8815-P1S-V1S-TS	SEE GENL NOTE 12.
8	1	1-1/2" CAM LOCK ADAPTER, BRASS, 250 PSI		TYPE – F	
9	1	1-1/2" CAM LOCK DUST CAP, BRASS, 250 PSI		TYPE –DC	
10	1	1" DIA SPLIT RING, 304 SS			
11	8"	SINGLE JACK CHAIN, SIZE 14, BRASS			
12	1	2-1/2"IPS 90 DEGREE LONG TURN ELBOW – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S	VICTAULIC		SEE GENL NOTE 13.
13	1	WATER TEE ASSEMBLY		SHEET 007c1	
A	1	2-1/2"IPS NIPPLE X 11-3/4" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
B	1	2-1/2"IPS NIPPLE X 4-5/8" LONG – BW X VICTAULIC, 316L SS, SCHD 40S			
14	1	2-1/2"IPS NIPPLE X 36" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
15	1	2-1/2"IPS BALL VALVE – VICTAULIC X VICTAULIC, BRONZE, 250 PSI	AKRON BRASS	8825-V1S-V1S-TS	SEE GENL NOTE 12.
16	1	2-1/2"IPS NIPPLE X 29-7/8" LONG – VICTAULIC X VICTAULIC, 316L SS, SCHD 40S			
17	4	2-1/2"IPS VICTAULIC FLEXIBLE COUPLING, STYLE 75, STEEL, PAINTED	VICTAULIC	WITH "T" GASKET	SEE GENL NOTE 13.
18	5	2-1/2"IPS VICTAULIC RIGID COUPLING, STYLE 07, STEEL, PAINTED	VICTAULIC	WITH "T" GASKET	SEE GENL NOTE 13.
19	1	1-1/2"IPS VICTAULIC RIGID COUPLING, STYLE 07, STEEL, PAINTED	VICTAULIC	WITH "T" GASKET	SEE GENL NOTE 13.
20					
21					
22					
23					
24					
25	1	CR3000 MICROLOGGER, WITH RECHARGEABLE BATTERIES & AC ADAPTER	CAMPBELL SCIENTIFIC INC.		SEE GENL NOTE 15.
26	12	ULTRASONIC TRANSIT TIME FLOW METER, AC POWER INPUT, NEMA 3,	DYNASONICS	DTFXL2-XA1-NN	SEE GENL NOTE 14.
		4-20 mA, RATE & TOTALIZER LCD DISPLAY			
27	12	TRANSDUCER, 20 FEET CABLE, BARE RG59 CABLE	DYNASONICS	DTTN-020-N000-F	SEE GENL NOTE 9 & 14.
28	12	WALL TRANSFORMER POWER SUPPLY	DYNASONICS	D0005-2502-009	SEE GENL NOTE 14.

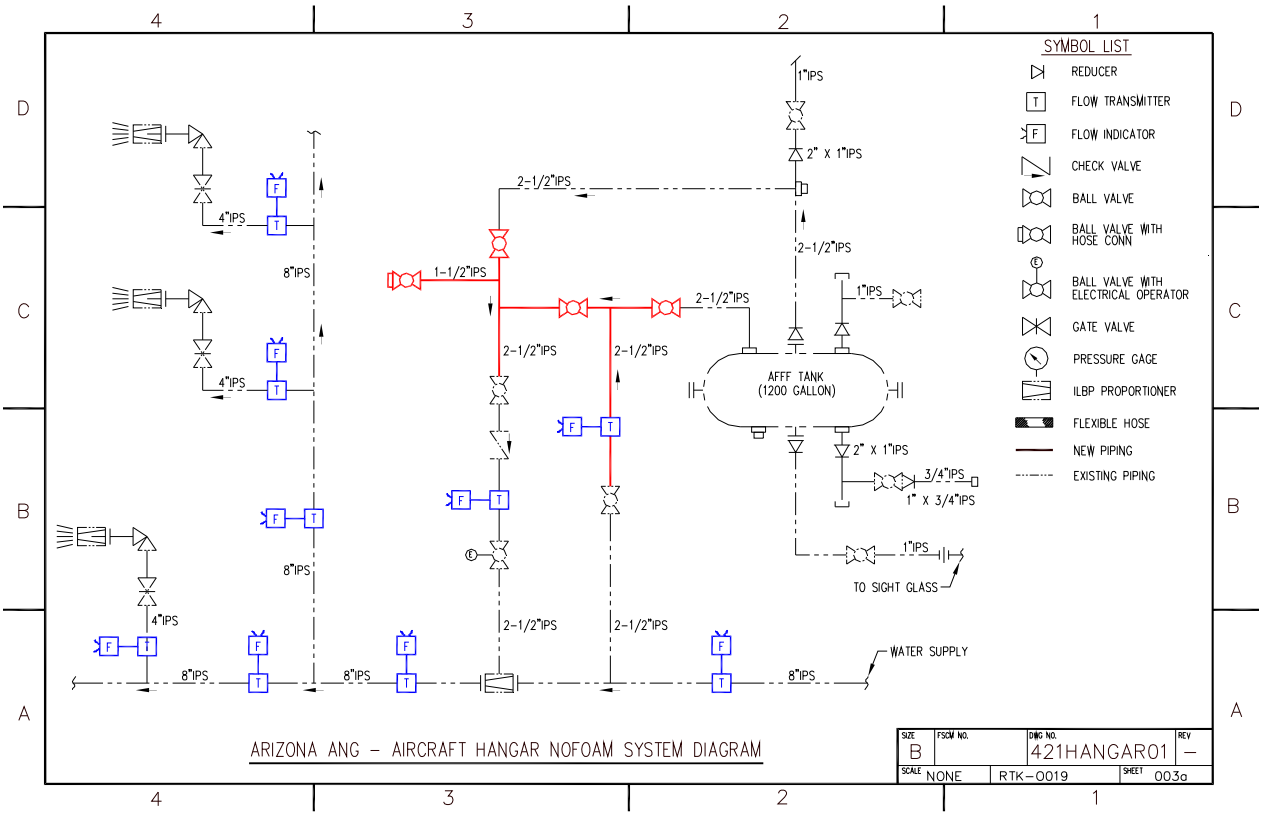
CONTINUED ON SHEET 4

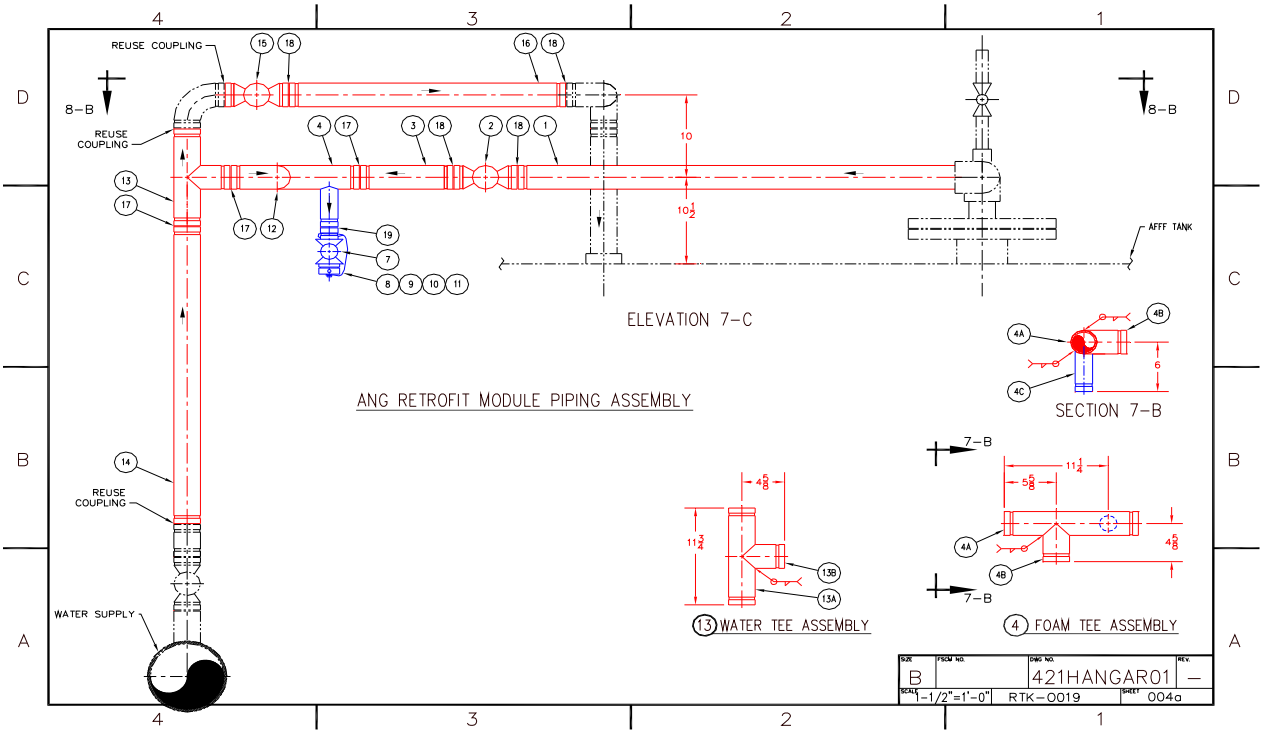
REVISIONS

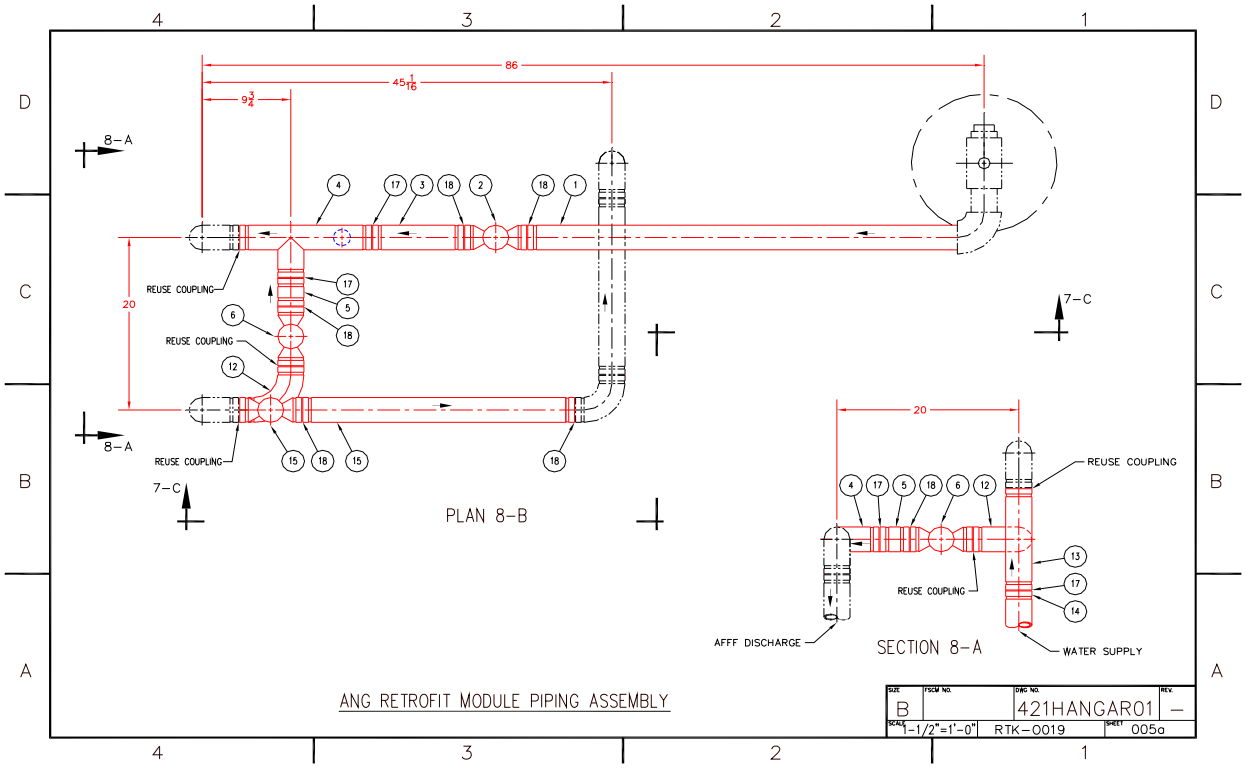
SHEET	LTR	DESCRIPTION	DATE	APPROVED

SIZE	FSCM NO.	DWG NO.	REV
B		421HANGAR01	–

SCALE NONE | RTK-0019 | SHEET 002a







Marine Corps Base Hawaii:

MECHANICAL PARTS LIST

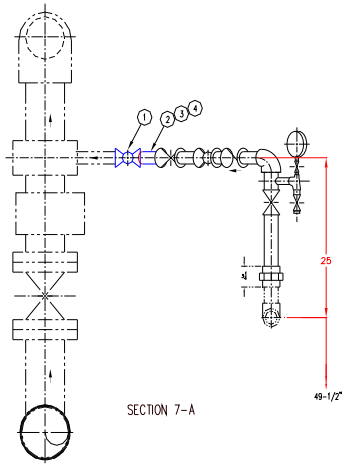
ITEM NO.	QTY	DESCRIPTION	MFG	PARTS OR IDENTIFYING NO.
1	1	1-1/2"FPT BALL VALVE, BRONZE, 250 LBS	AKRON BRASS	8815-P1S-P1S-TS GENL NOTE 12
2	1	1-1/2"MPT HOSE BARB, BRASS, 150 LBS		
3	1	1-1/2" NOMINAL HOSE CLAMP, 304 SS		
4	20 FT	1-1/2"ID POLYESTER BRAIDED-REINFORCED HOSE, CLEAR PVC, 100 LBS		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14	2	CR3000 MICRO LOGGER WITH RECHARGEABLE BATTERIES & AC ADAPTER	CAMPBELL SCIENTIFIC INC	GENL NOTE 15
15	6	ULTRASONIC TRANSIT TIME FLOW METER, AC POWER INPUT, NEMA 3, 4-20 mA, RATE & TOTALIZER LCD DISPLAY	DYNASONIC	DTFXL2-XAT-NN GENL NOTE 14
16	6	TRANSDUCER, 20 FEET CABLE LENGTH, BARE RG59 CABLE	DYNASONIC	DTTN-020-N00-F GENL NOTE 9 & 14
17	6	WALL TRANSFORMER POWER SUPPLY	DYNASONIC	D0005-2502-009 GENL NOTE 14
18	100 FT	INDOOR/OUTDOOR CABLE, 18 GAUGE X 2 CONDUCTOR, RED & BLACK, BLACK PVC JACKET	BELDEN	5300F1 GENL NOTE 16
19				
20				
21				

REVISION

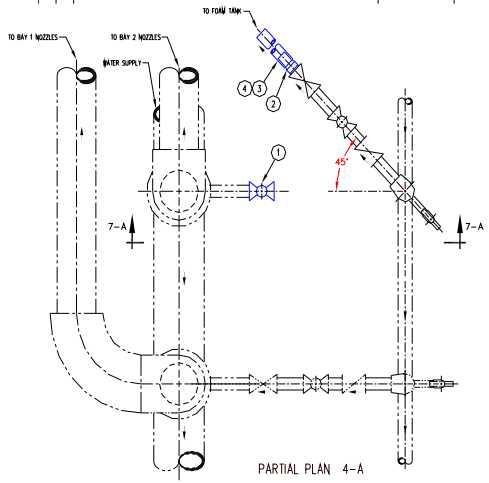
ZONE	LTR	DESCRIPTION	DATE	APPROVED

GENERAL NOTES

1. THIS DRAWING DEVELOPED TO PROVIDE FOAM-FREE DYE-WATER NOFOAM SYSTEM WITH RETROFIT MODULES ON AIRCRAFT HANGAR FIRE SUPPRESSION FOAM SYSTEM.
2. WHEN OR WHERE ANY PARTICULAR MAKE OR MANUFACTURE OF MATERIAL IS SPECIFIED, IT IS NOT THE INTENT OF THIS DRAWING TO EXCLUDE OTHER PRODUCTS IF OF EQUAL MERIT, PROVIDED ENGINEERING APPROVAL IS OBTAINED.
3. PIPING AND COMPONENTS SHALL BE FREE OF LOOSE PARTICLES.
4. PIPING AND COMPONENTS SHALL BE OPERATIONAL AND TIGHTNESS TESTED. NO LEAKS ALLOWED.
5. ALL DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
6. DIMENSIONAL TOLERANCES ARE AS FOLLOWS:
   FRACTION - ± 1/64 INCH
   ANGULAR - ± 0 - 30'
   FILLET AND ROUND - ± 1/8R
7. ALL WELDING SHALL BE IN ACCORDANCE WITH LOCAL INSTRUCTIONS AND PROCESSES.
8. ANTI SEIZE TAPE THREAD SEALANT CONTAINING TFE (OR EQUAL) SHALL BE BE USED ON ALL THREADED FITTINGS.
9. APPLY GENEROUS AMOUNT OF SILICONE GREASE TO ALL RUBBER GASKETS, O-RINGS, AND TRANSDUCER COUPLINGS DURING PIPE ASSEMBLY.
10. ALL WIRES SHALL BE 18 GAUGE UNLESS OTHERWISE NOTED.
11. ALL EXISTING COMPONENTS REMOVED AND NOT USED FOR RE-INSTALLATION SHALL BE TURNED OVER TO THE FACILITY.
12. BALL VALVE SOURCE OF PROCUREMENT IS AS FOLLOWS:
    AKRON BRASS CO.
    P.O. BOX 86
    WOOSTER, OH 44691
    (800) 228-1161, EXT# 7023, FAX (800) 531-7335
13. VICTAULIC FITTINGS SOURCE OF PROCUREMENT ARE AS FOLLOWS:
    FERGUSON ENTERPRISE, INC.
    4374 TRANSPORT ST
    VENTURA, CA 93003
    (805) 644-8871, FAX (805) 642-6113
    VICTAULIC
    20934 SOUTH SANTA FE AVE
    LONG BEACH, CA 90810
    (310) 537-1691, FAX (310) 537-9536
    VICTAULIC
    4001 KESSLERVILLE RD
    EASTON, PA 18040
    (610) 559-3300, FAX (610) 250-8817
14. ULTRASONIC FLOW SENSOR SOURCE OF PROCUREMENT IS AS FOLLOWS:
    DYNASONICS
    8635 WASHINGTON AVE
    RACINE, WI 53406
    (262) 639-5770, FAX (262) 639-2267
    www.dynasonics.com
15. DATA LOGGER SOURCE OF PROCUREMENT IS AS FOLLOWS:
    CAMPBELL SCIENTIFIC, INC
    815 WEST 1800 NORTH
    LOGAN, UT 84321-1784
    (435) 750-9602
16. INDOOR/OUTDOOR CABLE SOURCE OF PROCUREMENT IS AS FOLLOWS:
    ANIXTER
    4464 WILLOW RD, SUITE 101
    PLEASANTON, CA 94588
    (510) 489-7100
    www.belden.com
17. REFERENCES
    A) NAVFAC DRAWING NO. 7082879, SHEET 72 OF 110, MECHANICAL LEGEND AND SYMBOLS
    B) NAVFAC DRAWING NO. 7082884, SHEET 77 OF 110, DETAIL FLOOR PLAN
    C) NAVFAC DRAWING NO. 7082888, SHEET 78 OF 110, MECHANICAL EQUIPMENT ROOM, MEZZANINE PLAN, FIRE PROTECTION PIPING DIAGRAM



SECTION 7-A



PARTIAL PLAN 4-A

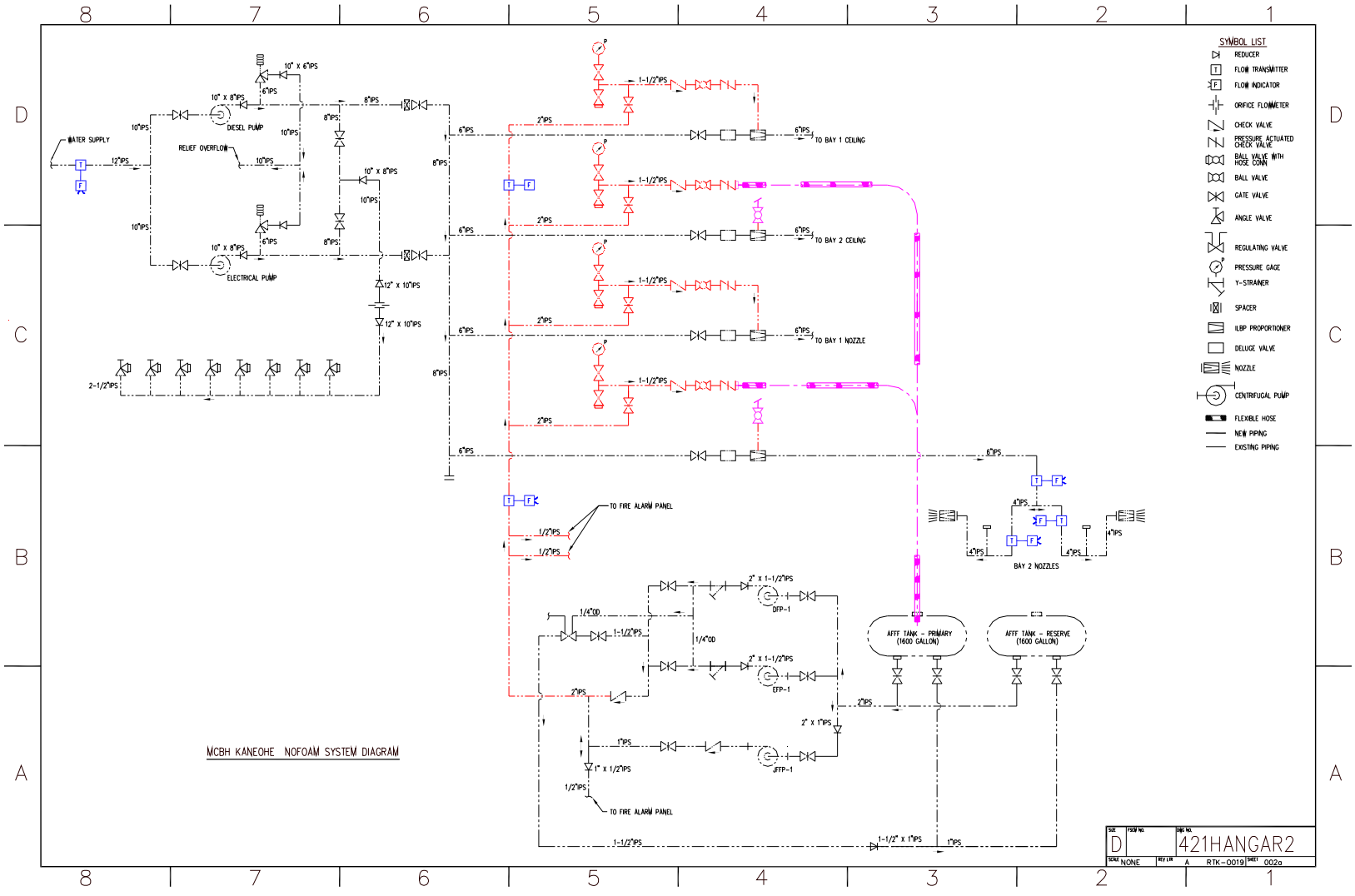
CORROSION CONTROL HANGAR RETROFIT MODULE PIPING ASSEMBLY
MCB HAWAII - PUMP ROOM - RISER BAY 2 NOZZLE MODIFICATION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ALEXANDRIA, VA 22332-2300

AIRCRAFT HANGAR
NOFOAM SYSTEM
NAVFAC ESC RETROFIT

DRAWN	DATE
RTK	2109

SIZE D | FSCM NO. | DWG NO. 421HANGAR02 | REV -
SCALE 3/4"=1'-0" | RTK - 0019 | SHEET 001a



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APPENDIX D

P2/FINANCE

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P2/FINANCE Title-pg1
Version 3.0

October 2009

PROJECT TITLE: NoFoam System Aircraft Hanagr Fire Suppression Foam System

PREPARED BY: Rance T. Kudo

ORGANIZATION: NAVFAC Engineering Service Center

COMMENTS: Assumptions:

1. Discount Rate = 2.5%
2. NoFoam System Study Period = 15 years
3. Based on 6-flow meter and retrofit module
4. Based on annual nozzle discharge checks

P2/FINANCE

Pollution Prevention Financial Analysis
and Cost Evaluation System

Version 3.0

Tellus Institute
Boston, MA

DEFAULT PARAMETERS

Global Parameters

P2/FINANCE uses the Inflation Rate, Discount Rate, and Income Tax Rate entered here for calculations on the Tax Deduction Schedule, Incremental Cash Flow Analysis, and Incremental Profitability Analysis sheets.

Inflation reflects the overall rate at which you expect prices to increase. For cases in which this Inflation Rate does not fully capture expected price changes, P2/FINANCE allows you to define an additional Escalation Rate for each Annual Operating Cost category.

Inflation Rate	0.0%

The Discount Rate accounts for the fact that there is an opportunity cost to using money -- if you choose to invest in one project, you lose the opportunity to gain a return on another investment. Many companies use their weighted average cost of capital as a Discount Rate. For more information on Discount Rate and its relationship to inflation, see the on-line help.

Discount Rate	2.5%

State and local income taxes are deductible from the taxable income used to calculate federal taxes. Enter your Local, State, and Federal Income Tax Rates below, and P2/FINANCE will calculate an Aggregate Income Tax Rate.

Local Income Tax Rate	0.0%
State Income Tax Rate	0.0%
Federal Income Tax Rate	0.0%
Aggregate Income Tax Rate	0.0%

The Default Parameters entered by the user in this section can be applied to the entire project file by pressing the button below. Do not press this button unless you are sure that you want these values to apply to the entire project file!

P2/FINANCE uses the Depreciation Method and Period entered here as defaults for all Initial Investment Costs. You can change the Depreciation Method and Period for individual categories on the Initial Investment Costs sheet.

Depreciation Method	wc
Depreciation Period	0.0

To specify Depreciation Method, use these abbreviations:

Straight Line	SL
150% Declining Balance switching to Straight Line	1.5DB
200% Declining Balance switching to Straight Line	DDB or 2DB
Expensed (tax deductible in the first year)	EXP
Working Capital (not tax deductible)	WC

The Default Parameters entered by the user in this section can be applied to the entire project file by pressing the button below. Do not press this button unless you are sure that you want these values to apply to the entire project file!

Scenario Parameters

P2/FINANCE allows you to create two alternative financial analysis scenarios, which represent different investment options you are considering. You can also create a baseline scenario, which contains data on your current "business-as-usual" operations. On the Incremental Cash Flow Analysis and the Incremental Profitability Analysis sheets, the Alternative Scenarios are compared to the Base Scenario, i.e., P2/FINANCE calculates incremental cash flows and profitability.

The Investment Year and Lifetime entered here are used as defaults for both Initial Investment Costs and Annual Operating Costs. P2/FINANCE assumes that investments occur AT THE END OF THE INVESTMENT YEAR, so the default Start Year for Annual Operating Costs is Investment Year + 1. The most common Investment Year will be Year 0, i.e., most Initial Investment Costs are incurred at the very beginning of the project lifetime.

Alternative Scenario 1

Name	NoFoam System		
Inv. Year	0	Lifetime	15
Start Year	1	End Year	15

Alternative Scenario 2

Name	NA		
Inv. Year	0	Lifetime	10
Start Year	1	End Year	10

Base Scenario

Name	Current Practice - aircraft hangar		
Inv. Year	0	Lifetime	15
Start Year	1	End Year	15

INITIAL INVESTMENT COSTS - Alternative Scenario 1

Alternative Scenario 1: NoFoam System | October 2009 | Inv-Alt1-pg1

Initial Investment Costs	$ Amount	Initial Investment Costs	$ Amount

Purchased Equipment (Purchase, Tax, Delivery)

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
NoFoam System: 6-flow meter, data logger, retrofit module			$17,000
Salvage Value		TOTAL	$17,000

Utility Connections/Systems

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Planning/Engineering (Labor, Materials)

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Site Preparation (Labor, Materials)

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Construction/Installation (Labor, Materials)

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Retrofit module installation, 6-flow meter			$1,600
Salvage Value		TOTAL	$1,600

Start-up/Training (Labor, Materials)

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
NoFoam System operation			$800
Salvage Value		TOTAL	$800

Permitting

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Buildings & Land

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Working Capital

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Contingency

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Inv-Alt1-pg2

Other

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Other

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Other

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Other

Dep. Method	wc	Investment Year	0
Dep. Period	0.0	Lifetime	15
Salvage Value		TOTAL	$0

Enter costs as positive values and revenues as negative values.

ANNUAL OPERATING COSTS - Alternative Scenario 1

Alternative Scenario 1: NoFoam System | October 2009 | Op-Alt1-pg1

Annual Operating Costs	$ Amount
Direct Materials (Purchase, Delivery, Storage)	
Escalation Rate 0.0%	Start Year 1 / End Year 15
AFFF concentrate	$0
TOTAL	$0
Direct Labor (Wage/Salary, Benefits)	
Escalation Rate 0.0%	Start Year 1 / End Year 15
Operating: aircraft hangar annual discharge check	$1,600
TOTAL	$1,600
Regulatory Compliance (Labor, Materials) #1	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0
Product Quality (Labor, Materials)	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0
Revenues - By-product	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0

Annual Operating Costs	$ Amount
Utilities	
Escalation Rate 0.0%	Start Year 1 / End Year 15
Water	$1,000
TOTAL	$1,000
Waste Management (Labor, Materials)	
Escalation Rate 0.0%	Start Year 1 / End Year 15
AFFF wastewater disposal	$0
TOTAL	$0
Regulatory Compliance (Labor, Materials) #2	
Escalation Rate 0.0%	Start Year 1 / End Year 15
Audits	$4,000
Reports	$4,000
Overhead	$4,000
TOTAL	$12,000
Revenues - Product	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0
Insurance	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0

Op-Alt1-pg2

Future Liability	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0
Other	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0

Other	
Escalation Rate 0.0%	Start Year 1 / End Year 15
Equipment maintenance	$200
Training operators	$100
TOTAL	$300
Other	
Escalation Rate 0.0%	Start Year 1 / End Year 15
TOTAL	$0

ANNUAL OPERATING COSTS - Base Scenario

Base Scenario: Current Practice - aircraft ha October 2009 Op-Base-pg1

Annual Operating Costs	$ Amount

Direct Materials (Purchase, Delivery, Storage)

Escalation Rate 0.0% Start Year 1
End Year 15

AFFF concentrate	$4,632
TOTAL	$4,632

Utilities

Escalation Rate 0.0% Start Year 1
End Year 15

Water	$1,000
TOTAL	$1,000

Direct Labor (Wage/Salary, Benefits)

Escalation Rate 0.0% Start Year 1
End Year 15

Operating: aircraft hangar annual	$1,600
TOTAL	$1,600

Waste Management (Labor, Materials)

Escalation Rate 0.0% Start Year 1
End Year 15

AFFF wastewater disposal	$50,000
TOTAL	$50,000

Regulatory Compliance (Labor, Materials) #1

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Regulatory Compliance (Labor, Materials) #2

lation Rate 0.0% Start Year 1
End Year 15

Audits	$4,000
Reports	$4,000
Overhead	$4,000
TOTAL	$12,000

Product Quality (Labor, Materials)

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Revenues - Product

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Revenues - By-product

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Insurance

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Op-Base-pg2

Future Liability

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Other

Escalation Rate 0.0% Start Year 1
End Year 15

Equipment maintenance	$200
Training operators	$100
TOTAL	$300

Other

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

Other

Escalation Rate 0.0% Start Year 1
End Year 15

TOTAL	$0

SCENARIO SUMMARY - Alternative Scenario 1

Alternative Scenario 1: NoFoam System | October 2009 | Summ-Alt1-pg1

INITIAL INVESTMENT COSTS	Cost	Salvage Value	Inv. Year	Lifetime	Depreciation Period	Depreciation Method
Purchased Equipment (Purchase, Tax, Delivery)	$17,000	$0	0	15	0	WC
Utility Connections/Systems	0	0	0	15	0	WC
Planning/Engineering (Labor, Materials)	0	0	0	15	0	WC
Site Preparation (Labor, Materials)	0	0	0	15	0	WC
Construction/Installation (Labor, Materials)	1,600	0	0	15	0	WC
Start-up/Training (Labor, Materials)	800	0	0	15	0	WC
Permitting	0	0	0	15	0	WC
Buildings & Land	0	0	0	15	0	WC
Working Capital	0	0	0	15	0	WC
Contingency	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC

ANNUAL OPERATING COSTS	Cost	Start Year	End Year	Escalation
Direct Materials (Purchase, Delivery, Storage)	$0	1	15	0.0%
Utilities	1,000	1	15	0.0%
Direct Labor (Wage/Salary, Benefits)	1,600	1	15	0.0%
Waste Management (Labor, Materials)	0	1	15	0.0%
Regulatory Compliance (Labor, Materials) #1	0	1	15	0.0%
Regulatory Compliance (Labor, Materials) #2	12,000	1	15	0.0%
Product Quality (Labor, Materials)	0	1	15	0.0%
Revenues - Product	0	1	15	0.0%
Revenues - By-product	0	1	15	0.0%
Insurance	0	1	15	0.0%
Future Liability	0	1	15	0.0%
Other	300	1	15	0.0%
Other	0	1	15	0.0%
Other	0	1	15	0.0%

GLOBAL PARAMETERS		SCENARIO PARAMETERS	
Project Title: NoFoam System Aircraft Hanagr Fire Suppression Foam System			
Inflation Rate	0.0%	Default Investment Year	0
Discount Rate	2.5%	Default Lifetime	15
Aggregate Income Tax Rate	0.0%	Default Start Year	1
Default Depreciation Method	wc	Default End Year	15
Default Depreciation Period	0		

SCENARIO SUMMARY - Base Scenario

Base Scenario: Current Practice - aircraft hangar | October 2009 | Summ-Base-pg1

INITIAL INVESTMENT COSTS	Cost	Salvage Value	Inv. Year	Lifetime	Depreciation Period	Depreciation Method
Purchased Equipment (Purchase, Tax, Delivery)	$0	$0	0	15	0	WC
Utility Connections/Systems	0	0	0	15	0	WC
Planning/Engineering (Labor, Materials)	0	0	0	15	0	WC
Site Preparation (Labor, Materials)	0	0	0	15	0	WC
Construction/Installation (Labor, Materials)	0	0	0	15	0	WC
Start-up/Training (Labor, Materials)	0	0	0	15	0	WC
Permitting	0	0	0	15	0	WC
Buildings & Land	0	0	0	15	0	WC
Working Capital	0	0	0	15	0	WC
Contingency	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC
Other	0	0	0	15	0	WC

ANNUAL OPERATING COSTS	Cost	Start Year	End Year	Escalation
Direct Materials (Purchase, Delivery, Storage)	$4,632	1	15	0.0%
Utilities	1,000	1	15	0.0%
Direct Labor (Wage/Salary, Benefits)	1,600	1	15	0.0%
Waste Management (Labor, Materials)	50,000	1	15	0.0%
Regulatory Compliance (Labor, Materials) #1	0	1	15	0.0%
Regulatory Compliance (Labor, Materials) #2	12,000	1	15	0.0%
Product Quality (Labor, Materials)	0	1	15	0.0%
Revenues - Product	0	1	15	0.0%
Revenues - By-product	0	1	15	0.0%
Insurance	0	1	15	0.0%
Future Liability	0	1	15	0.0%
Other	300	1	15	0.0%
Other	0	1	15	0.0%
Other	0	1	15	0.0%

GLOBAL PARAMETERS		SCENARIO PARAMETERS	
Project Title: NoFoam System Aircraft Hanagr Fire Suppression Foam System			
Inflation Rate	0.0%	Default Investment Year	0
Discount Rate	2.5%	Default Lifetime	15
Aggregate Income Tax Rate	0.0%	Default Start Year	1
Default Depreciation Method	wc	Default End Year	15
Default Depreciation Period	0		

TAX DEDUCTION SCHEDULE
Alternative Scenario 1

Alternative Scenario 1: NoFoam System | October 2009 | Tax-Alt1-pg1 | Tax-Alt1-pg2

Operating Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Depreciable Initial Investment Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Expensed Initial Investment Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Working Capital Initial InvestmentCosts	19,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Initial Investment Costs	19,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

For each category, the top line indicates the tax deduction taken in that year, including expensed items and depreciation. The bottom line tracks the Initial Investment Costs for all categories, plus the Remaining Book Value for depreciable categories.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Purchased Equipment (Purchase, Tax, Delivery) (WC)																
Initial Investment Cost and Remaining Book Value	17,000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Utility Connections/Systems (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Planning/Engineering (Labor, Materials) (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Site Preparation (Labor, Materials) (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Construction/Installation (Labor, Materials) (WC)																
Initial Investment Cost and Remaining Book Value	1,600	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Start-up/Training (Labor, Materials) (WC)																
Initial Investment Cost and Remaining Book Value	800	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Permitting (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Buildings & Land (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Working Capital (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Contingency (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Other (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Other (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Other (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Other (WC)																
Initial Investment Cost and Remaining Book Value	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Total Depreciation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Expensed Initial Investment Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Taxable Gain (Loss) on Salvaged Equipment		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Tax Deductions		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INCREMENTAL CASH FLOW ANALYSIS

Alternative Scenario 1 vs. Base Scenario

Analysis Name: NoFoam System Aircraft Hanagr Fire Suppression Foam Syst October 2009 — Cash Flow-Alt1 v. Base-pg.1 — Cash Flow-Alt1 v. Base-pg.2

Operating Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
INCREMENTAL INITIAL INVESTMENT COSTS																
Purchased Equipment (Purchase, Tax, Delivery)	17,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utility Connections/Systems	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Planning/Engineering (Labor, Materials)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Site Preparation (Labor, Materials)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction/Installation (Labor, Materials)	1,600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start-up/Training (Labor, Materials)	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Permitting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings & Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Initial Investment Costs	19,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCREMENTAL ANNUAL OPERATING (COSTS)/SAVINGS																
Direct Materials (Purchase, Delivery, Storage)		4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632
Utilities		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Direct Labor (Wage/Salary, Benefits)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Management (Labor, Materials)		50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Regulatory Compliance (Labor, Materials) #1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regulatory Compliance (Labor, Materials) #2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Quality (Labor, Materials)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Revenues - Product		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Revenues - By-product		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insurance		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Liability		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Annual Operating (Costs)/Savings		54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632
INCREMENTAL TAX CALCULATION																
Annual Operating (Costs)/Savings		54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632
- Depreciation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Expensed Initial Investment Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Taxable Gain (Loss) on Salvaged Equipment		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxable Income		54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632
Income Tax at 0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCREMENTAL CASH FLOW CALCULATION																
Annual Operating (Costs)/Savings		54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632
- Income Tax		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Initial Investment Costs	19,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Recovery of Working Capital		0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,400
+ Salvage Value		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
After-Tax Cash Flow	(19,400)	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	54,632	74,032
Cumulative Cash Flow	(19,400)	35,232	89,864	144,496	199,128	253,760	308,392	363,024	417,656	472,288	526,920	581,552	636,184	690,816	745,448	819,480
Discounted Cash Flow	(19,400)	53,300	52,000	50,731	49,494	48,287	47,109	45,960	44,839	43,745	42,678	41,637	40,622	39,631	38,665	51,117

INCREMENTAL PROFITABILITY ANALYSIS

P2/FINANCE calculates three indicators of profitability. (See on-line help for more detailed descriptions.)

Net Present Value (NPV), the most reliable indicator, is the value in today's dollars of the discounted future savings of a project. A positive NPV indicates a profitable project. When considering multiple projects, the most profitable project has the highest NPV.

Internal Rate of Return (IRR) is the Discount Rate for which the NPV of a project would equal zero. An IRR greater than the Discount Rate indicates a profitable project. When considering multiple projects, the most profitable project usually, but not always, has the highest IRR. IRR cannot be calculated for some projects with irregular cash flows.

Discounted Payback is the time period within which the discounted future savings of a project repay the Initial Investment Costs. A shorter payback period often, but not always, indicates a more profitable project because Discounted Payback does not account for cash flows that occur after the payback period. Discounted Payback cannot be calculated for some projects.

P2/FINANCE provides four time horizons for calculating Net Present Value and Internal Rate of Return. P2/FINANCE automatically calculates the profitability over 5, 10, and 15 years. You may choose an optional fourth time horizon between 1 and 15 years.

Optional Time Horizon 1

This analysis calculates the incremental profitability of each Alternative Scenario relative to the Base Scenario.
Base Scenario: Current Practice - aircraft hangar

Net Present Value ($)

Scenario	Name	Years 0-5	Years 0-10	Years 0-15	Years 0- 1
Alternative Scenario 1	NoFoam System	234,411	458,743	670,414	33,900
Alternative Scenario 2	NA	#N/A	#N/A	#N/A	#N/A

Internal Rate of Return (%)

Scenario	Name	Years 0-5	Years 0-10	Years 0-15	Years 0- 1
Alternative Scenario 1	NoFoam System	281.3%	281.6%	281.6%	181.6%
Alternative Scenario 2	NA	#N/A	#N/A	#N/A	#N/A

Discounted Payback (years)

Scenario	Name	Payback
Alternative Scenario 1	NoFoam System	0.36
Alternative Scenario 2	NA	#N/A